PROPOSAL FOR

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF 97KWp GRID-TIED SOLAR ROOF TOP POWER PLANT

Submitted

To

J.T. FABRICS Pvt. Ltd.,

By

GREENTEK

(AN ISO 9001-2015 & 14001-2015 CERTIFIED COMPANY)

GREENTEK INDIA PRIVATE LIMITED

Plot # 8, Lepakshi colony, West Marredpally, Secunderabad -500026
Tel: 040-27807145 / 040-65198519, Mob: +91-90031 32081
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Introduction, Vision & Mission of Greentek India Pvt Ltd

GIPL is an ISO 9001:2015 & 14001-2015 certified Company based at Hyderabad is one of the leading manufacturers of Solar Photo Voltaic Modules (SPV) in the Country. We are manufacturing modules in the range of 37W to 300W. Thus, our Module production line is geared to produce panels of any custom size or wattage having Certifications/Approvals from MNRE, IEC 61215, IEC 61701, IEC 61730.

GIPL is having strong presence in the field of Renewable Energy and provides complete turnkey solar EPC solutions. We have a team of highly skilled solar engineers to design and construct you solar project. GIPL offers Advisory Services, Engineering, Procurement & Construction (EPC) Services and Operation & Maintenance Services Solar Power Projects ranges KWp to MWp scale to domestic, industrial, commercial and government entities.

Incorporated in the year 2007 and expertise in all renewable energy systems. Joint ventured with many reputed companies throughout the India and having the best technical partners and supplier in their class throughout India.

To become one of the leading renewable energy equipments and turnkey solution provider. We always aim at one step ahead in the development of innovative and competitive solutions for the production and management of electrical power through Solar PV systems. Served & serving many esteemed organizations and individuals in India.

Solar Photovoltaic:

* Grid connected or Utility scale Solar Power Projects.
* Off-grid SPV Power Packs.
* Rooftop Solar Power Projects (Standalone & Grid-tied).
* Other Solar application

GIPL is a registered Solar PV Systems integrator in MNRE, NREDCAP & TNREDC.

GIPL tries not just to meet our customer's expectations; strive to exceed the customer's expectations. Every time, measure its success by its customer's trust and confidence in us. We always work with principle to provide up to date technology, the best quality equipment, error less workmanship and on time service to its clients.

Manufacturing Facility:

State of the art manufacturing facility at Shabhashpally(V), Shivampet(M), Medak(Dt) at a distance of 60 k.m from Hyderabad.

1. **Solar PV modules**
    a. **Polycrystalline**
    b. **Monocrystalline**

2. **Solar Water Heaters**
    a. **Flat Plate Collector (FPC)**
    b. **Evacuated Tube Collector (ETC)**

Corporate Office: Plot No. 8, Lepakshi Colony, West Marredpally, Secunderabad-26.
Manufacturing Unit : Sy No. 43/1A, Shabashpally(V), Shivampet(M), Medak(Dt).
North Branch : F-382, Sector-63, Noida – 201 307, Uttar Pradesh
Pune Branch : Shed No. 5, Sy. No. 25/3/2, Raikar Building, Satyam Industrial Estate, NandedPhata, Pune – 411 041, Maharashtra.

EPC - Services:

- **Megawatt scale ground mounted solar PV plants.**
- **Megawatt scale solar PV plants for third party sale.**
- **Megawatt scale solar PV plants for captive consumption.**
- **Large scale roof top solar PV plants for Hospitals, Hotels, Educational Institutions and other commercial buildings.**
- **Roof top Solar PV plants under net metering / Gross metering policies.**
- **Solar water heaters and Solar thermal projects.**
- **Solar powered LED street lights &Solar Fencing.**

Benefits of using solar power:

1. **Energy generation is for 25 years.**
2. **Payback period is 3-4 Years.**
3. **CFA Subsidy of 30% to the Hospitals, Educational Institutions, NGO's, Trusts and Societies those who are into non-profit making.**
4. **Accelerated depreciation for private / commercial / profit making organizations @ 40% in the first year and 20% in the second year.**
5. **Revenue from generation based renewable energy certificates.**
6. **Low maintenance cost.**
7. **Easy loan process from banks.**
8. **Free from power cuts.**
9. **Free from the DG expenses.**
10. **Quality power.**

