

Financing Solar : Issues and challenges.

The Future of Solar Energy in India

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**INDIA DEVELOPMENT AND
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Financing Solar : background & learning's

- Background today for the conference in Gujarat , is that we are reaching one and half years of have completed 800 MW in Gujarat and several other states have followed in their PV programs.
- Let me start at the outset with many positive lessons that were learnt in the Gujarat schemes for financing .
- First and foremost the
 - i) feed in tariff system (fixed as against reverse bid's)
 - ii) secondly the front ending of the tariff and
 - iii) later a separate tariff for non accelerated depreciationwere great prospects for us to move forward with the solar program on a bankable basis.

Financing solar : today's approach : Case to Case study to bring out the bankability

- However long time has passed and many other states have tried to come up with their own solar PV initiatives e.g. A.P., Tamil Nadu, Punjab, Bihar, UP etc to name a few. We also have the REC scheme.
- This apart there are new generation captive projects in power shortage states, under the REC mechanism or RPO based projects .
- Going by the brief for today's discussion “ We lack a clear plan for the future of solar energy.” So I thought I could be of service by taking you a new generation of 5 case studies that will give you the case to case understanding of the bankability problems both related to financing as in debt financing or direct investment in PPA's we have come across. I had discussed & taken permission of my esteemed co-speaker to cover the micro approach to start with.

Financing solar : before the challenges lets have a Vision for the solar industry.

- However before we take you through the problems and challenges I thought it would be far more effective, if we can start with a vision and another success story.
- With a grand vision the obstacles will feel small otherwise they would be overbearing.
- So I would like to take you through another major initiative that has been taking place globally called Germany's Energiewende ("Energy Transition".)
- This second round initiative to boost renewable energy was sparked by Japan's Fukushima nuclear disaster on March 11,2011 where in June 2011, the German parliament voted to abolish nuclear power altogether.

Financing solar : Germany's Eneriewende: Lesson's learned so far ?

- In an article on 28th March 2013, by John Matthews of the Globalist he wrote "Perhaps the most significant aspect of the Energiewende (and of the years leading upto it) is the almost complete destruction of Germany's erstwhile power generation oligopoly. Over many years, four large firms had dominated it – E.ON, RWE, EnBW and Sweden's Vattenfall.
- By 2010, these four once mighty firms accounted for only 6.5% of electricity generated in Germany – with their role being supplemented by hundreds of local co-op, municipal and small scale producers that have sprung into existence. This is a democratization of economic power unprecedented in the industrial world.
- Within the next decade, Germany will have shifted from a coal and nuclear powered industrial economy with four large, centralized power producers to a thriving, decentralized system generating power from renewable sources all over the country.

Financing Solar : Case 1 as Neemach M.P. Pvt PPAProject Introduction



10 MW project. (umbrella project with expansion to 100 MW. PPA on Jan 14th 2013 and deadline financial year end)

☀ High solar radiation with more than 300 days of clear sun: solar radiation up to 6.2 kWh/sq.m.

☀ Off taker is a leading pvt. power trading company

☀ Tariff is Rs. 9.2 at the plant substation.

Financing Solar : Case 1 as Neemach M.P. Structuring

- Project is based on a 15 year PPA where the private power trading company will trade the power directly under open access to third parties.
- Trader will sell and re-cover the REC certificates.
- So the tariff of Rs. 9.2 is a risk hedged tariff offered by the power trading company.
- The payment guarantee by LC is 90 days, with three month notice.
- Project has invited interest in financing or co-developers and interest has been shown by both banks and co-developers based on attractive tariff and the location.
- Project was looking for insurance cover, for additional security for the recovery of the receivables. Effective bankability of the project would be their or let us say the "best" or insurance is if to have an REC price window for the years 2017 onwards Rs. 7 to 9 ??.

Financing : Case study 2.

10 MW + in power short A.P.

- 17.2 million unit project in A.P. Golconda district is required to meet power short fall of a leading MNC company, Units will be procured with 20% variance.
- Tariff negotiated at MNC's substation is Rs. 5.5.
- REC benefits to accrue to developer or Rs. 14.5 is the potential recovery that is attractive till 2017.
- Please note implication of REC mechanism is that some of the incentives in A.P. like no wheeling charges etc, energy banking would not be applicable. Project would be located 1 km away so losses etc and other costs would be minimum.
- Again investors view is that the REC is not worth anything at this point and project has to sustained on Rs. 5.5 tariff with est. 4% losses & 30 to 35 paise wheeling charges.
- It is difficult for developers or bankers to take a call and project is looking for AD customer for viability at Rs. 5.5.

