



# SARANATHAN COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)



## INDEX

### CRITERION: 7.1.2

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## NAAC Criteria 7.1.2

The Institution has facilities for alternate sources of energy and energy conservation measures

### RV Block - College Campus

#### 1. Solar Power Plant Details


Type : 50 Kw ON Grid Tied power plant

\* Installed at RV Block, college campus

\* Month and year of Installation: September 2019

\*Total Cost: Rs. 24, 76,931/- (Rupees Twenty Four Lakhs Seventy Six Thousand and nine Thirty one only)

#### (A) Purchase Order

 <b>S. RAVINDRAN</b> SECRETARY	<b>SARANATHAN COLLEGE OF ENGINEERING</b> <b>TIRUCHIRAPALLI</b>																														
29-07-2019																															
SCE/VDS/RV/PV/GT-19-1																															
TO																															
Ra Source Private Limited, VDS House, 2 <sup>nd</sup> Floor, 41, Cathedral Road, Chennai-600086.																															
Sir,																															
<b>Sub:</b> Purchase order for installation of 50kW grid connected PV solar power plant at RV block Roof top																															
<b>Ref:</b> Your quotation																															
We are glad to place the purchase order on you for the supply and installation <b>grid connected</b> 50kW PV solar power plant at the roof top of RV block of our college campus. The specifications should conform to the MNRE/national /international standards:																															
<table border="1"><thead><tr><th>S.No</th><th>Description</th><th>Qty</th><th>Unit Price</th><th>Amount</th></tr></thead><tbody><tr><td>1.</td><td>Supply and installation of 50kWp Solar PV plant complete with: -Solar Poly Crystalline PV modules -Solar inverter -Solar Array Mounting Structure -Electrical accessories -Lightning protection -Earthing Arrangement -Testing and commissioning</td><td>1no</td><td>Rs.22,74,500/-</td><td>Rs.22,74,500/-</td></tr><tr><td></td><td>70% of total value</td><td></td><td>Rs.15,92,150/-</td><td>Rs.15,92,150/-</td></tr><tr><td></td><td>5% GST on 70% value</td><td></td><td>Rs.79,608/-</td><td>Rs.79,608/-</td></tr><tr><td></td><td>Balance 30% value</td><td></td><td>Rs.6,82,350/-</td><td>Rs.6,82,350/-</td></tr><tr><td></td><td></td><td></td><td>Rs.1,22,823/-</td><td>Rs.1,22,823/-</td></tr></tbody></table>	S.No	Description	Qty	Unit Price	Amount	1.	Supply and installation of 50kWp Solar PV plant complete with: -Solar Poly Crystalline PV modules -Solar inverter -Solar Array Mounting Structure -Electrical accessories -Lightning protection -Earthing Arrangement -Testing and commissioning	1no	Rs.22,74,500/-	Rs.22,74,500/-		70% of total value		Rs.15,92,150/-	Rs.15,92,150/-		5% GST on 70% value		Rs.79,608/-	Rs.79,608/-		Balance 30% value		Rs.6,82,350/-	Rs.6,82,350/-				Rs.1,22,823/-	Rs.1,22,823/-	
S.No	Description	Qty	Unit Price	Amount																											
1.	Supply and installation of 50kWp Solar PV plant complete with: -Solar Poly Crystalline PV modules -Solar inverter -Solar Array Mounting Structure -Electrical accessories -Lightning protection -Earthing Arrangement -Testing and commissioning	1no	Rs.22,74,500/-	Rs.22,74,500/-																											
	70% of total value		Rs.15,92,150/-	Rs.15,92,150/-																											
	5% GST on 70% value		Rs.79,608/-	Rs.79,608/-																											
	Balance 30% value		Rs.6,82,350/-	Rs.6,82,350/-																											
			Rs.1,22,823/-	Rs.1,22,823/-																											
<div style="display: flex; justify-content: space-between;"><div>VENKATESWARA NAGAR, EDAMALAIPATTI PUDUR (P.O.) PANJAPPUR VILLAGE, SRIRANGAM TALUK, TIRUCHIRAPALLI - 620 012. Ph : 0431 - 2473686    Telefax - 0431 - 2473684,    e-mail : secretary@saranathan.ac.in</div><div></div></div>																															

18% GST on 30% value		Rs.2,02,431/-	Rs.2,02,431/-
Total GST amount		Rs.24,76,931/-	Rs.24,76,931/-
Total value of the purchase order			

(Rupees Twenty Four Lakhs Seventy Six Thousand Nine Hundred and Thirty One)

**Terms and Conditions:**

1. The materials should conform to the relevant national and international standards and MNRE specifications
2. The Earthing system should be as per the CEIG norms and guidelines
3. The size of copper for earthing for the lightning protection should be of minimum 25mm x 3 mm cross section
4. All the earth pits should be conventional and no chemical earthing is acceptable
- 5 The steel structures should be hot dip galvanized
6. The lightning protection must have a minimum of two lightning masts located at different locations in the zone of PV panels
7. Zero point export device should be installed
8. All the junction boxes must of IP 67 protected; surge protectors must be provided
9. Manufacturers test reports must be provided for the inverter, PV modules, DC cables, Junction boxes
10. Cable and cable connections to the AC panel from inverter must be under supplier's scope
11. The AC cubicle must have the three phase indication lamps, switch control, a digital meter (to monitor, three phase voltages, currents, PF, etc)
12. The supply of cable to interface between main AC panel and AC cubicle is under college scope; the adequacy of switch rating and cable rating in the main AC panel must be checked and the suitability must be confirmed by the supplier
13. All the type test reports must be from a reputed third party accredited laboratories
14. To ensure the operation of PV plant under Generator power supply also (in case EB power failure)
15. A detailed Electrical schematic diagram should be furnished incorporating the AC cubicles, number of PV modules, series/parallel connections of PV modules, switch control, AC main panel connections, number of strings, etc
16. Apart from manufacturer warranty for the individual equipments, performance guarantee for the overall performance and workmanship must be provided by the supplier, as per MNRE specifications.
17. The inverter must have the display to monitor DC/AC parameters.
18. All the power generation parameters must be remote monitored
19. Complete data sheet should be provided for the relevant model of the PV module including power curves
20. No GI material should be used for Earth connections

J.R.  
 SECRETARY  
 SARANATHAN COLLEGE OF ENGINEERING  
 TIRUCHIRAPALLI

*[Signature]*

**21. Payment Terms:**

- a) 60% advance on the total project cost along with the PO
- b) 30% against delivery of the materials
- c) Balance 10% on successful completion of the project

Kindly supply the materials in time and execute the job with absolute perfection and quality.