Executed projects by our team:

i. **4 MW Solar Grid tied plant at Kalwakurthy, Mahaboobnagar (DT).**
ii. **81.6 KW Solar Power Plant for Omega Hospital, Hyderabad.**
iii. **75 KW Solar Grid Tied System for DE-SHAW Jubillee Hills, Hyderabad.**
iv. **60 KW Solar PV System for Rajas Dental College- Nagarcoil. Tamilnadu**
v. **30 KW for Stanley Engineered Fastners , Chennai. Tamilnadu**
vi. **20 KW Solar Grid Tied system for CAL Public School, Hyderabad.**
vii. **20 KW for MJ Hospital, Armoor, Nizamabad.**
viii. **20 KW for Subbulakshmi Nursing Home, Tenkasi. Tamilnadu**
ix. **15 KW for 4S systems, A.S.Rao Nagar, Hyderabad.**
x. **14 KW for FHD Group Hyderabad.**
xi. **14 KW for Directorate of Sorghum Research, Hyderabad.**
xii. **12 KW for AKG Filling Station, IOCL, Sadasivpet.**
xiii. **10 KW for Aravinda Schools, Kottayam, Kerala**
xiv. **10 KW for S.S.Service Station, IOCL, Kallakal, Medak.**
xv. **10 KW for MadhuVidyalayam, Wyra, Khammam.**
xvi. **10 KW for Hotel Satya Inn, Ashok Nagar, BHEL, Hyderabad.**
xvii. **10 KW Solar Grid Tied System for Dr. Reddys Foundation, Hyd.**
xviii. **10 KW for Mr.Surendra Reddy, Champapet, Hyderabad.**
xix. **10 KW for Mr. Srininvas Reddy, Champapet, Hyderabad.**
xx. **10 KW for Pastoral Centre, Abids, Hyderabad.**
xxi. **10 KW for Mr. Mukul Chand, Agra, Uttar Pradesh.**
xxii. **6 KW for Dr Water Mineral Water Plant, Boduppal, Hyderabad.**
xxiii. **6 KW for Mr. B.V.Bhadrappa, Champapet, Hyderabad**
xxiv. **5 KW for Commissioner of Industries APIIC, Hyderabad.**
xxv. **5 KW for Mahathma Gandhi University, Nalgonda, Hyderabad.**
xxvi. **5 KW for Vrihat Solar Lucknow.**
xxvii. **5 X 2 KW(2X5Hp Motors) for KommuriPrathap ReddyEngg. College.**
xxviii. **5 KW for Mr.C.Shashidhar Reddy, Ashok Nagar, Hyderabad.**
xxix. **5 KW for Mr. GovardhanHeda, Uppal, Hyderabad.**
xxx. **5 KW for Mr. ArunSoundhi, Agra, Uttar Pradesh.**
xxxi. **5 KW for Mr. Krishna Singh, Noida, Uttar Pradesh.**

Prestigious Clients:

DETAILS OF THE PROPOSED 97KWpROOFTOP SOLAR PV POWER PLANT

Client	**J.T. FABRICS Pvt. Ltd.**
Location	**MADURAI (DT)**
Plant Size	**97KWp**
Latitude	**9º54¹**
Longitude	**78º07¹**
Elevation	**462 Ft**
Type of Installation	**Rooftop**
Solar Radiation	**5.26 KW/ Hr / Sq. m**
Technology	**Poly Crystalline**

Energy Generation:

Solar Power Plant Capacity	**97KWp**
Average Solar Energy Generated Per Day	**485 KW / UNITS**
Average Solar Energy Generated Per Year	**1,55,200 KW / UNITS**
Area Required	**9700 SFT**
Space required for the control room	**1 Sq.m**

System configuration:

