



## VIEW POINT:

# Niche 25 MW to 50 MW multipurpose solar pv (low tariff) power project developments at every taluka of good solar irradiation states of India for energy security and food security

By Praveen Kumar Kulkarni

**“Sustainable Solar PV project development is a challenge and can be easily solved the following way if implemented in true spirit of Democracy with transparency”**

### We propose :

-A 25 to 50 MW of solar PV power project + Dry grain storage godown to store the dry food grains as per FCI guidelines + 1 MW Biomass power plant (in the 2nd phase depending upon biomass availability) at every taluka. + 5000 MT Cold Storage unit (in the 2nd Phase). The second phase items are intentionally kept out of scope of this article at present. However, there shall be land provision for the same to attract the people with such expertise for further sustainability with intrinsic value chain.

-Select the villages / Taluka where there is no electrification or no power in the existing grid for more than 4 hours/day from the grid line.

-Chain of substations for evacuation with new grid lines to be established along these 8 to 10 talukas by the State Government with ADB funding.

Proposed Business Model with an in principle policy support to attract Many Entrepreneurs in rural area with reduced overheads for a reduced tariff:

Assumptions for a 25 MW Solar PV power project as per CERC guide line on ROE, but, the rate of Interest for term loan (interest subsidy proposed) is assumed as 4% on rupee term and the loan term as 15 years. The results are tabulated to know the Cost of Generation (COG) and the IRR of 12% (mini) with a low tariff of Rs.5/kwh with a tariff escalation of 3% per year. Let the interested developers who can offer such business number can come forward so that the Nation gets benefitted. No further REC benefits etc shall be provided. This shall be a total cost to the government to buy the power as the interest subsidy is being proposed by us.

Instead of Viable Gap Funding or Capital Subsidy (due to failure of such capital subsidy for Biomass plants and to use the national wealth in a more effective way), we strongly propose an Interest subsidy to get the project interest at ONLY 4% (Fixed rupee term Interest rate). Let the Government form / raise the Clean tech fund and pay the Debt fund at this rate of Interest or let the promoters arrange the loan (from the Government designated or

nominated Banks or Institutions of INDIA or Abroad) and get the differential interest subsidy payable (from State of Centre Government with Escrow amount) per year against performance of the plant of having delivered the number of units as assumed! This will make the project developer to PERFORM else PERISH. If lesser energy generation, then, the interest payable shall be reduced. Thus, we do not subsidize the CAPEX and invite good quality players in Solar PV Power Generation. Let the developers hire competent EPC with good products within the Project Cost of Rs.8 Crore/MW. This can vary every year and CERC can furnish such guidelines on CAPEX from time to time and open the market and one need not waste time in reverse bidding, running around the ministers or Centre or State Government officers or such DISCOMs etc.

Let the Village Panchayat or Zilla Parishad (District), who want to have power generation in their district or village, come forward with land bank and attract the investors, thus, land acquisition problems can be reduced.

DISCOMS must buy at Rs.5/kwh with a PPA with 3% annual increment with a tripartite agreement and Assured Letter of Credit from the respective state government. This kind of PPA can be fixed for a year and let any developer come forward with a capacity capping per developer per year, otherwise, deep pocket people will only get richer. Government can promote local entrepreneurs through “Entrepreneur Funding” policy which is in the making for the further sustainability and for the local job creation at RURAL LEVEL. This will also ensure the common people to access low cost Solar PV power as early as possible. With the further drop of PV equipment price, the situation will improve further with good players and with more jobs, wealth creation and distribution for many Entrepreneurs, which is more democratic with transparency. Energy Access for ALL in true spirit.

Since the development of evacuation facility is with State Government, it must comply on time. Failure to do so, shall attract dismissal of the local officers or their team, thus, we make the local administration responsible. As the Village Panchayat and ZP are involved, the cable running in many farms will not be a problem and grid shall be ensured with redundancies to ensure power in the grid with a provision for Hybrid mix and future growth.

Local government involvement will make the people aware (expose) to elect their local representative in a better democratic environment. Land acquisition shall be through VP or ZP local administration as the developer need not run from pillar to post.