Thanking you,



Yours truly,



**S.RAVINDRAN**

**SECRETARY**

**SARANATHAN COLLEGE OF ENGINEERING  
TIRUCHIRAPALLI**

**(B) Bill**

**ra'source**  
re-creating energy

**TAX INVOICE**

<b>GST NO</b>	33AAGCR2689K12Y	<b>INVOICE NO:</b>	RSPL/EPC/009/19-20
<b>PAN NO</b>	AAGCR2689K	<b>DATE:</b>	20.09.2019

**Billed To:**  
SARANATHAN COLLEGE OF ENGINEERING,  
Venkateswara Nagar,  
Trichy-Madurai Main Road (NH 45 B),  
Edamalaipatti Pudhur(Post), Panjappur,  
Thiruchirappalli - 620012

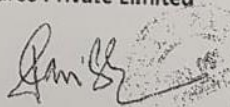
**Installation At:**  
SARANATHAN COLLEGE OF ENGINEERING,  
Venkateswara Nagar,  
Trichy-Madurai Main Road (NH 45 B),  
Edamalaipatti Pudhur(Post), Panjappur,  
Thiruchirappalli - 620012

**Sub: Design, Supply, Installation & Commissioning of 50 KW Grid Tie Solar Photovoltaic Plant.**  
**Ref: SCE/VDS/RV/PV/GT-19-1/1573**

SL.NO	DESCRIPTION	HSN/ Service Code	AMOUNT (Rs)
1	Design, Supply, Installation & Commissioning of 50 KW Grid Tie Solar Photovoltaic Plant - (A)	8543&9954	2,274,500
	5% GST on 70% of (A)		79,608
	18% GST on 30% of (A)		122,823
<b>TOTAL (Rs)</b>			<b>2,476,931</b>

**(Rupees Twenty Four Lakhs Seventy Six Thousand Nine Hundred and Thirty One Only)**

For Ra Source Private Limited

  
Authorised Signatory

## (C) Warranty Certificate



ra'source  
re-creating energy

*Hy Blue*



Date : 20.09.2019

To,  
Saranathan College of Engineering,  
Venkateswara Nagar,  
Edamalaipatti Pudur (PO),  
Panjappur Village,  
Tiruchirapalli - 620 012

**Sub: Warranty Certificates for Solar Inverter and Solar Panels.**

**Ref: Design, Supply, Installation and Commissioning of 50 kWp Grid Tie Solar Photovoltaic System.**

Dear Sir,

With reference to the above, please find the enclosed annexures of Warranty Certificates for Grid Tie Inverter and Polycrystalline Panels - EVVO Make installed at your above mentioned site. The other details are given below,

**50 KW Grid Tie Inverter - EVVO Make:**

- |                    |                   |
|--------------------|-------------------|
| 1. Material Number | : EVVO 50000TL    |
| 2. Serial Number   | : SJ2ES150K65007. |
| 3. Warranty Period | : 5 Years         |
| 4. Issue Date      | : 06.08.2019      |

**330 WP Polycrystalline Panels - EVVO Make:**

- |                    |                                                                     |
|--------------------|---------------------------------------------------------------------|
| 1. Material Number | : EVVO POLY 330W                                                    |
| 2. Serial Number   | : 152 Nos - Attached                                                |
| 3. Warranty Period | : 10 Years of Product Warranty & 25 Years of Power Output Warranty. |
| 4. Issue Date      | : 06.08.2019                                                        |

For further Clarifications, Please feel free to contact us.

We look forward to serving you again in the future.

Thanking You,

For RA SOURCE PRIVATE LIMITED,

*Santhosh*

Authorized Signatory



ra'solar



ra'water



ra'wind

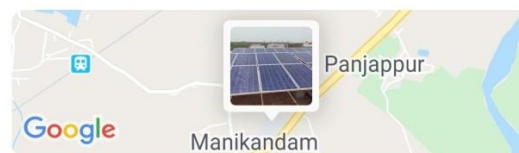
Ra-Source Pvt Ltd, VDS House, 4th Flr, #41 Cathedral Road, Gopalapuram, Ch 86,  
Phone No: +91 44 2811 3177. Email: haribalaji@ra-source.com. Website: www.ra-source.com

## (D) Geo-tagged Photo



Date 20 May 2020 13:02  
Size 4.82 MB | Resolution 4000x2250  
Path /Internal storage/SHAREit/pictures  
Title IMG\_50 kw spp.jpg

### LOCATIONS



Trichy - Madurai road, Tiruchirappalli, Manikandam,  
Tamil Nadu 620012, India

### STORIES



## NAAC Criteria 7.1.2

The Institution has facilities for alternate sources of energy and energy conservation measures

### KS Block - College Campus

#### 1. Solar Power Plant Details

Type : 10 Kw ON Grid Tied and 1Kw off grid power plant

\* Installed at KS Block , college campus

\* Month and year of Installation : November 2013

\* Total Cost : Rs. 10,50,000/- (Rupees Ten Lakhs and Fifty Thousand only)

#### (A) Purchase Order

Sno	Description	Qty	Amount
1	Supply and Installation of 10 kWp grid-tied mono crystalline/poly crystalline solar pv power plant complete with: - Solar PV modules - Solar Inverter (three phase)- sine wave - Solar Array Mounting Structure - Electrical accessories - Installation Material & accessories - Performance Monitoring System including monitoring from laptop	1 no	RS.9,00,000/-  Nett cost
2	Supply and Installation of 1 kWp grid-tied mono crystalline/poly crystalline solar pv power plant complete with: - Solar PV modules - Solar Inverter(at least 1.5Kva capacity)-sine wave - Solar Array Mounting Structure - Electrical accessories, tubular Exide batteries with at least four hours back up, 200AH each reverse flow protection from battery to PV Module, low battery, short circuit , over load protection at the input and output, overcharge protection - Installation Material & accessories - Performance Monitoring System including monitoring from laptop	1 no	RS.1,50,000/-  Nett cost
<b>Total</b> (Rupees Ten lakh and fifty thousand only)			RS.10, 50,000/-

SARANATHAN COLLEGE OF ENGINEERING  
TIRUCHIRAPALLI

S. RAVINDRAN  
SECRETARY

SCE/EEE/VDS/11kw/PV-1 / 268

13-09-2013

TO

M/S.V.D.Swami and Company Private Limited,  
'VDS House',  
New no. 41, Cathedral Road, 4th Floor,  
Chennai - 600086.

