

# HeliCAL

## Pre - Feasibility Report of your Solar Power Plant

Date: **16 February, 2016**

Report No: **02160216107**

Report Type: **Premium**

Customer Name : **John Doe**

Customer Type : **PV Farm Owner**

Site Name : **XYZ Solar Farm**

Site Address / City : **Jaipur, Rajasthan**

Lat-Long Co-ordinates : **26.912434, 75.787271**

Email : **johndoe89801@gmail.com**

Contact No : **922222222222**

Meteorological Data Source : **GeoModel Solar**

System Capacity : **48.00kWp**

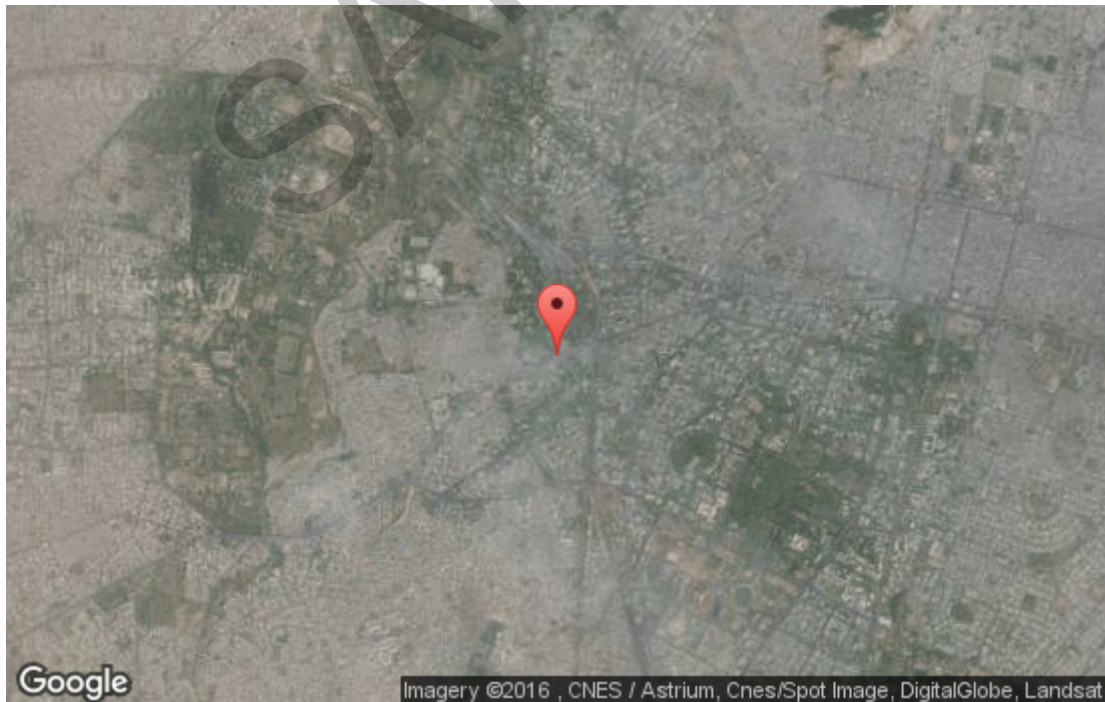
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## Geographic position



## Solar Photovoltaic (PV) System Sizing

<b>System</b>	
System Type	Off-Grid
Installed Power (KW)	48.00

<b>PV Module</b>	
Module Type	crystalline silicon (c-Si)
Module Make	Auxin Solar
Module Capacity (Wp)	250
Total no. of modules	192

<b>Inverter</b>	
Inverter Type	Central
Inverter Make	Deutsche Power
Inverter capacity (kVA)	10.4

<b>Battery</b>	
Battery Make	ACDelco
Battery capacity (Ah)	13072

<b>Mounting System</b>	
Mounting Type	Building Integrated
Tilt Direction (deg)	180 S
Tilt Degree (deg)	30

## Global Horizontal Irradiation and Air Temperature

Month	Ghm	Ghd	Dhd	T24
January	32.2	1.04	0.59	-2.5
February	49.9	1.78	0.96	-1.1
March	94.6	3.05	1.58	3.0
April	123.8	4.13	2.10	8.5
May	157.1	5.07	2.57	13.5
June	166.0	5.53	2.76	17.1
July	163.2	5.27	2.64	19.8
August	149.2	4.81	2.29	19.5
September	99.4	3.31	1.67	13.7
October	65.1	2.10	1.12	8.6
November	33.2	1.11	0.68	3.1
December	23.9	0.77	0.47	-1.8
<b>Year</b>	<b>1157.6</b>	<b>3.17</b>	<b>1.62</b>	<b>8.5</b>