Financing solar :Case 3 : Rajasthan FIT Rs. 6.45

5.5 DC MW project in		Rajasthan Project	
	8.5 million units		Or 1.7 million units per MW AC side
Generation total		5.48 cr p.a.	
Land		.25	cr
Development charges		.75	Cr
		1.00	
Land & Dev cost per MW		0.20	cr per MW
EPC cost per MW		6.54	cr per MW
EPC cost 5.5 MW DC		36	cr
Total project Cost		37	cr total
Total project cost per MW		6.72	Cr per MW

Financing solar :

Case 3 : Rajasthan at 6.45 Rs. IRR workings.

Project Summary	5.5 MW DC
Gross Project IRR	14.30%
Net Project IRR after O&M, insurance & invertors replace.	11.90%
Net IRR including carbon	11.90%
Interest at 13%.	
Equity investment	14.80 cr
Equity IRR on cash flows	10.30%

Tariff Bid is set by AD benefit customer and difficult to justify at current levels. Suggests a need to segregate AD tariff as the rare AD bid can set low benchmark.

Case 4 : 5 MW RPO

customer in Chhattisgarh

- Customer is a large steel company and has RPO obligations and need 7.5 million units p.a. solar power.
- As against procuring REC's the customer strategy is to buy RPO power that maybe 30 to 40% cheaper.
- In July 2013 the buyer called for bids, due in Aug from various developers for a 5 MW project.
- Issues remain centered around the payment security and customer solvency. Market of 90 day LC is tough.
- Bids were received in the range of Rs. 8 to 9 with line losses, est. at 6% to the account of the developer.
- Need a dynamic open access regime to cater to power delivery at point to the customer, with clear policy.
- For the RPO model Rs. 6 to 7 , seems out of range at this point mostly due to open access considerations that are falling typically to the developer account but also module at 60 cent +, \$ 60 + upto 65 cents or 65 rs.

Case 5: Gujarat 5 MW, hedging cost's example hedged at Rs. 52 per US \$ in 2011

		Hedged
1	5/31/2013	55.39
2	11/30/2013	56.82
3	5/31/2014	58.36
4	11/30/2014	59.79
5	5/31/2015	61.41
6	11/30/2015	63.1
7	5/31/2016	64.82
8	11/30/2016	66.56

Case 5 : Gujarat 5 MW ECB , revenue from year 2 to year 5 at leverage US 11 Million is offset only by 1st years surplus.

Year 2 to 5 revenue	45.11 cr	3.32 cr total O&M
Net revenue	41.39 cr	
Debt + Int repayments	45.69 cr	fully hedged
Shortfall	-4.30 cr	
1 st year Balance in Escrow account is Rs. 4.4 cr		
Due to loan moratorium	0.10 cr	

Case study 5 : Gujarat refinancing requirement

- Developers need new colour of money including FDI & institutional players with strong balance sheets to re-finance the projects with fresh terms & tenures.
- Lock in terms of 1 year are reasonable or 2 years as in gujarat phase I projects, where 74% divesture allowed.
- However 5 years maybe a little harsh, as after first year most of the free cash flow comes after year 9, unless one can stretch the debt to 12 years.
- Stability of the tariff a must and recent petition of GUVNL can hurt confidence of investors in the sector as a whole, as it put into question the sanctity of the generic tariff order process. GERC to be congratulated for its timely decision to dismiss the petition which would have been an earthquake or Tsunami for the industry confidence.

Conclusions & Questions :

Utility scale

- REC mechanism & importance of RPO enforcement cannot be over emphasized for a robust green economy.
- Open access various charges to be clearly mandated in policy, transmission losses, wheeling, cross subsidy and electricity duty for RPO customers or for REC projects.
- The AD customer remains largely illusive and shows up sometimes in the last quarter of the year. Transfer mechanisms to foster such customer after COD, as merger is the only way a company can absorb AD.
- Non Recourse Debt remains difficult, Innovative financing through bridging is possible and investors can exit and recapitalize the projects by selling to next set of long term annuity investors ... Real Estate model.

Conclusions & Questions : Roof top scale.

1. Feels like industry may be moving from utility to roof top as per some global trends e.g. in the UK, going by the financing credit given to the industry. For e.g. in Gujarat roof top is the only real opportunity in the class of upto 100 KW. (to review conditions extended upto 500 Kw).
2. Also Encouraging the roof top model and removing cap's of 1 kw for personal use, net metering will create interesting opportunities for both financing and investment with new class retail investors & bankers just like in cars and homes.
For all categories utility scale, roof top & off grid lets make renewable energy not only a means for climate change and energy security but an engine for growth of SME industry and a means for counter cyclicity in a new emerging world.

Thank you very much

INDIA DEVELOPMENT & ENVIRONMENT
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IDEA has recently launched the incubation
of a pan India Solar PV initiative to provide
corporate financial and advisory consulting
services in this space

Siddharth Kohli , Managing Partner & CEO
ideagujarat@vsnl.net 98240 17302 (M)