The expenses related to Taxes, duties, transmission costs etc shall not be loaded to the Developer and one can further

reduce the tariff. If the Income tax can be waived for Developers of Solar PV power project, the accelerated depreciation benefit

TARIFF TEMPLATE FOR : SOLAR PV POWER PROJECT						
S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Assumptions	
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	25	
			Capacity Utilization Factor (CUF)	%	19	
			Deration Factor	%	0	
			Useful Life	Years	25	
2	Project Cost		Capital cost / MW	Rs. Lacs/MW	800	
		Capital Cost / MW	Total Power Plant Cost	Rs. Lacs	20000	
3	Financial Assumptions		Tariff Period	Years	25	
		Debt : Equity	Debt	%	75	
			Equity	%	25	
			Total Debt Amount	Rs. Lacs	15000.00	
			Total Equity Amount	Rs. Lacs	5000.00	
		Debt Component	Loan Amount	Rs. Lacs	15000.00	
			Moratorium Period	Years	0	
			Repayment (Incl Moratorium)	Years	15	
			Rupee term Interest Rate for Term Loan	%	4	
		Equity Component	Equity Amount	Rs. Lacs	5000.00	
			Return on Equity for first 10 years	% p.a	19	
			RoE Period	Years	10	
			Return on Equity after 10 years	%	24	
			Weighted average of RoE	%	22	
Discount Rate (Equiv to WACC)	%		15.97			
4	Financial Assumptions	Economic Assumptions	Coal Price Escalation	% p.a	0	
			HSD Price Escalation	% p.a	0	
			Discount Rate	% p.a	15.97	
		Fiscal Assumptions	Income Tax	%	33.99	
			MAT Rate(for First-10 years)	%	16.995	
			80 IA Benefits	Yes / No	Yes	
		Depreciation	Depreciation Rate for first 10 years	%	6	
			Depreciation Rate 11th year onwards	%	1.33	
			Years for 7% Depreciation rate		10	
		5	Working Capital	For Fixed Charges	O & M Charges	Months
Maintenance Spare	(% of O & M Charges)				%	15
Receivables for Debtors	Months				2	
For Variable Charges	Interest on Working Capital			%	8	
7	Operation & Maintenance	Power Plant(FY 2010-11)	(Rs. Value per MW)		11	
		Power Plant(FY 2010-11)	(Rs. Value for total capacity/ MW)	Rs.Lacs	275	
		Total O & M Expenses Escalations	%	5.72		

game (which played havoc in Wind mill without sustainability) can be eliminated and the village level entrepreneurs with funding through national policy on entrepreneur funding can make way for many entrepreneurs for the local area sustainability with responsibility, thus, the project promoters will take pride in local area development. Thus, with detailed calculations shared, we can create good business case to develop local entrepreneurs with necessary support from large EPC companies to create good quality national assets. Thus, there will be a very good eco system by eliminating the project award to known coterie and then selling the equity to make money without executing the project or such corrupt practices during the award or sanctioning the project etc.... Thus, money is made available with necessary security, low cost debt fund (from donor or Kfw, IREDA etc) to reduce the tariff of Solar PV power.

Government can give a thought on this kind of business plan preparation with clarity on numbers for sustainability (for all RE resources) to attract SMALL entrepreneurs with mentoring, monitoring to create good quality national assets with real PPP model.

The numbers illustrated can be debated, discussed, improved and then made as a policy for a Financial year for quick development while the project allotment agencies must

facilitate for quick redressal of the project development, irrespective of which party in the ruling. Let the system work and not the politics, once, the policy with principles are decided with no payouts as the project allotment is open for the Project developers who can show the required credentials with good EPC company, Equity money in the bank with land arrangement with VP or ZP and then approach the State or Central government with good quality money with necessary RBI clearances. Thus, there won't be mad rush of applications, waiting for clearances from allotment department etc. There shall not be delay in sanctioning the debt fund as it shall be through FIs or Cleantech Fund with credit line secured well in advance as the CAPEX is fixed. Whatever savings on CAPEX, it is for the benefit of the Project Developer for their efficient project development and hence reduced interest burden. The company which comes up with lesser CAPEX or lesser loan amount, it shall be given first preference as there is no CAPEX subsidy. There will only be Interest subsidy and that too payable at the end of year after showing the generation performance and MUST be reimbursed to the developer within 15 days of such valid document submission or a LC can be ensured or an Escrow amount be kept.