- Ghm - Monthly sum of global irradiation (kWh/m<sup>2</sup>)
- Ghd - Daily sum of global irradiation (kWh/m<sup>2</sup>)
- Dhd - Daily sum of diffuse irradiation (kWh/m<sup>2</sup>)
- T24 - Daily Diurnal air temperature

Global Horizontal Irradiation (GHI) is the radiation received by a horizontal plane to the surface of the earth. The GHI is mainly used to calculate the PV Electricity yield.

## Global In-Plane Irradiation

Month	Gim	Gid	Did	Rid	Shloss
January	56.1	1.81	0.71	0.01	0.5
February	75.2	2.69	1.10	0.02	0.5
March	122.0	3.94	1.73	0.03	0.5
April	140.8	4.69	2.19	0.03	0.4
May	163.4	5.27	2.59	0.04	0.4
June	166.8	5.56	2.75	0.05	0.4
July	167.0	5.38	2.65	0.04	0.4
August	164.8	5.32	2.39	0.04	0.4
September	121.8	4.07	1.80	0.03	0.5
October	92.0	2.97	1.26	0.02	0.5
November	52.3	1.74	0.77	0.01	0.6
December	42.3	1.37	0.56	0.01	0.5
<b>Year</b>	<b>1364.5</b>	<b>3.74</b>	<b>1.71</b>	<b>0.03</b>	<b>0.5</b>

- Gim - Monthly sum of global irradiation (kWh/m<sup>2</sup>)
- Gid - Daily sum of global irradiation (kWh/m<sup>2</sup>)
- Did - Daily sum of diffuse irradiation (kWh/m<sup>2</sup>)
- Rid - Daily sum of reflected irradiation (kWh/m<sup>2</sup>)
- Shloss - Losses of global irradiation by terrain shading (%)

Global In-Plane Irradiation or Global Tilted Irradiation (GTI) is the total radiation that falls on a tilted surface. The GTI is an important parameter for PV system designers. PV modules may be installed on different mounting systems such as flat, tilted, 1-axis or 2-axis tracking, etc. For each mounting system, GTI is calculated individually.. (Geo Model Solar)

