



# DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

## An Autonomous Institute

Approved by A.I.C.T.E & Permanently affiliated to SBTET, Vijayawada

Accredited by NAAC with 'A' Grade and Inclusion u/s 2(f) & 12(B) of UGC Act

An ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018 Certified Institute.

NH-16, Anakapalle - 531002, Visakhapatnam, A.P.

Website: [www.diet.edu.in](http://www.diet.edu.in), 9963993229 E-mail: [principal@diet.edu.in](mailto:principal@diet.edu.in)

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## Criterion-7

### 7.1.2 The Institution has facilities for Alternate Sources of Energy and Energy Conservation Measures

#### 1. Solar energy

As an initiative to adopt renewable energy generation, the Institute has encouraged the students of electrical engineering department to work on the real time project of illuminating street lights in the campus with Solar Energy. As a part of this, the department of EEE at DIET collaborated with EFFISOL Energy Solutions Pvt. Ltd to erect an Off Grid solar PV system with an installed capacity of 2kVA MPPT Technology based solar inverter, six solar panels rated at 1.92kwp and 08 solar batteries with 150Ah rating to meet the street light illumination needs at college premises.

An off grid 2 kwp solar-systems designed and implemented for illumination of LED Street lights in college campus. In order to compute the off-grid solar system components, solar data for Visakhapatnam district is obtained from NREL web site. The design was done based on the shortest day of the year. The solar system is set to supply load current for 12 hrs during night time automatically with a digital programmable timer.

Project mainly focused on various design aspects like PV sizing, battery sizing and MPPT based inverter sizing also required protection like DC and AC side earthing along with lightning arrester followed by cable sizing. In this computation the shortest day of the year has been assumed. Although the total design is acceptable from an engineering point of view, from economical view of the total cost of system is higher than that has been designed for summer days.



**Solar Panels provided at the entrance of the Institution**



# Dadi Institute of Engineering & Technology

(Approved by A.I.C.T.E., New Delhi & Affiliated to J.N.T.U.K., Kakinada)

NAAC Accredited Institute

An ISO 9001 : 2008, ISO 14001 : 2004 & OHSAS 18001 : 2007 Certified Institution

NH-5, Anakapalle, Visakhapatnam-531002, A.P.

Ph. : 08924-221111,22,33, 9963981111 / www.diet.edu.in / e-mail : info@diet.edu.in

Lr. No.131 Engg./P.O./2018

Date: 10-10-2018

To

EffiSol Energy Solution Pvt.Ltd.  
#16-200,  
Prahalladapuram,  
Visakhapatnam-530 027.

Dear Sir,

Sub: Purchase Order for 2KW Off-Grid Solar PV System – Reg.

Ref: EFFISOL/Q/2018/06/2, dated 08/06/2018.

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With reference to your Proposal cited above, I am herewith placing the Purchase order for 2KW Off-Grid Solar PV System.

S. No	Item Description	Qty	Unit Price	GST	GST Amount	Amount
1.	Off-grid Solar PV System with 2 KVA MPPT Technology Based Soar Inverter, 1.92 kWp Solar Panels and 8numbers of 150 Ah Solar Batteries along with required materials for installation. Automatic Timer Controller.	1	2.07.000	5 %	10.350	2,17,350

(Rupees Two lakhs seventeen thousand and three hundred fifty only)

We are herewith paying an advance amount of Rs .1,00,000 /- through RTGS.

**Terms & Conditions:**

1. The price is inclusive of all taxes
2. The equipment shall be under warranty (10 years Modules) (3 years for Inverters) (5 years for Batteries).
3. 50 % advance along with purchase order.
4. The equipment shall be delivered at the college address within 10 days.
5. Remaining payment will be done after commissioning of Solar System.

Thanking you,



Yours Sincerely,

*Dadi Ratnakar*  
(DADI RATNAKAR)  
Correspondent

**Effisol Energy Solutions Private Limited**  
 #16-200, Main Road Prahaladapuram, Prahaladapuram, Visakhapatnam Andhra Pradesh 530027 India  
 GSTIN: 37AAEC4349M1Z8

**TAX INVOICE**

Invoice# : EFFISOL/18-19/44  
 Invoice Date : 08/11/2018

Place Of Supply : Andhra Pradesh (37)  
 Mode/Terms of Payment : Credit  
 Terms of Delivery : Ex-Works

Bill To: Dadi Institute of Technology  
 National Highway 5, Anakapalle, Visakhapatnam - 531002, Andhra Pradesh, India  
 Contact Person: Mr. Dadi Ratnakar  
 Phone: 98924-221111, 22333, 9963081111 / www.diet.edu.in / e-mail: info@diet.edu.in