**IMPORTANT NOTE: THE PROJECT DEVELOPERS WITH LESS EXPECTATIONS ON RETURN ON EQUITY WILL STAND BETTER CHANCE !**

Determination of Tariff Components: Solar

Cost / MW	800 Lakhs	Total Cost of Project	2000 Lakhs
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Units Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Installed Capacity	MW		25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Circle Generation (per MW)	MU	1.65	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	
Net Generation	MU		41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	

Fixed Cost	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O & M Expenses	Rs. Lakh	0.0572	275	280.75	307.36	334.94	343.52	362.28	381.95	405.94	429.13	453.68	479.62	507.06	536.07	566.73	599.15	633.42	669.65	707.95	748.45	791.28	836.52	884.37	934.95	988.43	1044.97
Depreciation	Rs. Lakh		1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00
Interest on Term Loan	Rs. Lakh	4	600.00	580.00	530.00	480.00	440.00	400.00	360.00	320.00	280.00	240.00	200.00	160.00	120.00	80.00	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Working Capital	Rs. Lakh		19.11	19.97	20.87	21.81	22.78	23.81	24.91	26.08	27.24	28.48	29.80	31.21	32.64	34.16	35.76	37.44	39.21	41.06	43.00	45.04	47.22	49.48	51.87	54.38	57.00
Return on Equity	Rs. Lakh		950.00	950.00	950.00	950.00	950.00	950.00	950.00	950.00	950.00	950.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00
<b>Total Fixed Cost</b>	<b>Rs. Lakh</b>		<b>3044.11</b>	<b>3020.71</b>	<b>2986.21</b>	<b>2956.75</b>	<b>2927.01</b>	<b>2898.06</b>	<b>2869.94</b>	<b>2842.57</b>	<b>2815.97</b>	<b>2790.13</b>	<b>2765.04</b>	<b>2740.70</b>	<b>2717.12</b>	<b>2694.29</b>	<b>2672.15</b>	<b>2650.70</b>	<b>2629.95</b>	<b>2609.90</b>	<b>2590.54</b>	<b>2571.88</b>	<b>2553.91</b>	<b>2536.63</b>	<b>2519.04</b>	<b>2502.14</b>	<b>2485.93</b>

Localized Tariff Corresponding to Useful Life

Per Unit Cost of Generation	Unit	Year-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O & M Expenses	Rs./kwh		0.66	0.70	0.74	0.78	0.82	0.86	0.90	0.94	1.00	1.06	1.12	1.20	1.27	1.35	1.44	1.53	1.63	1.71	1.80	1.90	2.02	2.15	2.29	2.38	2.52
Depreciation	Rs./kwh		2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89
Interest on Term Loan	Rs./kwh		1.45	1.35	1.25	1.16	1.06	0.96	0.87	0.77	0.67	0.58	0.48	0.39	0.29	0.19	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Working Capital	Rs./kwh		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Return on Equity	Rs./kwh		2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89	2.89
<b>Sub Total COG</b>	<b>Rs./kwh</b>		<b>7.94</b>	<b>7.88</b>	<b>7.82</b>																						
<b>Total COG</b>	<b>Rs./kwh</b>		<b>7.94</b>	<b>7.88</b>	<b>7.82</b>																						

Important Note : International Donor Organisation, Cleantech Promotion Organisations, Csr Believer Good Corporate Companies Can Manage With Irr Of 12% With A Good Business Case. The Dry Grain Storage, Biomass And Cold Storage Units With Their Separate P & L, Will

Improve Project Irr And Help In Inclusive Growth With Good Job Creation At Rural Area. (Tariff Cost Escalation Of 3% Per Year Is Illustrated For Irr Of 12%)

Determination of IRR and CASHFLOW

Capex/ MW 800 lakhs Total Cost of Project 2000 lakhs

Units Generation	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Installed Capacity	MW	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Units Generation (per MW)	000	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
Net Generation	000	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50