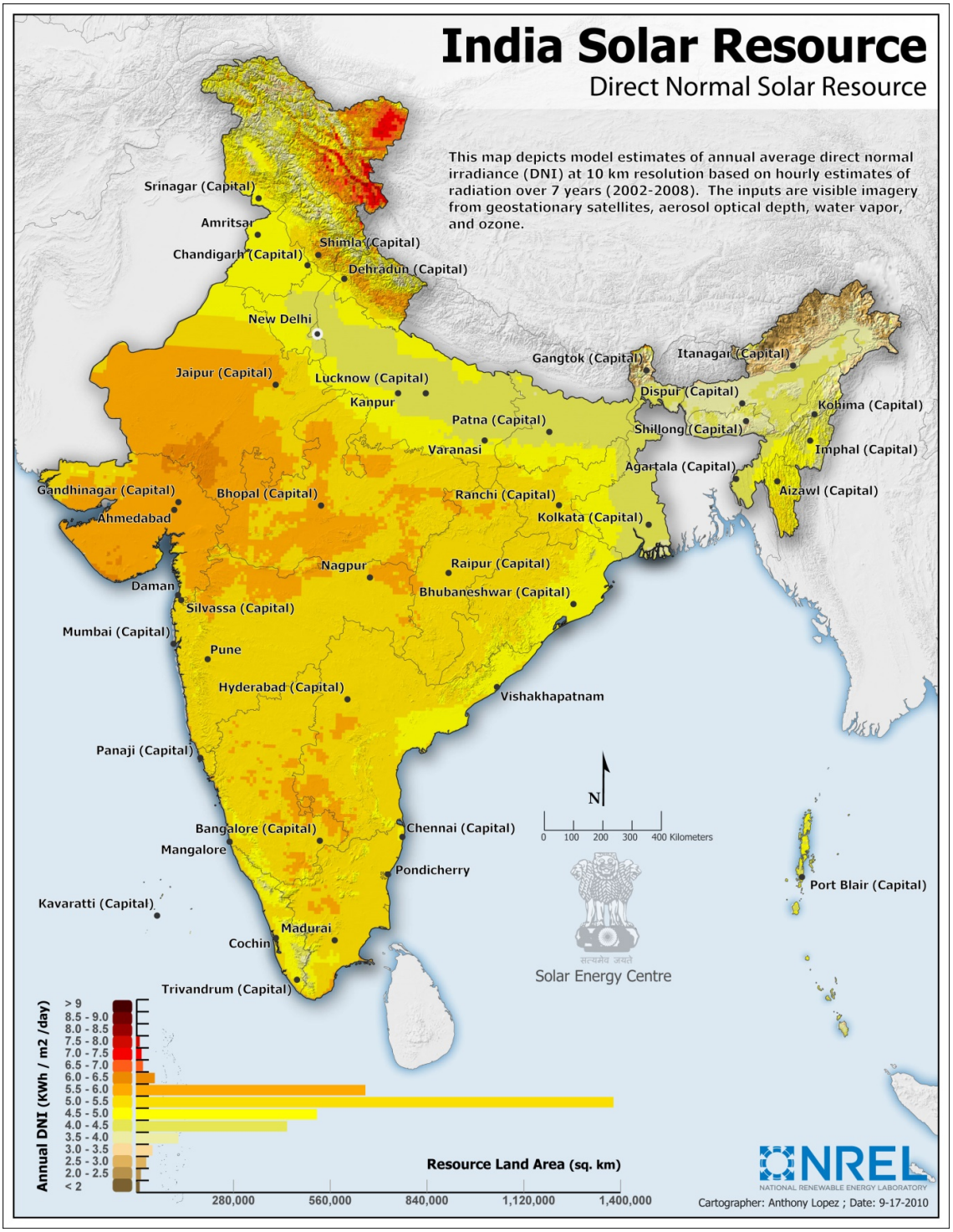
Equipment Description	**Rating**	**Qty.**
Solar Grid Tied UPS MPPT based	**50 KVA**	**2**
Polycrystalline PV panels	**325**	**298**
Mounting Structures	**GI/MS Galvanized**	**298**
AJB's/SCB's, Cables, ACDB, Transformers, L/A,Earthling & BOS etc.	**As per MNRE Spec**	

SATELLITE IMAGE OF PROPOSED SITE.