#	Item & Description	HSN/SAC	Qty	Rate	CGST	SGST	Amount
1	2 kW Offgrid Solar PV System Components: 1. Solar PV Modules: 320 Wp - 6 Nos 2. 3 kVA MPPT technology based offgrid inverter 3. Batteries: 8 Nos of 150 Ah (± 10 rating) Solar Batteries 4. Mounting structure: GI mounting structure 5. DC/AC line ACDB for protection and maintenance of solar inverter and solar panels, battery for DC side 6. BPTV Cable: 12sq mm of above the rating from 100m to 100m 7. Automatic earth connector 8. Other connection accessories	85	1.00	155,000.00	2.5%	2.5%	159,800.00
Sub Total							159,800.00
CGST @ 2.5%							4,000.00
SGST @ 2.5%							4,000.00
Total							167,800.00
Psychometric cost							(1,000.00)
Balance Due							Rs. 166,800.00

Total in Words: **Rs. 1,66,800/-**  
 Rupees two lakh five thousand five hundred eighty

Company Bank Account Details:  
 Effisol Energy Solutions Pvt. Ltd.  
 AC No: 36268215018 IFSC Code: SEPN0001611 State Bank of India

Terms & Conditions:  
 1. Warrantee according to manufacturer's description  
 2. Goods once sold will not be taken back.  
 3. All disputes are subjected to Visakhapatnam Jurisdiction only  
 4. Goods remain property of Effisol until full payment is done.

Authorized Signature: *D. Venu*

**Dadi Institute of Engineering & Technology**  
 (Approved by A.I.C.T.E., New Delhi & Affiliated to J.N.T.U.K., Kakinada)  
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Lr. No.131/Engg./P.O./2018 Date: 16-10-2018

To: Effisol Energy Solution Pvt.Ltd.  
 #16-200, Prahaladapuram, Visakhapatnam-530 027.

Dear Sir,

Subj: Purchase Order for 2KW Off-Grid Solar PV System - Reg.  
 Ref: EFFISOL/Q/2018/06-2, dated 08/06/2018.

With reference to your Proposal cited above, I am herewith placing the Purchase order for 2KW Off-Grid Solar PV System.

S. No	Item Description	Qty	Unit Price	GST	GST Amount	Amount
1.	Offgrid Solar PV System with 2 kVA MPPT Technology Based Solar Inverter, 1 2kW Solar Panels and Rounders of 150 Ah Solar Batteries along with required materials for installation, Automatic Timer Controller.	1	2,07,000	5%	10,350	2,17,350

(Rupees Two lakhs seventeen thousand and three hundred fifty only)  
 We are herewith paying an advance amount of Rs. 1,00,000/- through RTGS.

Terms & Conditions:  
 1. The price is inclusive of all taxes  
 2. The equipment shall be under warranty (10 years Modules) (5 years for Inverters) (5 years for Batteries).  
 3. 50% advance along with purchase order.  
 4. The equipment shall be delivered at the college address within 10 days.  
 5. Remaining payment will be done after commissioning of Solar System.

Thanking you.

Yours Sincerely,  
*Dr. Ratnakar*  
 (DADI RATNAKAR)  
 Correspondent

**Effisol Energy Solutions Private Limited**  
 #16-200, Main Road Prahaladapuram, Prahaladapuram, Visakhapatnam Andhra Pradesh 530027 India  
 GSTIN: 37AAEC4349M1Z8

**TAX INVOICE**

Invoice# : EFFISOL/18-19/47  
 Invoice Date : 12/11/2018

Place Of Supply : Andhra Pradesh (37)  
 Mode/Terms of Payment : Credit  
 Terms of Delivery : Ex-Works

Bill To: Dadi Institute of Technology  
 National Highway 5, Anakapalle, Visakhapatnam - 531002, Andhra Pradesh, India  
 Contact Person: Mr. Dadi Ratnakar  
 Phone: 98924-221111, 22333, 9963081111 / www.diet.edu.in / e-mail: info@diet.edu.in

#	Item & Description	HSN/SAC	Qty	Rate	CGST	SGST	Amount
1	Installation of 2 kW Offgrid Solar PV System	59	1.00	9,000.00	5%	5%	9,900.00
Sub Total							9,900.00
CGST @ 5%							495.00
SGST @ 5%							495.00
Total							Rs. 11,759.85
Balance Due							Rs. 11,759.85

Total in Words: **Rs. 11,759.85/-**  
 Rupees eleven thousand seven hundred fifty-nine and eighty-eight paise

Company Bank Account Details:  
 Effisol Energy Solutions Pvt. Ltd.  
 AC No: 36268215018 IFSC Code: SEPN0001611 State Bank of India

Terms & Conditions:  
 1. Warrantee according to manufacturer's description  
 2. Goods once sold will not be taken back.  
 3. All disputes are subjected to Visakhapatnam Jurisdiction only