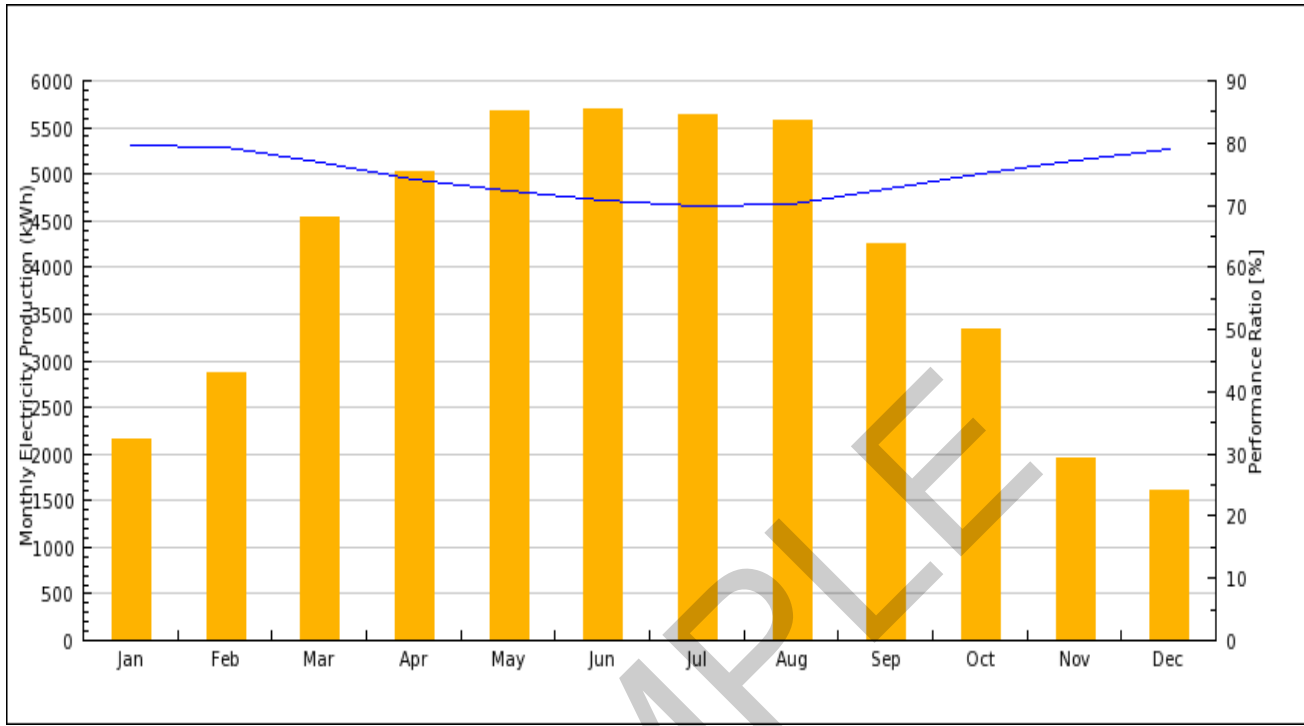
## PV Electricity Production

Month	Esm	Esd	Etm	Eshare	PR
January	45.0	1.45	2160.0	4.5	79.7
February	59.8	2.14	2870.4	5.9	79.2
March	94.4	3.05	4531.2	9.4	77.0
April	104.8	3.49	5030.4	10.4	74.1
May	118.4	3.82	5683.2	11.8	72.2
June	118.7	3.96	5697.6	11.8	70.9
July	117.2	3.78	5625.6	11.6	69.9
August	116.1	3.75	5572.8	11.5	70.1
September	88.7	2.96	4257.6	8.8	72.5
October	69.5	2.24	3336.0	6.9	75.1
November	40.6	1.35	1948.8	4.0	77.2
December	33.6	1.08	1612.8	3.3	79.1
<b>Year</b>	<b>1006.8</b>	<b>2.76</b>	<b>48326.4</b>	<b>100.0</b>	<b>73.5</b>

- Esm - Monthly sum of specific electricity production (kWh/kWp)
- Esd - Daily sum of specific electricity production (kWh/kWp)
- Etm - Monthly sum of total electricity production (kWh)
- Eshare - Percentual share of monthly electricity production (%)
- PR - Performance Ratio (%)

PR - The Performance Ratio informs you as to how energy efficient and reliable your PV plant is. A PV system with high efficiency can achieve a PR of upto 80%.

## Monthly Electricity Production VS Performance Ratio



Monthly Electricity Production

Performance Ratio

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## System Losses and Performance Ratio

Energy Conversion Step	Energy o/p (kWh/kWp)	Energy Loss (kWh/kWp)	Energy Loss (%)	Performance Ratio (cum %)
Global in-plane irradiation	1371			100.0
Global irradiation reduced by terrain shading	1365	-6	-0.45	99.6
Global irradiation reduced by reflectivity	1321	-43	-3.16	96.4
Conversion to DC in the modules	1202	-120	-9.05	87.7
Other DC losses	1136	-66	-5.5	82.9
Inverters (DC/AC conversion)	1022	-114	-10.0	74.6
Transformer & AC cabling losses	1007	-15	-1.5	73.5
Reduced availability	1007	0	0.0	73.5
<b>Total system performance</b>	<b>1007</b>	<b>-364</b>	<b>-26.54</b>	<b>73.5</b>

Energy conversion steps and losses:

1. Initial production at Standard Test Conditions (STC) is assumed,
2. Reduction of global in-plane irradiation due to obstruction of terrain horizon and PV modules,
3. Proportion of global irradiation that is reflected by surface of PV modules (typically glass),
4. Losses in PV modules due to conversion of solar radiation to DC electricity; deviation of module efficiency from STC,
5. DC losses: this step assumes integrated effect of mismatch between PV modules, heat losses in interconnections and cables, losses due to dirt, snow, icing and soiling, and self-shading of PV modules,
6. This step considers euro efficiency to approximate average losses in the inverter,
7. Losses in AC section and transformer (where applicable) depend on the system architecture,
8. Availability parameter assumes losses due to downtime caused by maintenance or failures.