Revenue Cash In	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
tariff with 3% Escalation /yr	Rs. Lakhs	79,07,100	8,15,000	8,36,000	8,58,000	8,81,000	9,05,000	9,30,000	9,56,000	9,83,000	10,11,000	10,40,000	10,71,000	11,03,000	11,37,000	11,73,000	12,11,000	12,51,000	12,93,000	13,37,000	13,83,000	14,31,000	14,81,000	15,33,000	15,87,000	16,43,000	17,01,000
Revenue Cash In	Rs. Lakhs	20,95,000	2,11,25,000	2,20,12,000	2,29,43,000	2,39,19,000	2,49,40,000	2,60,06,000	2,71,17,000	2,82,73,000	2,94,74,000	3,07,20,000	3,20,11,000	3,33,47,000	3,47,28,000	3,61,54,000	3,76,25,000	3,91,41,000	4,07,02,000	4,23,08,000	4,39,59,000	4,56,55,000	4,74,06,000	4,92,11,000	5,10,71,000	5,29,85,000	5,49,53,000

Fixed Cost (Cash Out)	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Capex	Rs. Lakhs	2000																								
Interest on Term Loan	Rs. Lakhs	4	600,000	500,000	520,000	480,000	440,000	400,000	360,000	320,000	280,000	240,000	200,000	160,000	120,000	80,000	40,000	0	0	0	0	0	0	0	0	0
Insurance fee	Rs. Lakhs	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.11	1.23	1.36	1.50	1.65	1.81	1.98	2.16	2.35	2.55	2.76	2.98	3.21	3.45	3.70	3.96	4.23	4.51
Interest on Working Capital	Rs. Lakhs	19.12	19.97	20.81	21.63	22.44	23.23	24.01	24.78	25.54	26.29	27.03	27.76	28.48	29.19	29.89	30.58	31.26	31.93	32.59	33.24	33.88	34.51	35.13	35.74	36.34
Payment of Loan	Rs. Lakhs	2000.00	2000.00	1999.00	1998.00	1997.00	1996.00	1995.00	1994.00	1993.00	1992.00	1991.00	1990.00	1989.00	1988.00	1987.00	1986.00	1985.00	1984.00	1983.00	1982.00	1981.00	1980.00	1979.00	1978.00	1977.00
Total Fixed Cost	Rs. Lakhs	2004.12	1,601.17	1,501.00	1,401.00	1,301.00	1,201.00	1,101.00	1,001.00	901.00	801.00	701.00	601.00	501.00	401.00	301.00	201.00	101.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project Equity Cash Out	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Capex	Rs. Lakhs	2000																									
Accrued Income (Cumulative Income)	Rs. Lakhs	-600,000	-4,07,450	-3,92,450	-3,78,450	-3,64,450	-3,50,450	-3,36,450	-3,22,450	-3,08,450	-2,94,450	-2,80,450	-2,66,450	-2,52,450	-2,38,450	-2,24,450	-2,10,450	-1,96,450	-1,82,450	-1,68,450	-1,54,450	-1,40,450	-1,26,450	-1,12,450	-98,450	-84,450	
Project IRR based on w/y incomes		3000000	2095000	2111250	2201120	2267430	2310430	2405490	2477160	2531160	2608160	2678400	2752400	2830400	2912400	2998400	3088400	3182400	3280400	3382400	3488400	3598400	3712400	3830400	3952400	4078400	4212400
Project IRR based on yearly ACODES		12.14%																									

Project IRR based on Cumulative Income	12.14%
Total Investment	2000 lakhs
Debt	800 lakhs
Equity	1200 lakhs
Total Annual Income	9814

Total Project cost	2000 lakhs
Project Equity	1200 lakhs
EPC Costs	1700 lakhs
Loan tenure	15 years

Total Interest paid on Term loan	4000 lakhs	10 lakhs
Total Interest paid on WC for 25 years	84	100 lakhs



The author is a Gold Medalist from SLN College of Engineering, Gulbarga University. Industrial work experience over 23 years with PSU, MNCs. He had worked for: Tungabharda Steel Products Ltd, Hospet from 1988 to 1995. Executed engineering of 21 Hydro Mechanical Equipment projects. Deputed to Japan for 5 months as part of UNIDO program to become JICA participant-1994. He introduced CAD in TSPL with software programs for design of Gates, Hoists and Cranes. He was deputed to TSPL Hyderabad branch to assist business development of Steel Plant Equipments. With SMS Demag India Ltd, German MNC), he engineered Steel Melt Shop equipments of Jindal Vijay Nagar Steel Plant. Apart from being the Head of Secondary refining equipments viz. VD, VOD, RH, RHOB, SMS equipments, he supported the pre-bid and business development activities thru ICB of SMS Demag Secondary refining equipments. Visited SMS Demag, Duisburg on company assignments