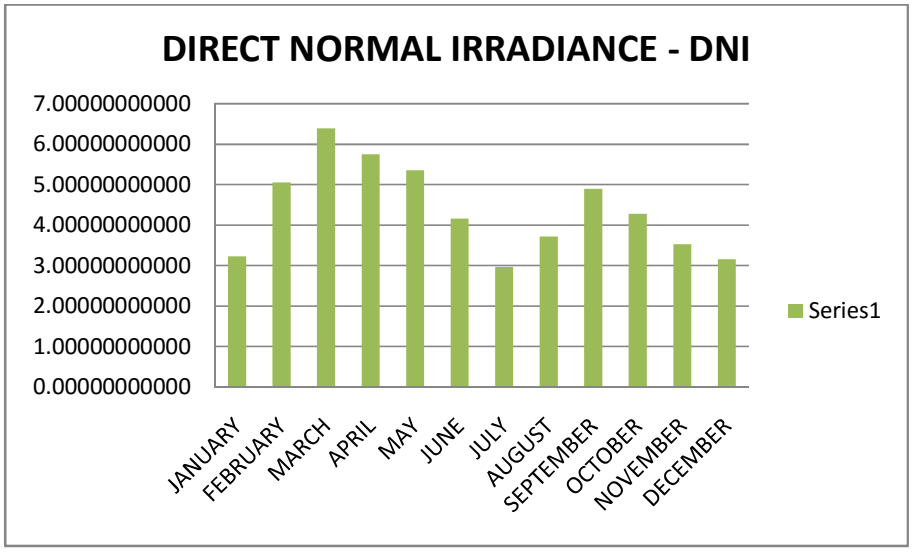
Physical parameters:

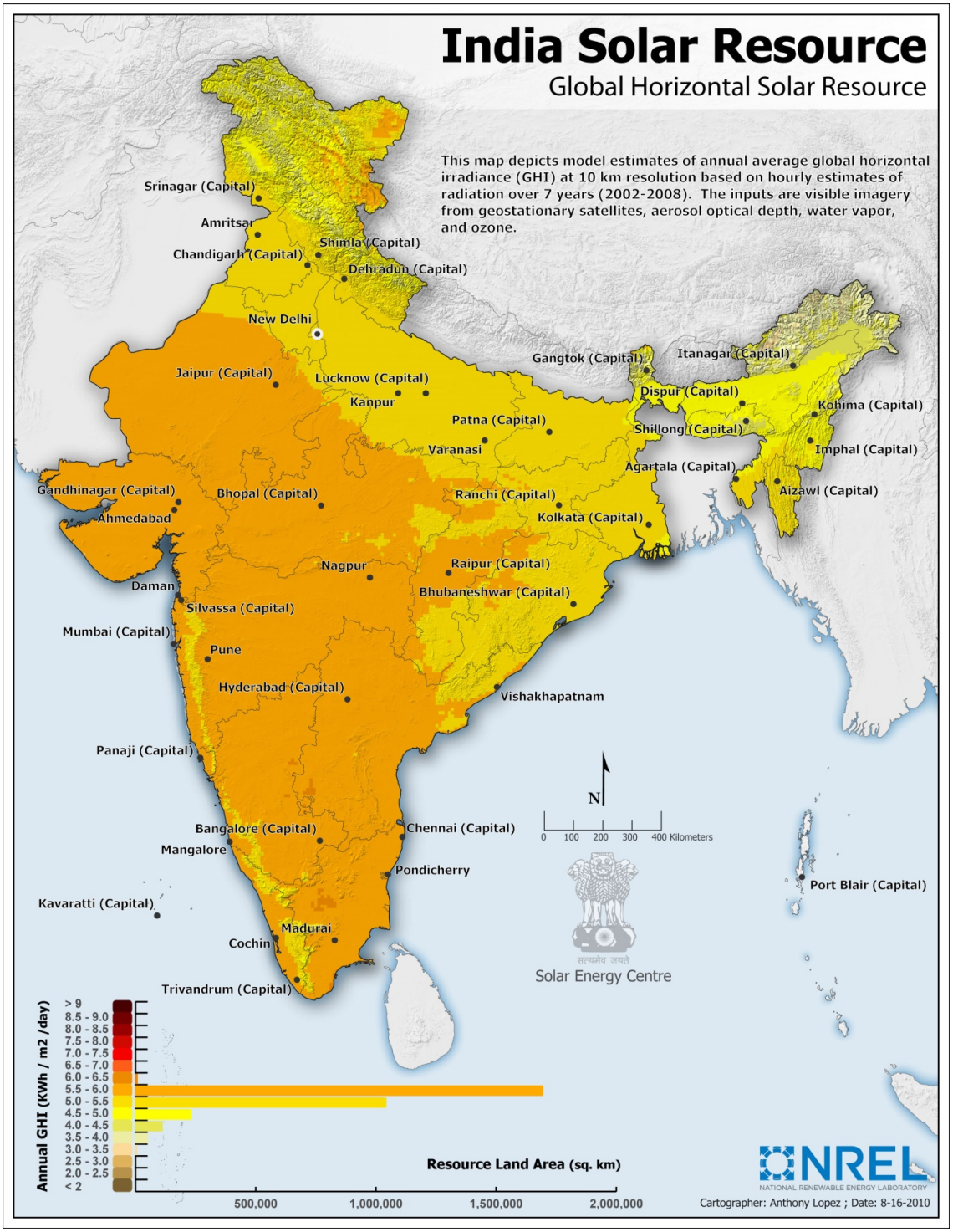
Latitude : 9º54¹
Longitude : 78º07¹
Elevation : 462 Ft