## Cash Flow Analysis

### Year 1 - 12

Total Cash Inflow													
	Unit	1	2	3	4	5	6	7	8	9	10	11	12
Sale of Electricity	Lacs	7.39	7.06	6.77	6.50	6.23	6.00	5.78	5.58	5.40	5.24	5.53	5.41
Total Cash Inflow	Lacs	7.39	7.06	6.77	6.50	6.23	6.00	5.78	5.58	5.40	5.24	5.53	5.41

### Year 1 - 12

Total Cash Outflow													
	Unit	1	2	3	4	5	6	7	8	9	10	11	12
Principal payment	Lacs	1.903	1.792	1.688	1.589	1.497	1.409	1.327	1.249	1.176	1.108	1.043	0.982
Interest payment	Lacs	2.97	2.72	2.49	2.27	2.06	1.87	1.69	1.51	1.35	1.20	1.05	0.92
Interest on Working Capital	Lacs	0.1860	0.1797	0.1742	0.1694	0.1648	0.1610	0.1576	0.1545	0.1522	0.1503	0.1587	0.1579
O&M expense	Lacs	0.6240	0.6597	0.6974	0.7373	0.7795	0.8241	0.8712	0.9210	0.9737	1.0294	1.0883	1.1506
Tax	Lacs	0.6468	0.6091	0.5738	0.5401	0.5088	0.4789	0.4510	0.4245	0.3997	0.3766	0.3545	0.3338
Total Cash Outflow	Lacs	6.3298	5.9605	5.6234	5.3058	5.0101	4.743	4.4968	4.259	4.0516	3.8643	3.6945	3.5443
Total Cash flow	Lacs	1.06	1.10	1.15	1.19	1.22	1.26	1.28	1.32	1.35	1.38	1.84	1.87
Cash Reserves	Lacs	1.06	2.16	3.31	4.50	5.72	6.98	8.26	9.58	10.93	12.31	14.15	16.02
Debt Service Coverage Ratio													
	Unit	1	2	3	4	5	6	7	8	9	10	11	12
Total Debt Repayment	Lacs	4.873	4.512	4.178	3.859	3.557	3.279	3.017	2.759	2.526	2.308	2.093	1.902
EBDIT	Lacs	6.766	6.4003	6.0726	5.7627	5.4505	5.1759	4.9088	4.659	4.4263	4.2106	4.4417	4.2594
Interest on Working Capital	Lacs	0.1860	0.1797	0.1742	0.1694	0.1648	0.1610	0.1576	0.1545	0.1522	0.1503	0.1587	0.1579
Net Operating Income	Lacs	6.58	6.2206	5.8984	5.5933	5.2857	5.0149	4.7512	4.5045	4.2741	4.0603	4.283	4.1015
DSCR Ratio		1.350	1.379	1.412	1.449	1.486	1.529	1.575	1.633	1.692	1.759	2.046	2.156

## Cash Flow Analysis

### Year 13 - 25

Total Cash Inflow														
	Unit	13	14	15	16	17	18	19	20	21	22	23	24	25
Sale of Electricity	Lacs	3.82	3.88	3.95	4.02	4.10	4.18	4.27	4.36	4.46	4.58	4.68	4.80	4.92
Total Cash Inflow	Lacs	3.82	3.88	3.95	4.02	4.10	4.18	4.27	4.36	4.46	4.58	4.68	4.80	4.92

### Year 13 - 25

Total Cash Outflow														
	Unit	13	14	15	16	17	18	19	20	21	22	23	24	25
Principal payment	Lacs													
Interest payment	Lacs													
Interest on Working Capital	Lacs	0.1242	0.1278	0.1317	0.1358	0.1402	0.1447	0.1496	0.1547	0.1602	0.1662	0.1721	0.1787	0.1854
O&M expense	Lacs	1.2164	1.2860	1.3596	1.4374	1.5196	1.6065	1.6984	1.7955	1.8982	2.0068	2.1216	2.2430	2.3713
Tax	Lacs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Cash Outflow	Lacs	1.3406	1.4138	1.4913	1.5732	1.6598	1.7512	1.848	1.9502	2.0584	2.173	2.2937	2.4217	2.5567
Total Cash flow	Lacs	2.48	2.47	2.46	2.45	2.44	2.43	2.42	2.41	2.40	2.41	2.39	2.38	2.36
Cash Reserves	Lacs	18.50	20.97	23.43	25.88	28.32	30.75	33.17	35.58	37.98	40.39	42.78	45.16	47.52
	Unit	13	14	15	16	17	18	19	20	21	22	23	24	25