ALSTOM Portugal / India (French MNC) hired him as a Consultant and Part of Management team to launch Hydro Mechanical Equipment in India in their Baroda factory. Prepared Business plans, Export support (IME,Owenfalls ,Uganda), tendering support to realize and launch Omkareshwar Project. Visited ALSTOM Lisbon, France, Grenoble on assignments and important missions. He was a Project Manager of Omkareshwar HME (24 ME) and as Implementation Manager to rebuild (15ME) Alstom Baroda factory to manufacture Hydro turbines, Generators and HME to cater to their Indian and Export Markets. He visited USA, Russia for special equipment evaluations, purchase and installations. He was the Project Director of Nam Ngum, Laos HME project (10ME). Established KK NESAR PROJECT PRIVATE LIMITED to execute renewable energy projects on EPC basis with a collaborative business approach with Indian specific needs. His contact email: praveenkulkarni@kknesar.com

**My Company Advertisement in Energy Blitz to attract good quality Investors to promote Renewable Energy Projects in INDIA and AFRICA / USA**

have including water splitting, fossil fuel decarbonisation and conversion of biomass and organic wastes into gaseous fuels. Success in these areas affirms the need for larger-

part of the global energy mix.

(Courtesy: International Energy Agency)



He has more than two decades of experience as a journalist and a writer on Energy and Environment subjects, interacting with energy sectors both conventional as well as non-conventional in India and the Kingdom of Bahrain. In the Eighties, he was the Bahrain Correspondent for 'Middle East Electricity' magazine published by Reeds, U.K. He also worked as the Media Manager (India) for Washington, DC-based publication 'Business Times' which promotes India's commercial interests in North America. He was also the editor and publisher of 'Sun Power', a quarterly renewable energy magazine during 1995-2002. His contact email address: moothedathramanathan@gmail.com

**INVESTORS CUM PARTNERS NEEDED: TO CO-DEVELOP NICHE RENEWABLE ENERGY PROJECTS WITH WORLD CLASS EPC COMPANIES WITH AN ACCESS TO LOW COST DEBT FUND WITH JOINT O & M SUPPORT FROM**

**KK NESAR PROJECTS Pvt Ltd**

Cell No: 0091 9898296247 / Vadodara / INDIA



**Promoter: Praveen Kumar Kulkarni**

**Investor Needed : 15 MW Solar PV under PPA with a right to cultivate below PV panels to grow medicinal plants, cash crops etc**

Contact Person : Mr. Praveen Kumar Kulkarni / Cell: +91 9898296247/ praveenkulkarni@kknesar.com

We are looking for the Investor Partner to bring the following on the table to hold 51% stake holding :

- a). 70 to 100 Acres of land. (Our KK NESAR portion of 49% of this land will be paid through energy bills over first 5 years) Leased land is not acceptable.
- b). An investment of Rs. 15 Crores only (Around 2 MEURO) in addition to the Land.
- c). Be part of Good network with State Government officials to get a sanction of PPA. All costs to arrange a and b shall be in Investor Partner's scope.

An International EPC Company due to our credentials, in principle, shown interest to invest Rs. 150 Crore (will exit after 5 years with Equity collected through energy bills) and it will be placed for an order for 15 MW Solar PV as per our design so that we can use the land below the PV panels to grow medicinal plants. We can negotiate the EPC costs too, but, with a little premium as it will be with us for 5 years with energy generation assurance too.

Capital Needed:

Minimum Investment / Investor :

Region:

Industry type :



INR 15,00,00,000

INR 5,00,00,000

Gujarat , Karnataka, Andhra, Tamilnadu, MP, OPEN Renewable Project Development company

Web site :

Company/product Stage:

Investor Role:

[www.kknesar.com](http://www.kknesar.com)

MCA registered Pvt limited (CIN NO:

U742006J2009PTC058267) / Ready to launch

Any but minimum of a),b),c) roles.