SOLAR INSOLATION AT PROPOSED SITE

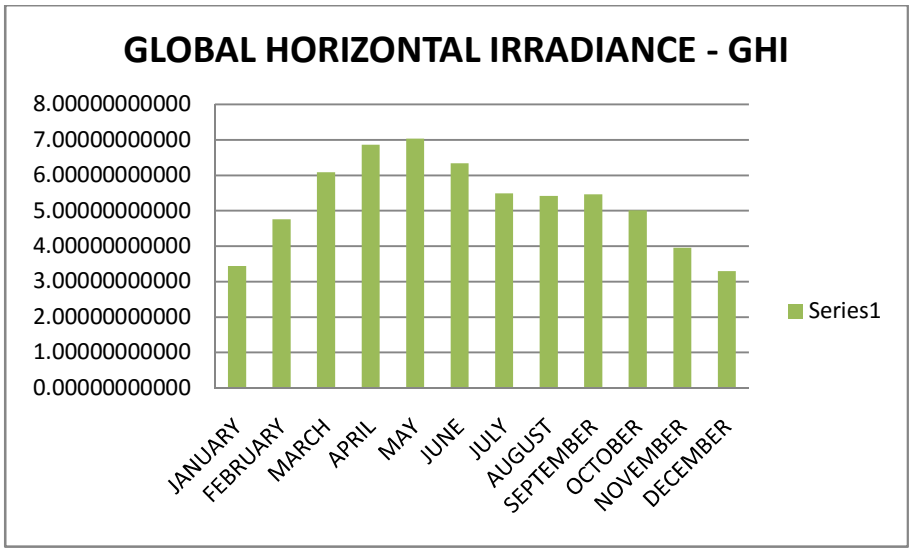


DNI	DIRECT NORMAL IRRADIANCE
LATTITUDE:	9°54¹
LONGITUDE:	78°07¹
ELEVATION:	462 Ft
CLIENT	J.T. FABRICS Pvt. Ltd.
MONTH	SOLAR INSOLATION KWh/Sq.M/DAY
JANUARY	3.22789990234
FEBRUARY	5.05600000000
MARCH	6.39170019531
APRIL	5.74810009766
MAY	5.35570019531
JUNE	4.16389990234
JULY	2.96310009766
AUGUST	3.71230004883
SEPTEMBER	4.89529980469
OCTOBER	4.27729980469
NOVEMBER	3.53030004883
DECEMBER	3.15530004883
ANNUAL DNI	4.36560009766