Sirs,

**Sub:** Supply of 10kW grid-tied PV plant and 1kW off-grid PV plant  
**Ref:** Your quotation and final price negotiation you had with us on 12-09-2013 afternoon at our College campus

We are very glad to place this purchase order on you for the supply of one number of 10kW grid-tied and one number of 1kW off-grid photo-voltaic power plants for our college use. The equipment should conform to the technical specifications mentioned below and also meet the technical requirements and specifications of MNRE.

SECRETARY

COLLEGE OFFICE : VENKATESWARA NAGAR, PANJAPPUR, TIRUCHIRAPALLI - 620 012.

Page 1 of 2

Fax : 0431 - 2473684  
E-mail: secretary@saranathan.ac.in

Off : 0431 - 2473686

Kindly execute the supply and complete the job in time. We expect your co-operation, back up technical support and services to maintain a good bilateral relationship in the future.

#### TERMS and CONDITIONS

1. The above price is inclusive of all taxes and duties, F.O.R. destination
2. The price includes material, labour and installation costs
3. Payment: 100% against delivery and installation
4. Any civil work will be done by us under your guidance
5. The price is inclusive of MNRE subsidy and no more price variation from the PO is acceptable
6. Minimum of two earth pits will have to be provided by you for connecting the earthing to the system
7. DC cabling from PV to DC monitoring will be under supplier's scope
8. Cable connection between Inverter and DC panel also with supplier's scope
9. All the tests in the field have to be performed during commissioning of panels
10. Cabling from inverter panel to our distribution board will be provided by us
11. Manufacturer's power curves correlating solar irradiation, temperature, wind speed, DC output have to be provided along with the supply
12. Manufacturer's test reports must be provided for the inverter and PV panels
13. Lightning protection must be provided for the system
14. Delivery 3 to 4 weeks for completing the supply and commissioning from the date of this order
15. Field tests must be performed as per MNRE/relevant standard specifications
16. Data sheets/technical documents for PV panels, inverter and any other subsystem that is part of the PV power plant must be provided along with the supply
17. Warranty- '10' years for PV panels, '5' years for Battery and '5' years for Inverter from the date of commissioning

Please confirm acceptance of this order and effect early delivery.

Thanking you,

Yours truly,

S. Ravindran

S. Ravindran  
SECRETARY

SARANATHAN COLLEGE OF ENGINEERING  
TIRUCHIRAPALLI,

Received the Purchase Order.  
For VD Swamin & Co P Ltd.

A. Srinivas  
14/9/2013

(C) Installation & commissioning certificate



**V.D.SWAMI AND COMPANY PRIVATE LIMITED**

41, VDS House, Cathedral Road,  
Chennai - 86.

Ph: 044 - 4341 9321 / 4321 9326

Website: [www.vdswami.com/vdsolar](http://www.vdswami.com/vdsolar),



E-mail: [vdsolar@vdswami.com](mailto:vdsolar@vdswami.com)

**INSTALLATION & COMMISSIONING CERTIFICATE**

**DATE: 15. 11. 2013**

This is to certify that M/s. **V.D.SWAMI AND COMPANY PRIVATE LIMITED, Chennai – 86, India.**  
Have designed, supplied, installed, commissioned and handed over the following system to our satisfaction.

System Description	: Solar Photovoltaic Grid Tie & off Grid System
System capacity	: 10 kWp Grid Tie & 1 KWp off Grid Solar Photovoltaic System
Date of Commissioning	: 09.11.2013
Installation Site address	: Saranathan College of Engineering, Venkateswara Nagar, Madurai Road (NH 45 B), Panjappur, Tiruchirappalli – 620 012.
Customer Name & Address	: Saranathan College of Engineering, Venkateswara Nagar, Madurai Road (NH 45 B), Panjappur, Tiruchirappalli – 620 012.
Name of the contact Person	: Mr. Kalyan Kumar
Contact No	: +91 – 9443 79 79 72

<u>CUSTOMER</u>	<u>VDS REPRESENTATIVE</u>
NAME:	NAME:
SIGNATURE	SIGNATURE 
SEAL	SEAL 

**V.D. SWAMI AND COMPANY PRIVATE LIMITED** "VDS House" 41, Cathedral Road, Chennai - 600 086, India  
Tel : +91 44 4210 4079-81, Fax : +91 44 2811 7479, E-mail : [vds@vdswami.com](mailto:vds@vdswami.com), Web : [www.vdswami.com](http://www.vdswami.com)

#### (D) Geo-tagged Photo



Date 20 May 2020 13:19

Size 5.41 MB | Resolution 4000x2250

Path /Internal storage/SHAREit/pictures

Title 10 kw spp ks block.jpg

#### LOCATIONS



34/4, Muniyappan Nagar, Panjapur, Madurai Main Rd, Tiruchirappalli, Tamil Nadu 620012, India

#### STORIES



## 2. Solar Power Plant Details





**Type : 2.4 Kw OFF Grid**

\* Installed at KS Block , college campus

\* Month and year of Installation : January 2014

\* Total Cost : Rs. 3,30,000/- (Rupees Three Lakhs and Thirty Thousand only)

### **(A) Bill**

TIN : 33043465637 dtd 20.11.2012		CST : 1079899 dtd 20.11.12	
		PAN : AASCS2562C	
<b>INVOICE</b>			
			
SISCO SOLAR PRIVATE LIMITED 377, Rajaram Salai, K.K.Nagar, Tiruchirappalli – 620 021, Tamil Nadu		Phone Fax E-mail Web	0431-3255250,3255350 0431-2456148 corporate@siscosolar.in <a href="http://www.siscosolar.in">www.siscosolar.in</a>
INVOICE NO: 2013-2014 / 015		DATE:	31.03.2014
<b>CUSTOMER:</b> SARANATHAN COLLEGE OF ENGINEERING Venkateswara Nagar, Edamalaipatti Pudur (P.O), Panjappur Village, Srirangam TK, Trichy- 620 012 PH : 0431-2473286		Job No WO / PO / OF No WO / PO Date	SS006 SCE/EEE/RPS-2 23.01.2014
SI.NO	ITEM DESCRIPTION	QTY	UNIT
1	Supply of 2.4 kW Solar Power Plant, 600V Battery Bank & Battery Charger	1set	330000
	VAT @ 5%		15714.00
	TOTAL		330000.00
Total Invoice Value : Rupees Three Lakhs Thirty Thousand Only			
Prepared By: 		for SISCO SOLAR PRIVATE LIMITED	
Checked By: 		 Authorised Signatory	
ALL DISPUTES SUBJECT TO TRICHY JURISDICTION ONLY			