Debt Service Coverage Ratio														
	Unit	13	14	15	16	17	18	19	20	21	22	23	24	25
Total Debt Repayment	Lacs													
EBDIT	Lacs	2.6036	2.594	2.5904	2.5826	2.5804	2.5735	2.5716	2.5645	2.5618	2.5732	2.5584	2.557	2.5487
Interest on Working Capital	Lacs	0.1242	0.1278	0.1317	0.1358	0.1402	0.1447	0.1496	0.1547	0.1602	0.1662	0.1721	0.1787	0.1854
Net Operating Income	Lacs	2.4794	2.4662	2.4587	2.4468	2.4402	2.4288	2.422	2.4098	2.4016	2.407	2.3863	2.3783	2.3633
DSCR Ratio														

## Depreciation

### Year 1 - 12

	Unit	1	2	3	4	5	6	7	8	9	10	11	12
System / Project Cost	Lacs	32.64	30.74	28.95	27.26	25.67	24.17	22.76	21.43	20.18	19.00	17.89	16.85
Depreciation	Lacs	1.903	1.792	1.688	1.589	1.497	1.409	1.327	1.249	1.176	1.108	1.043	0.982
Depreciated value	Lacs	30.74	28.95	27.26	25.67	24.17	22.76	21.43	20.18	19.00	17.89	16.85	15.87
Acumulated Depreciation	Lacs	1.903	3.695	5.383	6.972	8.469	9.878	11.205	12.454	13.63	14.738	15.781	16.763

### Year 13 - 25

	Unit	13	14	15	16	17	18	19	20	21	22	23	24	25
System / Project Cost	Lacs	15.87	15.63	15.39	15.15	14.92	14.69	14.46	14.24	14.02	13.80	13.59	13.38	13.17
Depreciation	Lacs	0.244	0.241	0.237	0.233	0.230	0.226	0.223	0.219	0.216	0.213	0.209	0.206	0.203
Depreciated value	Lacs	15.63	15.39	15.15	14.92	14.69	14.46	14.24	14.02	13.80	13.59	13.38	13.17	12.97
Acumulated Depreciation	Lacs	17.007	17.248	17.485	17.718	17.948	18.174	18.397	18.616	18.832	19.045	19.254	19.46	19.663

Depreciation is the reduction in the value of your Solar PV system over time.

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## Debt Repayment

### Year 1 - 12

	Unit	1	2	3	4	5	6	7	8	9	10	11	12
Interest	Lacs	2.97	2.72	2.49	2.27	2.06	1.87	1.69	1.51	1.35	1.20	1.05	0.92
Cumulative Interest	Lacs	2.97	5.69	8.18	10.45	12.51	14.38	16.07	17.58	18.93	20.13	21.18	22.10
Principal Payment	Lacs	1.903	1.792	1.688	1.589	1.497	1.409	1.327	1.249	1.176	1.108	1.043	0.982
Cumulative Principal	Lacs	1.903	3.695	5.383	6.972	8.469	9.878	11.205	12.454	13.63	14.738	15.781	16.763
Total Payment	Lacs	4.873	4.512	4.178	3.859	3.557	3.279	3.017	2.759	2.526	2.308	2.093	1.902
Cumulative Payment	Lacs	4.873	9.385	13.563	17.422	20.979	24.258	27.275	30.034	32.56	34.868	36.961	38.863

Debt Repayment is the process of paying off your principal debt balance on a loan over a period of time

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## Determination of Tariff

### Year 1 - 12

Units Generation	Unit	1	2	3	4	5	6	7	8	9	10	11	12
Installed Capacity	kW	48	48	48	48	48	48	48	48	48	48	48	48
Gross Generation	MU	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
Auxiliary Consumption	MU	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200
Net Generation	MU	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
Net Generation	Lacs kWh	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800
<b>Fixed Cost</b>	Unit	1	2	3	4	5	6	7	8	9	10	11	12
O&M Expenses	Lacs	0.6240	0.6597	0.6974	0.7373	0.7795	0.8241	0.8712	0.9210	0.9737	1.0294	1.0883	1.1506
Depreciation	Lacs	1.903	1.792	1.688	1.589	1.497	1.409	1.327	1.249	1.176	1.108	1.043	0.982
Interest on Term Loan	Lacs	2.97	2.72	2.49	2.27	2.06	1.87	1.69	1.51	1.35	1.20	1.05	0.92
Interest on Working Capital	Lacs	0.1860	0.1797	0.1742	0.1694	0.1648	0.1610	0.1576	0.1545	0.1522	0.1503	0.1587	0.1579
Return on Equity	Lacs	1.898	1.898	1.898	1.898	1.898	1.898	1.898	1.898	1.898	1.898	2.350	2.350
Total Fixed Cost	Lacs	7.581	7.249	6.948	6.664	6.399	6.162	5.944	5.733	5.550	5.386	5.690	5.561