India Solar Resource
Global Horizontal Solar Resource
This map depicts model estimates of annual average global horizontal irradiance (GHI) at 10 km resolution based on hourly estimates of radiation over 7 years (2002-2008). The inputs are visible imagery from geostationary satellites, aerosol optical depth, water vapor, and ozone.
Srinagar (Capital)
Amritsar
Chandigarh (Capital)
Shimla (Capital)
Dehradun (Capital)
New Delhi
Jaipur (Capital)
Lucknow (Capital)
Kanpur
Patna (Capital)
Varanasi
Gangtok (Capital)
Itanagar (Capital)
Dispur (Capital)
Kohima (Capital)
Shillong (Capital)
Imphal (Capital)
Agartala (Capital)
Aizawl (Capital)
Gandhinagar (Capital)
Bhopal (Capital)
Ahmedabad
Ranchi (Capital)
Kolkata (Capital)
Nagpur
Raipur (Capital)
Daman
Bhubaneshwar (Capital)
Silvassa (Capital)
Mumbai (Capital)
Pune
Hyderabad (Capital)
Vishakhapatnam
Panaji (Capital)
Bangalore (Capital)
Chennai (Capital)
Mangalore
Pondicherry
Port Blair (Capital)
Kavaratti (Capital)
Madurai
Cochin
Trivandrum (Capital)
N
0 100 200 300 400 Kilometers
Solar Energy Centre
Annual GHI (KWh / m2 /day)
> 9
8.5 - 9.0
8.0 - 8.5
7.5 - 8.0
7.0 - 7.5
6.5 - 7.0
6.0 - 6.5
5.5 - 6.0
5.0 - 5.5
4.5 - 5.0
4.0 - 4.5
3.5 - 4.0
3.0 - 3.5
2.5 - 3.0
2.0 - 2.5
< 2
Resource Land Area (sq. km)
500,000
1,000,000
1,500,000
2,000,000
NREL
NATIONAL RENEWABLE ENERGY LABORATORY
Cartographer: Anthony Lopez ; Date: 8-16-2010

GHI	GLOBAL HORIZONTAL IRRADIANCE
LATTITUDE:	9°54¹
LONGITUDE:	78°07¹
ELEVATION:	462 Ft
CLIENT	J.T. FABRICS Pvt. Ltd.
MONTH	SOLAR INSOLATION KWh/Sq.M/DAY
JANUARY	3.43889990234
FEBRUARY	4.75610009766
MARCH	6.09129980469
APRIL	6.85839990234
MAY	7.03310009766
JUNE	6.34389990234
JULY	5.48470019531
AUGUST	5.41470019531
SEPTEMBER	5.45910009766
OCTOBER	5.00729980469
NOVEMBER	3.95760009766
DECEMBER	3.29189990234
ANNUAL GHI	5.26089990234



TECHNICAL DETAILS:

SOLAR PV PANELS:

Make : GREENTEK
Model : 325 Wp – 72 Cells
RFID : Internal
Approvals :MNRE, UL, IEC
Warranty : 25 Years
Wattage :325Wp
Voltage : 46.6 V
Current :8.85 A
Size : 1961 X 991 X 40 mm
Weight : 24 KG

CERTIFICATIONS:

IEC – 61215, 61730, 62716& UL CERTIFIED

MNRE APPROVED

Solar Grid – Tied Inverter:

Make:Growatt / Delta / Sungrow
Model :50 KVA
MPP Range :480-850 V
Operating Range :200-950 V
Min DC Voltage/Starting Voltage:200/250V
No-Load Voltage :1000V
Maximum input Current :3*36.0A
No of MPP Trackers :4
Max Power /Tracker :50KW
No of strings :3*4
Rated Output :49900 VA
Supply Voltage :According to requirement
Rated Current : 50 A
Rated Frequency :50/60Hz
Cos Phi :0.80 inductive,capacitive
No of Grid Phases :3
Protection Class :IP-65
Weight :50 Kg

SAFETY/STANDARDS	
Anti-islanding Protection / Grid Regulation	VDE-AR-N 4105; VDE 0126-1-1
EMC	EN 61000-6-2; EN 61000-6-4
Safety	IEC 62109-1/-2
Efficiency	IEC 61683:1999
Environmental Testing	IEC 60068-2-1; IEC 60068-2-2; IEC 60068-2-14; IEC 60068-2-30; IEC 60068-2-6; IEC 60068-2-21; IEC 60068-2-27; IEC 60068-2-75; IEC 60068-2-78 (As Per MNRE and SECI Requirement)
Ingress Protection	IEC 60529

Mounting Structure:

Protection:Galvanized
Longevity:Rust proof
Material:Mild steel
Warranty : 30 years