**(C) Geo-tagged Photo**



Date 20 May 2020 13:16

Size 4.34 MB | Resolution 4000x2250

Path /Internal storage/SHAREit/pictures

Title IMG\_20200520\_131620.jpg

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**LOCATIONS**



Trichy - Melur Rd, Tiruchirappalli, Tamil Nadu  
620012, India

**NAAC Criteria 7.1.2**

**The Institution has facilities for alternate sources of energy and energy conservation measures**

**Ladies Hostel - Alandhur campus**

**1. Bio gas plant Details**

**Type : 30 cubic meter cow dung/ Food waste based Bio -gas plant**

- \* Installed at Ladies Hostel , Alandhur campus For cooking purpose.
- \* Month and year of Installation : May 2016
- \* Total Cost : Rs. 6,00,000/- (Rupees six lakhs only)

**(A) Quotation**

**-RESOURCE MANAGEMENT SOLUTIONS.**

**203/62, PAARAI VATTAM, ALAGAPURAM,  
SALEM- 636 016.**

**Mail- greenconnectindia@gmail.com ;**

**web- greenconnect.in**

**AN ISO 9001:2008 CERTIFIED ORGANIZATION**

TIN no- 33202845913

CST no-1116941

Ref no- GC-QU-20150818-08-25 cum FRP

Date- 30<sup>th</sup> October, 2015

To

The director,  
Saranathan college of engineering,  
Trichy - 12.

Dear Sir,

Sub- Revised quotation for installing 30 cubic meter biogas plant- reg.



Further to our previous quotation dated 18<sup>th</sup> august, 2015, I am offering you the revised quote as per our discussions on 30<sup>th</sup> October, 2015. Kindly accept this as our final offer and release the favorable purchase order along with advance.

Thanking you.

**(B) Purchase Order**



**SARANATHAN COLLEGE OF ENGINEERING**  
TIRUCHIRAPALLI

**S. RAVINDRAN**  
SECRETARY

03-11-2015

SCE/ALANDUR/BIOGAS/GC-1

TO

THE CEO,  
GREEN CONNECT,  
203/62, PAARAI VATTAM,  
ALAGAPURAM,  
SALEM -636016.

Sir,

Sub: Purchase order for supply and installation of 30 cubic metre cow dung /Food waste based Bio Gas plant at Alandur Campus

Ref: Your revised quotation GC-QU-20150818-08-25 cum FRP dt 30-10-2015

We are glad to place the purchase order on you for the supply and installation of 30 cubic metre cow dung/ food waste based Bio Gas plant, conforming to the following specifications, at Saranathan Academy of Higher Education, Alandur Campus:

**30 cum/day Biomethanation plant-(FRP portable water jacket Model )**

**PART 1- GREEN CONNECT BIO-METHANATION PLANT**

ITEMS INCLUDED	DESCRIPTION	COSTS (INR)
Green Connect Bio-methanation plant	Supply and install	4,73,000
Slurry pump	Supply and install	18,000
Total		4,91,000

Contd page 2...

COLLEGE OFFICE : VENKATESWARA NAGAR, PANJAPPUR, TIRUCHIRAPALLI - 620 012.

☎ Off : 0431 - 2473686

Fax : 0431 - 2473684

E-mail: secretary@saranathan.ac.in

**PART 2- GAS PIPING**

ITEMS INCLUDED	DESCRIPTION	COSTS (INR)
Gas piping and Connections(50m)	Supply and install	5,500
Biogas Stove- 2 No.'s	Supply and install	8,000
Biogas booster	Supply and install	13,500
Biogas meter	Supply and install	18,000
Total		45,000

**PART 3- FOOD/DUNG PULPER:**

ITEMS INCLUDED	DESCRIPTION	COSTS (INR)
Waste pulper	Supply and install	64,000
Total		64,000

<b>GRAND TOTAL</b>	<b>6,00,000 INR Nett</b>
--------------------	--------------------------

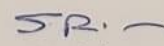
**Total Value of this Purchase Order Rupees Six Lakhs Nett)**

**Terms and Conditions:**

- The above price is inclusive of all taxes and duties
- Transportation cost will be paid separately by us
- Power supply cabling for crusher, Booster and slurry pump will be under our scope. However the required panels, controls for these will be supplied by you
- Piping- 15 Kgf PVC, Nylon Breaded Hose, Flexible hose.
- Fabrication/Construction of the biogas plant- 30-35 working days.
- Piping connections- 3 working days.
- Total time duration for completion - 40-45 days from the receipt of purchase order
- **Payment terms:-**
  - Stage 1- 25% advance along with work order( Rs. 1.5 Lakhs)
  - Stage 2- 50% on receipt of all the materials at our campus (Rs.3 Lakhs)
  - Stage 3- 10% after installation ,commissioning and put in to operation (Rs. 0.6 Lakhs)
  - Stage 4- 15% after successful operation of 2.5 months from the date of installation (Rs.0.9 Lakhs)
- Food, accommodation will be borne by us for five of your staff members for 5 days approx during the last part of field work at our campus
- Bio gas sample from the outlet has to be analyzed for CH<sub>4</sub>,H<sub>2</sub>S,CO<sub>2</sub>,etc percentage composition

Kindly execute this order within the stipulated duration without compromise on quality of materials and workmanship. Expecting your good services and best performance of your plant for continued association with us.

Encl: DD No. ....dated.....for Rs.1.5 Lakhs

  
S.Ravindran  
(Secretary)

(C) Bill

Green Connect-AN ISO 9001:2008 CERTIFIED ORG.

COMMERCIAL INVOICE

203/62, paarai vattam,  
alagapuram, Salem 636 016.

Consignee :  
saranathan college of engineering,  
Trichy.

INVOICE NUMBER GC-CI-20160530-04  
INVOICE DATE May 30, 2016  
OUR TIN NO- 33202845913  
OUR CST NO- 1116941

SALES PERSON CHYTHENYEN.N.K  
SHIPPED VIA ROAD  
PAN NO AUNPC1900C

ITEM	MATERIAL/DESCRIPTION	ORDER QNTY	UOM	PRICE PER UNIT	NET VALUE INR
1	30 CUBIC METER/DAY FRP PORTABLE BIO-METHNATION PLANT VAT 5%	1550	1	1.00	4,00,000 20,000.00
2	INSTALLATION CHARGES				1,40,000
3	COMMISSIONING CHARGES				40,000
	TRANSPORTATION CHARGES				6,400.00
Rupees "THOUSAND NINE HUNDRED ONLY"				Total net Value	6,06,400

SIGNATURE AND DATE-

For GREEN CONNECT

*Chythenyen* 30/5/16  
Proprietor

- Less Transport  
Cost Rs 6,400  
Rs 6,00,000

Nett Bill  
amount

So far Rs 5,10,000/- payment has been made. Balance  
and final payment of Rs 90,000/- (Rupees Ninety thousand)  
may please be cleared.