### Year 13 - 25

Units Generation	Unit	13	14	15	16	17	18	19	20	21	22	23	24	25
Installed Capacity	KW	48	48	48	48	48	48	48	48	48	48	48	48	48
Gross Generation	MU	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
Auxiliary Consumption	MU	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200	0.000200
Net Generation	MU	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
Net Generation	Lacs kWh	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800
<b>Fixed Cost</b>	Unit	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M Expenses	Lacs	1.2164	1.2860	1.3596	1.4374	1.5196	1.6065	1.6984	1.7955	1.8982	2.0068	2.1216	2.2430	2.3713
Depreciation	Lacs	0.244	0.241	0.237	0.233	0.230	0.226	0.223	0.219	0.216	0.213	0.209	0.206	0.203
Interest on Term Loan	Lacs													
Interest on Working Capital	Lacs	0.1242	0.1278	0.1317	0.1358	0.1402	0.1447	0.1496	0.1547	0.1602	0.1662	0.1721	0.1787	0.1854
Return on Equity	Lacs	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350
Total Fixed Cost	Lacs	3.935	4.005	4.078	4.156	4.240	4.327	4.421	4.519	4.624	4.736	4.853	4.978	5.110

## Determination of Tariff

### Year 1 - 12

Per Unit Cost of Gen	Unit	Levelling	1	2	3	4	5	6	7	8	9	10	11	12
Per Unit O&M Expenses	Rs/kWh		0.78	0.82	0.87	0.92	0.97	1.03	1.09	1.15	1.22	1.29	1.36	1.44
Per Unit Depreciation	Rs/kWh		2.38	2.24	2.11	1.99	1.87	1.76	1.66	1.56	1.47	1.39	1.30	1.23
Per Unit Int on Term loan	Rs/kWh		3.71	3.40	3.11	2.84	2.58	2.34	2.11	1.89	1.69	1.50	1.31	1.15
Per Unit Int on Working Capital	Rs/kWh		0.23	0.22	0.22	0.21	0.21	0.20	0.20	0.19	0.19	0.19	0.20	0.20
Per Unit ROE	Rs/kWh		2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.94	2.94
Total Cost of Generation	Rs/kWh		9.24	8.83	8.46	8.12	7.79	7.5	7.23	6.97	6.75	6.55	6.91	6.76
Discount Factor			0.862	0.743	0.641	0.552	0.476	0.410	0.354	0.305	0.263	0.227	0.195	0.168
Discount Tariff Component			7.965	6.561	5.423	4.482	3.708	3.075	2.559	2.126	1.775	1.487	1.347	1.136
Levelised Tariff	Rs/Unit	7.595												

### Year 13 - 25

Per Unit Cost of Gen	Unit	Levelling	13	14	15	16	17	18	19	20	21	22	23	24	25
Per Unit O&M Expenses	Rs/kWh		1.52	1.61	1.70	1.80	1.90	2.01	2.12	2.24	2.37	2.51	2.65	2.80	2.96
Per Unit Depreciation	Rs/kWh		0.31	0.30	0.30	0.29	0.29	0.28	0.28	0.27	0.27	0.27	0.26	0.26	0.25
Per Unit Int on Term loan	Rs/kWh		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Per Unit Int on Working Capital	Rs/kWh		0.16	0.16	0.16	0.17	0.18	0.18	0.19	0.19	0.20	0.21	0.22	0.22	0.23
Per Unit ROE	Rs/kWh		2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94
Total Cost of Generation	Rs/kWh		4.77	4.85	4.94	5.03	5.13	5.23	5.34	5.45	5.58	5.72	5.85	6	6.15
Discount Factor			0.145	0.125	0.108	0.093	0.080	0.069	0.060	0.051	0.044	0.038	0.033	0.028	0.024
Discount Tariff Component			0.692	0.606	0.534	0.468	0.410	0.361	0.320	0.278	0.246	0.217	0.193	0.168	0.148
Levelised Tariff	Rs/Unit	7.595													