Cables:

Polycab
UV Resistant
Type 1 cable
ISO 9001:2008 and 14001:2004 certified
Flame Retardant Low Smoke
High temperature resistant (Up to 120 ^{0}C)

Tasks and Scope of work:

TASK DESCRIPTION	SCOPE	
PRE-CONTRACT STAGE		**REMARKS**
AGREEMENT	CLIENT&GREENTEK	
GATHER REQUIREMENTS	GREENTEK	
SITE SURVEY	GREENTEK	
PROJECT PROPOSAL	GREENTEK	
FEASIBILITY REPORT	DISCOM	
EXECUTION STAGE		
DESIGN – Civil, Electrical and Mechanical	GREENTEK	
SOURCE ALL COMPONENTS	GREENTEK	
CIVIL WORKS	GREENTEK	
MOUNTING STRUCTURE'S ERECTION	GREENTEK	
PV MODULE MOUNTING	GREENTEK	
DC WIRING FROM PV MODULES TO INVERTER & TERMINATION	GREENTEK	
AC WIRING FROM SOLAR INV. TO LOADS& TERMINATION	GREENTEK	
EARTHLING & LIGHTINING ARRESTORS	GREENTEK	
COMMISSIONING	GREENTEK	
POST-EXECUTION STAGE		
TRIAL RUN	GREENTEK	
INSPECTION	DISCOM	
GRID SYNCHRONISATION	DISCOM	
TRAINING CLIENT PERSONNEL	GG Enterprises	
SUBMISSION OF MANUALS & WARRANTIES	GG Enterprises	
HANDING OVER	GREENTEK & GG Enterprises	
OPERATIONS& MAINTENANCE	GG Enterprises	

Financials:

Cost of the project	**INR. 63,08,000/-**
Taxes (VAT-5%)	**INR. 3,15,400/-**
SECI SUBSIDY 30%	**NA**
NET PAYABLE BY CUSTOMER	**INR. 66,23,400/-**
Depreciation Claim @ 30%	**INR. 19,87,020/-**
Actual Investment on System	**INR. 46,36,000/-**
Transportation to Site	**Inclusive**
Cost of Grid Synchronization	**INR. 1,00,000/-**
Cost of Bi-Directional meter	**At actual**

(Rupees: Sixty Six lakhs Twenty three thousand four Hundred only)

Note:

1. **Cost of Liasoning with DISCOM, MNREfor getting approvals and processing fee will be INR. 1,00,000/-.**
2. **Subsidy 30% applicable only to Educational Institutions, Hospitals, Residential and nonprofit making organizations (Trusts and Societies).**
3. **Total plant insurance – Customer scope.**
4. **AMC free for first 2 years.**

Payment Terms:

Advance along with PO	**30%**
After getting DISCOM feasibility	**50%**
Before the dispatch of material	**10%**
Upon commissioning	**10%**

Warranty:

Solar PV module Performance warranty	**25 years**
Grid tied Inverter	**5 years**

Key Features of the Plant:

Expected Power Generation from 97 KW solar power plant per day @ 5Kwh / KW	**485Units**
Net Export to the Grid (Month)	**14,550Units**
Net Generation Cost@Rs. 7.5(Monthly)	**INR 1,09,125-00**
Peak Generation cost per year considering 320 days working	**INR 11,64,000-00**

CASH FLOW – ANALYSIS FOR 97 KW SOLAR PV PLANT:

YEAR	GENERATED UNITS	TARIFF	SAVING	CUMULATIVE SAVINGS	Cum Int on Surplus	TOTAL SAVING
1	155200	7.5	1164000	1164000	0.00	1164000
2	154424	7.875	1216089	2380089	81480.00	2461569
3	153651.88	8.375	1286834.495	3666923.495	172309.83	3839233.325
4	152883.6206	8.875	1356842.133	5023765.628	268746.33	5292511.961
5	152119.2025	9.375	1426117.523	6449883.151	370475.84	6820358.988
6	151358.6065	9.875	1494666.239	7944549.39	477425.13	8421974.519
7	150601.8135	10.375	1562493.815	9507043.205	589538.22	10096581.42
8	149848.8044	10.875	1629605.748	11136648.95	706760.70	11843409.65
9	149099.5604	11.375	1696007.499	12832656.45	829038.68	13661695.13
10	148354.0626	11.875	1761704.493	14594360.94	956318.66	15550679.6
11	147612.2922	12.375	1826702.117	16421063.06	1088547.57	17509610.63
12	146874.2308	12.875	1891005.721	18312068.78	1225672.74	19537741.53
13	146139.8596	13.375	1954620.623	20266689.41	1367641.91	21634331.31
14	145409.1603	13.875	2017552.1	22284241.5	1514403.19	23798644.7
15	144682.1145	14.375	2079805.396	24364046.9	1665905.13	26029952.03
16	143958.704	14.875	2141385.721	26505432.62	1822096.64	28327529.26
17	143238.9104	15.375	2202298.248	28707730.87	1982927.05	30690657.92
18	142522.7159	15.875	2262548.115	30970278.99	2148346.05	33118625.04
19	141810.1023	16.375	2322140.425	33292419.41	2318303.75	35610723.16
20	141101.0518	16.875	2381080.249	35673499.66	2492750.62	38166250.28
21	140395.5465	17.375	2439372.621	38112872.28	2671637.52	40784509.8
22	139693.5688	17.875	2497022.542	40609894.82	2854915.69	43464810.51
23	138995.101	18.375	2554034.98	43163929.8	3042536.74	46206466.54
24	138300.1255	18.875	2610414.868	45774344.67	3234452.66	49008797.33
25	137608.6248	19.375	2666167.106	48440511.78	3430615.81	51871127.59
			0	48440511.78	3630978.93	52071490.71
					TOTAL SAVINGS	52071490.71

	ROI (Return on investment)
	TOTAL CUMULATIVE SAVING IN 25 YEARS
TARIFF ESCALATION	5% per anum
DETORIATION	0.5% Per Year
INTEREST ON SAVINGS	7% Per Anum

Annual Maintenance Contract (AMC)

FREE FOR 2 YEARS

SCOPE OF WORK

We offer the following services as a part of solar plant annual maintenance contract:

1) Facility Management: Maintenance and
Implementation of official requirements for technical operation,

2) Plant Monitoring: Monthly analysis and evaluation of operational plant data
Remote monitoring
Plausibility test of current yield and weather data(If available)
Energy meter value management
Service Hot line from 8.00 hr-17.00 hr.

3) Preventive Maintenance: Preventive inspection and maintenance of system according to
Manufacturer's specifications
Documentation of events and measures
Provision of small parts and operating material
Conduction of regulatory tests according to technical standards

4) Fault detection and analysis: Function check after fault message is received
Immediate start of fault removal measurers
Long term trend analysis

5) Management of repairs: Analysis of interruptions and incidents and claims
Supply chain management for spare parts i.e. modules, inverters,
Cabling and mechanical components

6) Documentation and Data management:
Documentation of plant energy output and system availability
Electronic plant logbook
Detailed information about main events measures
Customer reports on a quarterly/yearly basis

7) Warranty and service management:
Monitoring and tracking of warranty rights
Support with insurance cases
Coordination and managing of external (3rd party) service providers (If any)

AMC – COST AFTER 2 YEARS

OPTION - 1

AMC – Service without spares

AMC COST FOR 100 KW SOLAR POWER PLANT	INR. 45,000-00
SERVICE TAX @ 18%	INR. 8,100-00
NET PAYABLE	INR. 53,100-00
ESCALATION	5% P.A

OPTION – 2:

As the solar power plant is maintenance free, as and when there is a problem, our service team will attend within 24 hours to resolve the issue. We will be charging per visit INR. 5,000/- + Tax as service charge per visit. If any part replaced during service, it will be charged extra at actual.

With all the attributes of a reliable group, we take the opportunity to approach you for giving us the opportunity to serve you with quality and expertise.

Looking forward to receive your valuable order on which we will give our prompt attention for smooth execution.

Dr. N.V. VIJAYAPRASAD M.Sc., M.Phil., Ph.D.
G M (Projects - R&D)

S.SANDHOSH KUMAR
Regional Manager – Projects & Sales | South India

GREENTEK INDIA Pvt. Ltd.
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