*Dharmu* 03/06/16

**(D) Geo tagged Photographs**



**2. Solar Power Plant Details**

## Type : 20 Kw ON Grid Solar Power Plant

\* Installed at Ladies Hostel , Alandhur campus For cooking purpose.

\* Month and year of Installation : September 2017

\* Total Cost : Rs. 14,40,000/- (Rupees Fourteen Lakhs and Forty Thousand only)

### (A) Solar Panel and Inverter Details

<u>Inverter Serial No:</u> DELTA RPI M20A / O4817801273WB	
<b><u>Solar Panel Details</u></b>	<b><u>Inverter Details</u></b>
Make : WAAREE	Make : DELTA
Type of module : POLY CRYSTALLINE	DC Input : 200-1000 Vdc, MPPT 355-800 (KR)/ 850 Vdc, 1000 Vdc max, 22A*2 max
Capacity of each module : 315 WATTS	AC Output : 220/380 Vac, 230/400 Vac, 50/60 Hz, 20 kVA nom, 15.75 kVA max, 24 A max, 3P3W or 3P4W, cos $\phi$ 0.8 ind ~ 0.8 cap
Number of modules : 64 Nos	IP Code : IP65
Total capacity of module : 20160 WATTS	
Maximum power (P max) : 315 W	
Voltage at max power (Vmp) : 36.75 V	
Current at max power (Imp) : 8.58 A	
Open Circuit Voltage (Voc) : 45.25 V	
Short Circuit Current (Isc) : 9.29 A	
Power Tolerance : +/- 5 W	
<b><u>Check list:</u></b>	
<input type="checkbox"/> DC Grounding Earth pit	<input type="checkbox"/> Operation was educated to user
<input type="checkbox"/> Main change over switch provided	<input type="checkbox"/> Panel structure concrete
<input type="checkbox"/> Paint/powder coating work	<input type="checkbox"/> AJB, DCDB, ACDB
<input type="checkbox"/> Panel floor bolt tightness	<input type="checkbox"/> Remote monitoring
<input type="checkbox"/> Separate meter installed	<input type="checkbox"/> Net meter installation
<input type="checkbox"/> Inverter manual provided	<input type="checkbox"/> Panel cleaning explained

### (B) Installation Report

# **RIVERAA COMPUTERS**

Symbol of Quality

## **Solar power plant Installation report**

Report No. 005

Date of Installation: 28/09/17

**Customer Details:**

M/s. SARANATHAN COLLEGE GIRLS HOSTEL

ALUNTHUR

TRICHY

**Inverter:**

DELTA RPI M20A

**Solar panel:**

WAREE Polycrystalline 315W/24V X 64nos

**EB NO:**

06212054376

**NET METER INSTALLED ON:** \_\_\_\_\_

Packing condition (Fault if any):

GOOD

Engineer's remarks comments:

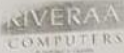
*M. S. Saranathan-V*  
CSE's Signature

The installation has been completed to our satisfaction

Customer's Signature

**Remarks:** 4 string 16 panels wired in series and connected to MPPT individually.  
2 Rows, 32 Panels in each Row

**(C) Bill of Details**

Tax Invoice				(ORIGINAL FOR RECIPIENT)			
 <b>Riveraa Computers</b> 15/A-2 Nd Floor, Main Road Thillai Nagar Trichy-620018 Pan No-AEWPM9450L GSTIN/UIN: 33AEWPM9450L1ZP		Invoice No.		Dated			
		<b>RIV/17-18/685</b>		<b>15-Sep-2017</b>			
<b>THE SECRETARY (SARANATHAN)</b> SARANATHAN ENG.COLLEGE,, TRICHY State Name : Tamil Nadu, Code : 33		Delivery Note		Other Reference(s)			
		Supplier's Ref.		Dated			
		Buyer's Order No.		Delivery Note Date			
		Despatch Document No.		Destination			
		Despatched through					

SI No.	Description of Goods	HSN/SAC	GST Rate	Quantity	Rate	per	Amount
1	<b>SOLAR-ONGRID-20KW DELTA</b> 315 W PANELS X 64 NOS. (20160W) ARRAY BOX / DC BOX / AC BOX WITH ELECTRICAL ACCESORIES EARTHING KIT / STRUCTURE REMOTE MONITORING KIT AND INSTALLATION	85044090	5 %	1 nos	13,71,428.57	nos	13,71,428.57
2	<b>Rounding Off Amt</b>		18 %				0.01
							13,71,428.58
	<b>CGST</b>						34,285.71
	<b>SGST</b>						34,285.71
	<b>Total</b>			<b>1 nos</b>			<b>₹ 14,40,000.00</b>

Amount Chargeable (in words) E. & O E

Indian Rupees Fourteen Lakh Forty Thousand Only

Declaration

We declare that this invoice shows the actual price of the goods described and that all particulars are true and correct.

for Riveraa Computers

\_\_\_\_\_  
 Authorised Signatory

This is a Computer Generated Invoice

**(D) Geotagged Photographs**



Use of LED Bulbs in SCE campus

Photo 1



Photo2 :



### NAAC Criteria 7.1.2

#### (4) Sensor based energy conservation is achieved by Automation of college's street lighting

It is real time based timer which is used to control the college's street lights. The implementation of this automation circuit has discarded the need for a separate man power for street light operation at college campus with ON/OFF timings precisely set depends upon climatic seasons and the automated circuit is found to be operating satisfactory. By using this timer, we can switch off the lights during the day time preventing power wastage unnecessarily. The students from Dept. of EEE, Saranathan College of engineering have done this project .