## Net Present Value & Internal Rate of Return

### Year 1 - 12

	Unit	0	1	2	3	4	5	6	7	8	9	10	11	12
Capex	Lacs	-32.64	0	0	0	0	0	0	0	0	0	0	0	0
Net Cash Flow (Project Pre tax)	Lacs	-32.64	6.580	6.221	5.898	5.593	5.286	5.015	4.751	4.505	4.274	4.060	4.283	4.102
Net Cash Flow (Project Post tax)	Lacs	-32.64	5.933	5.612	5.325	5.053	4.777	4.536	4.300	4.080	3.874	3.684	3.929	3.768
Present Value (Pre tax)	Lacs	-32.64	5.67	4.62	3.78	3.09	2.52	2.06	1.68	1.37	1.12	0.92	0.84	0.69
Present Value (Post tax)	Lacs	-32.64	5.11	4.17	3.41	2.79	2.27	1.86	1.52	1.24	1.02	0.84	0.77	0.63
Total Debt Repayment	Lacs		4.873	4.512	4.178	3.859	3.557	3.279	3.017	2.759	2.526	2.308	2.093	1.902
Net Present Value (Equity Pre tax)	Lacs	-9.792	1.707	1.709	1.720	1.734	1.729	1.736	1.734	1.746	1.748	1.752	2.190	2.200
Net Present Value (Equity Post tax)	Lacs	-9.792	1.060	1.100	1.147	1.194	1.220	1.257	1.283	1.321	1.348	1.376	1.836	1.866
Internal Rate of Return (Project Pre tax)		12.25%												
Internal Rate of Return (Project Post tax)		10.86%												
Internal Rate of Return (Equity Pre tax)		15.90%												
Internal Rate of Return (Equity Post tax)		12.66%												

### Year 13 - 25

	Unit	13	14	15	16	17	18	19	20	21	22	23	24	25
Capex	Lacs	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Cash Flow (Project Pre tax)	Lacs	2.479	2.466	2.459	2.447	2.440	2.429	2.422	2.410	2.402	2.407	2.386	2.378	2.363
Net Cash Flow (Project Post tax)	Lacs	2.479	2.466	2.459	2.447	2.440	2.429	2.422	2.410	2.402	2.407	2.386	2.378	2.363
Present Value (Pre tax)	Lacs	0.36	0.31	0.27	0.23	0.20	0.17	0.14	0.12	0.11	0.09	0.08	0.07	0.06
Present Value (Post tax)	Lacs	0.36	0.31	0.27	0.23	0.20	0.17	0.14	0.12	0.11	0.09	0.08	0.07	0.06
Total Debt Repayment	Lacs													
Net Present Value (Equity Pre tax)	Lacs	2.479	2.466	2.459	2.447	2.440	2.429	2.422	2.410	2.402	2.407	2.386	2.378	2.363
Net Present Value (Equity Post tax)	Lacs	2.479	2.466	2.459	2.447	2.440	2.429	2.422	2.410	2.402	2.407	2.386	2.378	2.363

## Payback Period

### Year 1 - 12

		0	1	2	3	4	5	6	7	8	9	10	11	12
Net Cash Flow (Project Post tax)	Lacs	-32.64	5.933	5.612	5.325	5.053	4.777	4.536	4.300	4.080	3.874	3.684	3.929	3.768
Cumulative Cash flow without year 0	Lacs		5.93	11.54	16.87	21.92	26.70	31.24	35.54	39.62	43.49	47.17	51.10	54.87
Cumulative Cash flow with year 0	Lacs		-26.71	-21.10	-15.77	-10.72	-5.94	-1.40	2.90	6.98	10.85	14.53	18.46	22.23
		6 Years												

### Year 13 - 25

		13	14	15	16	17	18	19	20	21	22	23	24	25
Net Cash Flow (Project Post tax)	Lacs	2.479	2.466	2.459	2.447	2.440	2.429	2.422	2.410	2.402	2.407	2.386	2.378	2.363
Cumulative Cash flow without year 0	Lacs	57.35	59.82	62.28	64.73	67.17	69.60	72.02	74.43	76.83	79.24	81.63	84.01	86.37
Cumulative Cash flow with year 0	Lacs	24.71	27.18	29.64	32.09	34.53	36.96	39.38	41.79	44.19	46.60	48.99	51.37	53.73