##### **(i) Bill of components**

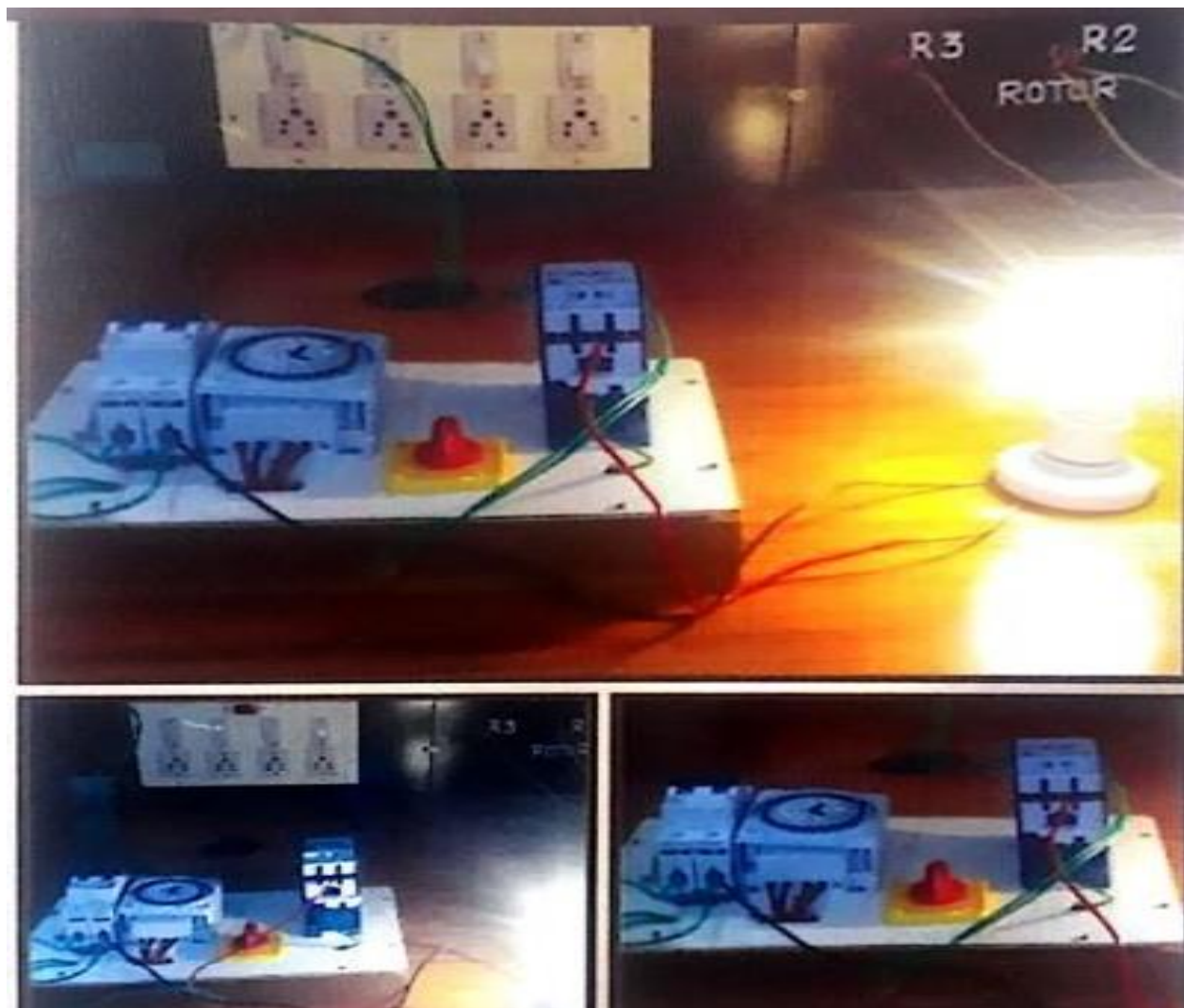
Serial NO.	Component Description	Quantity	Rating	Cost
1	Analog timer switch FM/1 quartz	1	240 V AC , 50/60 Hz	Rs.2230/-
2.	MNX 253 - Pole Contactor	1	415V/50Hz	Rs.1185/-
3.	Cam Operated Rotary switch	1	Poles:2	Rs.139/-
4.	Total Cost			Rs.3554/-

##### **(ii) Photographs**

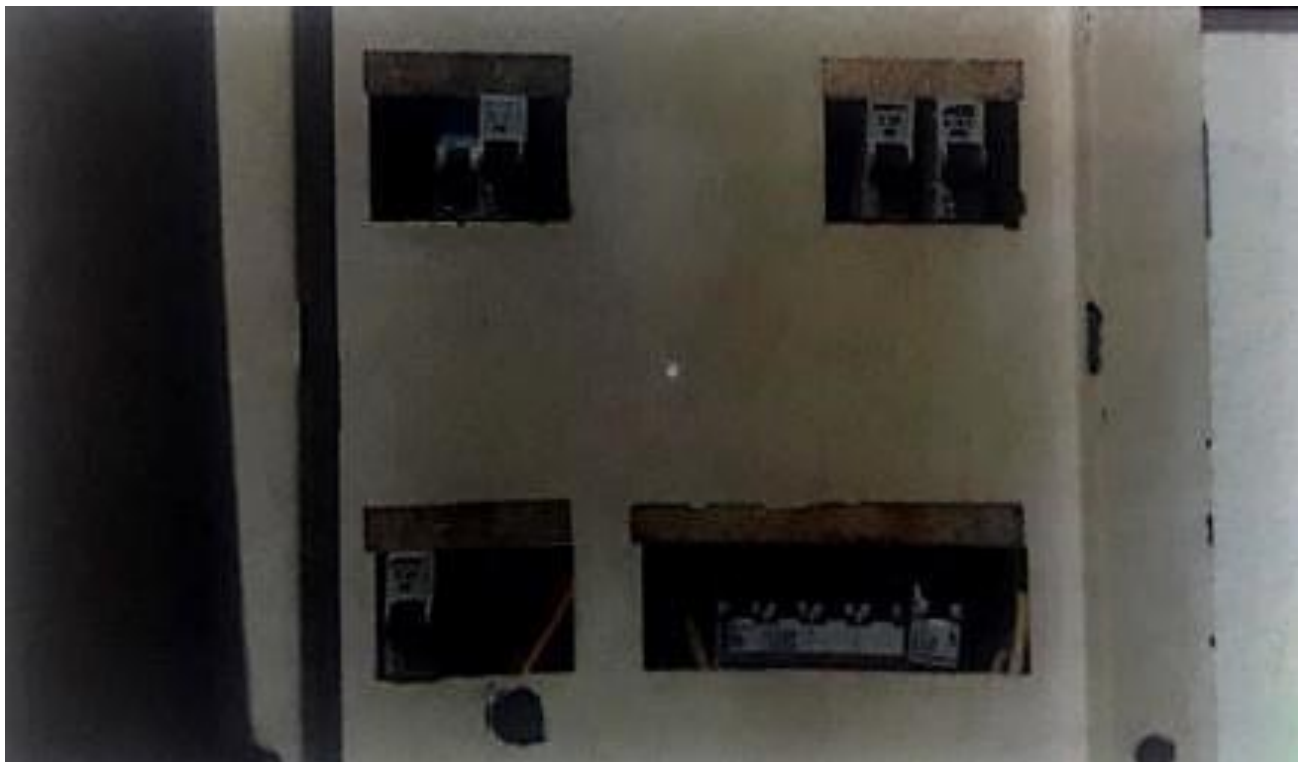
###### **(a) Street lights at college campus**



**(b) Hardware of control circuit of Automation of street light**



**(c) Incomer Panel and Distribution Board for street lighting**



(iii) Proof (Relevant pages of Project Report)

**POWER QUALITY ASSESSMENT IN INDUSTRIAL  
AND EDUCATIONAL SECTORS UNDER  
PREVAILING LOAD CONDITIONS & AUTOMATION  
OF STREET LIGHTING**

**A PROJECT REPORT**

*Submitted by*

**NIVETHA N (813812105069)**

**NIVETHAA D (813812105070)**

**PRIYADARSNI P (813812105081)**

**YAALINI LAKSHMI PRIYA M (813812105123)**

*in partial fulfilment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**

**IN**

**ELECTRICAL AND ELECTRONICS ENGINEERING**

**SARANATHAN COLLEGE OF ENGINEERING, TRICHY**

**ANNA UNIVERSITY: CHENNAI 600 025**

**APRIL 2016**

### BONAFIDE CERTIFICATE

Certified that this project report "POWER QUALITY ASSESSMENT IN INDUSTRIAL AND EDUCATIONAL SECTORS UNDER PREVAILING LOAD CONDITIONS" and "AUTOMATION OF STREET LIGHTING" is the bonafide work of "NIVETHA N, NIVETHAA D, PRIYADARSNI P, YAALINI LAKSHMI PRIYA M" who carried out the project work under my provision.

  
SIGNATURE

Dr. M.GIRIRAJKUMAR, M.Tech., Ph.D., Dr.D.KALYANAKUMAR

  
SIGNATURE

M.Tech.,Ph.D.,

HEAD OF THE DEPARTMENT,  
Electrical and Electronics Engineering,

Saranathan College of Engineering,  
Venkateshwara Nagar , Panjappur,  
Trichy-620 012.

PROFESSOR,  
Electrical and Electronics  
Engineering,

Saranathan College of Engineering,  
Venkateshwara Nagar , Panjappur,  
Trichy- 620 012.

Submitted for the ANNA UNIVERSITY examination held on 12.04.2016

### 12.3 DESCRIPTION OF CONTROL CIRCUIT

The hardware of control circuit is made up of four main components-MCB, Analog Timer Switch, On/Off Switch and MNX 25 contactor. These components were wired together as per the circuit diagram and the set up was fixed on a wooden board for real-time implementation. The hardware was tested using a temporary test-piece for successful operation along with precise timer settings. After completion of successful testing of the design circuit, it has been now interfaced in the street light circuit of our college. The implementation of this automation circuit has discarded the need for a separate manpower for street light operation at our campus with on/off timings precisely set and the automated circuit is found to be operating satisfactorily.

SERIAL NO	COMPONENT NAME	QUANTITY	RATING	PRICE
1.	Analog Timer Switch FM/1 Quartz	1	240 V AC 50/60 Hz	Rs.2230
2.	MNX 25 3-pole Contactor	1	415 V 50 Hz	Rs.1185
3.	CAM OPERATED ROTARY SWITCH	1	Poles:2	Rs.139

TABLE 12.3.1 BILL OF COMPONENTS

## Saranathan College of Engineering

## Department of EEE

## Cost saving achieved through solar energy NACC 7.1.2

S.No	Academic year	Utility electricity units consumption	Gross utility bill amount/annum in Rupees	Electricity units produced through solar PV plant	Cost of solar units produced in Rupees	Annual saving achieved through renewable energy in Rupees	Reduction of emission of CO <sub>2</sub> in tons
1	2015(june)-2016(May)	368461.8	3991256	9091.5	60640.31	60640.305	9.0915
2	2016(June)-2017(May)	604720.8	6358504.2	15463	103138.2	103138.21	15.463
3	2017(June)-2018(May)	573730.4	6122661	26444.8	197594.7	197594.686	26.444
4	2018(June)-2019(May)	628490.4	6369951	33491	262182.8	262182.8	33.491
5	2019 (June)-2020 (May)	548362.6	5850462	26818	214132.8	214132.84	26.818
Total	2015(june) To 2020(May)	2723766	28692834.2	111308.3	837688.8	837688.841	111.3075

Solar PV plant commissioned date: September 2017(20.16kW)& November 2013(10kW)

Capital cost of the plant: (20.16kW)Rs. 14,40,000/- + (10kW) Rs.10,50,000 =Rs. 24,90,000/-

Installed capacity of the plant: 20.16kW + 10 kW

## Cost saving achieved through BIO GAS energy

S.No	Year	Total Bio-gas produced in cubic meter	Total Number of LPG cylinder equally conserved	Cost of LPG saved in Rupees
1	from 2016 (May)- to 2020(June)	4889.43	129 Numbers(commercial cylinder -19 kg)	1,78,020

Bio- gas plant commissioned date: May 2016

Capital cost of the plant: Rs. 6,00,000/-

capacity of the plant: 30 Cubic Meter

## TO WHOM SO EVER IT MAY CONCERN

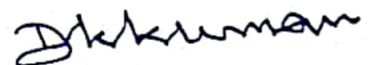
This is to certify that the institution "Saranathan College of Engineering" has been continuously practicing Energy Conservation Measures, through various Energy Efficient practices, as a token of contribution from this educational institution to reduce CO<sub>2</sub> emissions in to the atmosphere, preserve fossil fuels, prevent disastrous occurrence of weather events, slow down climate change and to use the available energy more judiciously. The various Energy conservation measures adopted in the college campus, from time to time, includes replacement of all the CRT monitors by LCD monitors in the computer Engineering laboratories / other Engineering department laboratories, retrofitting standard fluorescent lamps and CFL lamps with LED lighting, introducing automatic street lighting control to reduce energy wastage due to manual errors, upgrading window air conditioners into split air conditioners and further into BEE certified star rated energy efficient split air conditioners & inverter air conditioners. The entire college campus power supply has been converted from LT in to HT in order to reduce the operation of Diesel Generators, to meet out the peak demand, thereby reducing the massive diesel consumption and the associated pollution.