## Summary

SYSTEM	FINANCIAL
Installed Power (kW) : 48	System Cost (INR Lacs): 32.64
No of PV modules : 192	Levellised Tariff (INR): 7.595
Inverter Capacity (kVA): 10.4	IRR (Project Pre Tax) (%): 12.25
Battery Capacity (Ah): 13072	IRR (Project Post Tax) (%): 10.86
Mounting Type: Building Integrated	IRR (Equity Pre Tax) (%): 15.90
Mounting system Tilt Direction: 180 S	IRR (Equity Post Tax) (%): 12.66
Mounting System Tilt Degree: 30	Payback period (years): 6
Energy output (kWh): 1007	
Performance Ratio (%): 73.5	

### SYSTEM

- Installed Power – Maximum power that can be produced under specific conditions
- No of PV Modules - Total no of PV modules required for your system.
- Inverter Capacity - Inverter size required.
- Battery Capacity - Battery size required.
- Mounting Type - Type of mounting structure to install your PV panels.
- Mounting System Tilt Direction – Direction in which your panels face.
- Mounting System Tilt Degree – Angle that your panels make with the surface of the earth.
- Energy Output – Estimated electricity production.
- Performance Ratio - This informs how energy efficient and reliable your PV plant is.

### FINANCIAL

- System Cost – Total cost of your system including subsidies (if any). This excludes battery cost.
- Levellised Tariff – In simple terms, this is the tariff representing the tariffs throughout the plant life
- IRR (Project Pre Tax) – Helps you evaluate attractiveness of your Solar PV project or investment (pre-tax). Interests and debt are not included.
- IRR (Project Post Tax) - Helps you evaluate attractiveness of your Solar PV project or investment (post-tax). Interests and debt are not included.
- IRR (Equity Pre Tax) – This is the Return on Equity (Pre-Tax) invested in a project including debt-service payments.
- IRR (Equity Post Tax) - This is the Return on Equity (Post-Tax) invested in a project including debt-service payments.
- Payback period – The amount of time required for your Solar PV system to generate sufficient income to recover its investment.

## Financial Assumptions\*\*\*

### Power Generation

- Auxiliary Consumption : 0.00 %
- Capacity Utilization Factor : 19 %
- Useful Life : 25 Years
- Deration factor : 70 %

### Working Capital

- O&M Charges : 1 Month(s)
- Maintenance Spares (% of O&M) : 15 %
- Receivable for Debtors : 2 Months
- Interest on Working capital : 13.5 %

### Operation & Maintenance

- O&M expenses : 13 Lakh/MW
- O&M expenses escalation : 5.72%

### Financial Assumptions

- Debt : 70 %
- Equity : 30 %
- Repayment Period : 12 Years
- No. of Payments / Year : 4
- Total no. of Payments : 48
- Return on Equity (first 10 years) : 20.00 % pa
- Return on Equity (11th year onwards) : 24.00 % pa
- Weighted Average of ROE : 22.40 %
- Discount Rate : 10.81 %

### Fiscal Assumptions

- Income Tax : 33.990 %
- Depreciation Rate (first 12 years) : 5.83 %
- Depreciation Rate (13th year onwards) : 1.54 %

\*\*\*The parameters listed above have been used in financial calculations most of which are recommended by the Central Electricity Regulatory Commission (CERC) for 2015-16.

PR - The Performance Ratio informs you as to how energy efficient and reliable your PV plant is. A PV system with high efficiency can achieve a PR of upto 80%.

## Sources

1. The climate / meteorological data, system losses and the PV electricity production have been obtained by "Solar GIS PV Planner © Geo Model Solar."
2. Most of the parameters used in Financial Analysis are as prescribed by the Central Electricity Regulatory Commission (CERC) for 2015-2016.

## Disclaimer and Legal Information

Considering the nature of climate fluctuations, interannual and long-term changes, as well as the uncertainty of measurements and calculations, Helical Power Private Limited does not take full guarantee of the accuracy of estimates. The maximum possible has been done for the assessment of climate conditions based on the best available data, software and knowledge. Helical Power Private Limited shall not be liable for any direct, incidental, consequential, indirect or punitive damages arising or alleged to have arisen out of use of the provided report.

The values obtained in this Pre-Feasibility report are to be used solely as a general guide. This report is intended to provide an estimate of what could potentially be the system technical / financial parameters. The actual values will vary depending on site conditions, system efficiencies, location and other factors. We recommend you to arrange for a qualified solar professional to undertake a detailed assessment of your site before proceeding with the installation of your solar system.

## Contact information:

[info@helicalpower.com](mailto:info@helicalpower.com)