*Dr. D. Kalyanakumar*

**Dr. D. KALYANAKUMAR**  
**CERTIFIED ENERGY AUDITOR**  
**REG.No.EA-1589**  
**(By the Bureau of Energy**  
**Efficiency, Under Ministry of**  
**Power, Government of India )**

## TO WHOM SO EVER IT MAY CONCERN

This is to certify that the institution "Saranathan College of Engineering" has been continuously promoting Green Energy, from time to time, in the college campus to enhance Energy Security, lower the risk of other fuel spills, help conserve nation's natural resources, reduce pollution, create awareness to the students' community and increase reliance on Renewable Energy. 62.4kW Photo voltaic (PV) solar plant has been commissioned and in operation in the campus (10 kW at KS block on grid, 2.4 kW at KS block off grid, 50 kW at RV block on grid plant), out of which 50kW PV plant was recently commissioned and under monitoring. 2.4 kW off grid plant is feeding the Drives lab and the rest of 10kW and 50kW plants are sharing the campus other loads. Exclusively an additional 20kW on grid plant was commissioned at college girl's hostel campus and has been successfully operating. A 30 cubic metre cow dung based Bio Gas plant was put in to operation to feed thermal energy to the girl's hostel kitchen to conserve LPG. These solar plants were reducing college utility bill to an appreciable extent ensuring reduction of CO<sub>2</sub> liberation in to the atmosphere and in turn contributing to the National Mission for sustainability and a Greener Environment.



**Dr.D.KALYANAKUMAR**  
**CERTIFIED ENERGY AUDITOR**  
**REG.No.EA-1589**  
**(By the Bureau of Energy**  
**Efficiency,Under Ministry of**  
**Power,Government of India )**



TANGEDCO

Office of the Superintending Engineer,  
Trichy Elec. Distn Circle/Metro  
Mannarpuram/Trichy-20.

Memo.No.SE/TEDC/M/TRY/AEE/Cables/F. Solar/D.No: 6/18, Dt.25.04.2018.

Sub: TEDC/Metro/Trichy -Solar net metering - Saranathan  
Academy of higher Education Solar net metering - Report  
Called for -Reg.

Ref: Saranathan Academy of higher Education Lr. Dt: 16.04.2018.

\*\*\*\*\*

Copy of letter received vide reference is enclosed herewith for  
information and necessary action to effect net metering as per rules.

EE/O&M/East/Trichy is further requested to send a reply to the  
Secretary Saranathan Academy Higher Education without delay with a copy  
to this Office.

Sd/- 25.04.2018  
Superintending Engineer,  
T.E.D.C./Metro/Trichy.


To

The Executive Engineer/O&M/East/Trichy.

Copy to: AEE/R/Trichy: - Thro' E Mail only.

✓ Copy to: The Secretary, Saranathan College of Higher Education, Trichy.  
- For kind information.

//FORWARDED BY ORDER//

  
(V.BALAMURUGAN)  
ASST.EXE.ENG/U.G CABLE/TRICHY.

**SARANATHAN ACADEMY OF HIGHER EDUCATION**  
**VENKATESWARA NAGAR, PANJAPPUR**  
**TIRUCHIRAPALLI – 620 012**

**S. RAVINDRAN**  
SECRETARY

Ref: Alandur/LT/TANGEDCO/Solar Net Meter/1140

16.04.2018

TO  
The Executive Engineer,  
TANGEDCO,  
Mannarpuram,  
Trichy.

Sir,

**Sub:** Request for Net metering for the 20kW solar Plant commissioned on 02-10-2017 at  
"Saranathan Academy of Higher Education", Alundur – LT service number 2290091168 -  
reg.

Ref: Our application reference No. 10006-22910171453 dated 24.10.2017.

We have installed 20kW PV on-Grid solar Plant and commissioned on 02-10-2017 at Saranathan Academy of  
Higher Education", Alundur, after obtaining the safety certificate from CEIG. We have also submitted the necessary  
application to TANGEDCO well in advance for the "Net Metering" and completed all the procedural formalities.  
Presently only the Girls hostel is functioning in that campus and the LT service is under tariff V (commercial).

We would be much obliged, if you could kindly inform us the reason for the delay in installing the "Net  
Meter".

Once again we request you to kindly install the "Net Meter" without further delay.

Thanking you,

Yours faithfully

*S. R.*  
SECRETARY

**SECRETARY**  
**SARANATHAN ACADEMY OF**  
**HIGHER EDUCATION**  
**TIRUCHIRAPALLI**

**Copy to :** The Chief Engineer, TANGEDCO, Thennur, Trichy  
The Superintending Engineer, TANGEDCO, Mannarpuram, Trichy  
The Asst. Executive Engineer, TANGEDCO, Mannarpuram, Trichy  
The Asst. Engineer, TANGEDCO, Manikandam, Trichy

*O/c.*

FAX: 0431-2473684

E-mail: secretary@saranathan.ac.in

Off.: 0431-2473686

## Annexure – II

### Declaration

I hereby declare that the information furnished above is true to the best of my knowledge and behalf. If false, TANGEDCO has the right to reject/cancel the application. Further, I hereby agree with the specifications, terms and conditions stipulated by TANGEDCO for the selection and installation of roof-top solar power plant. I also confirm that I am aware of the conditions stipulated in the CEA regulations on Technical Standards for connectivity of the Distributed Generation Resources) Regulations 2013 and confirms that I will abide by the same.

Place: TRICHY

Signature: S. R. -

Date: 06.09.2017

Name: S. RAVINDRAN

**SECRETARY**  
**SARANATHAN ACADEMY OF**  
**HIGHER EDUCATION**  
**TIRUCHIRAPALLI**

#### Encl:-

1. Copy of Electricity Bill (YES/NO) : YES
2. Copy of EB Card (YES/NO) : YES
3. Copy of Property Tax (YES/NO) : YES

Form - 1  
Net Metering Connection Application

To:  
The Assistant Engineer,  
O & M / Manikandam,  
Trichy

I / we herewith apply for a solar energy net-metering connection at the service connection and for the solar PV plant of which details are given below.

1. Name of applicant: THE SECRETARY
2. Address of applicant: SARANATHAN ACADEMY OF HIGHER EDUCATION,  
MADURAI MAIN ROAD, ALUNDUR
3. Service connection number: 062290091168
4. Service connection tariff: LM51
5. Telephone number(s): 9894582557
6. Email ID: sriram-eee@saranathan.ac.in
7. Solar PV plant capacity (Watts): 20,160 (watts)
8. Solar grid inverter make and type: Delta RPI M20A
9. Solar grid inverter has automatic: Yes  
isolation protection (Y/N)?
10. Has a Solar Generation Meter been  
installed (Y/N)? : Yes
11. Expected date of commissioning of  
solar PV system. : 02.10.2017

Name: S. RAVINDRAN

Signature S. R - -

Date **SECRETARY**  
SARANATHAN ACADEMY OF  
HIGHER EDUCATION  
TIRUCHIRAPALLI