Authorized Signature: *V. Venkatesh*

Bills of Solar Panel System Installed in the Institute

## 2. Wheeling to the Grid

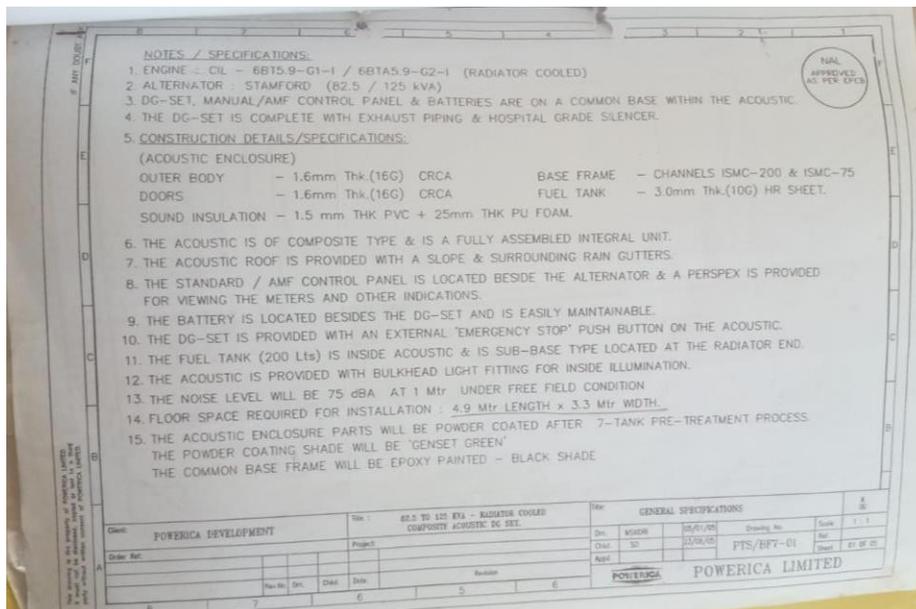
160 KVA Transformer withdrawing 100 KVA

### Specification of the grid in the Institution

S.No.	Description	Specification
1	Eastern Power Distribution Company of Andhra Pradesh Ltd No Load Voltage	11 KV [HV] 433V [LV]
2	Amperes	8.4A [HV] 213.4A [LV]
3	No. of Phases	03
4	Frequency	50Hz
5	Type of Cooling	ONAN Vector Group DYN 11
6	Volume of Oil	260 Liters
7	Core & Winding Weight	400 Kgs
8	Total Weight	850Kgs
9	Maximum Temperature rise in Oil	45°C
10	45°C Percentage Impedance Volts	4.5 %
11	Power Factor	0.97
12	Load Factor	5%



**Devices installed for wheeling to the Grid**



**Instructions and notes regarding specifications and construction details of the wheeling to the grid**

TAX INVOICE (Page 2)

(ORIGINAL FOR RECIPIENT)

<b>SRINIVASA SALES AND SERVICE PVT LTD</b> Authorised Dealer for Cummins India Ltd (DBU) Plot No 99/9, D Block Autonagar, Gajuwaka, Visakhapatnam - 530012 GSTIN : 37AAMCS8086K1Z3 State Name : Andhra Pradesh, Code : 37 PAN No: <b>AAMCS8086K</b>	Invoice No. <b>AMCVSP2122000311</b>	Dated <b>1-Dec-21</b>
	Delivery Note	Mode/Terms of Payment <b>Credit</b>
Consignee (Ship to) <b>DADI INSTITUTE OF ENGINEERING AND TECHNOLOGY</b> NEAR NH-5, ANAKAPALLI, VISAKHAPATNAM State Name : Andhra Pradesh, Code : 37	Reference No. & Date.	Other References
	Buyer's Order No.	Dated
Buyer (Bill to) <b>DADI INSTITUTE OF ENGINEERING AND TECHNOLOGY</b> NEAR NH-5, ANAKAPALLI, VISAKHAPATNAM State Name : Andhra Pradesh, Code : 37	Dispatch Doc No.	Delivery Note Date
	Dispatched through	Destination
Terms of Delivery		

Sl No	Part No.	Description of Services	HSN/SAC	Quantity	Rate	per	Disc %	Disc Amt	Amount	Taxable Value	Central Tax Rate	Central Tax Amount	State Tax Rate	State Tax Amount	Total Amount
		SGST-Tax on Service-Output							1,188.00						
Total									6 NOS	₹ 15,576.00	13,200.00	1,188.00	1,188.00	15,576.00	

Amount Chargeable (in words) <b>INR Fifteen Thousand Five Hundred Seventy Six Only</b>	Taxable Value	Central Tax Rate	Central Tax Amount	State Tax Rate	State Tax Amount	Total Tax Amount
	13,200.00	9%	1,188.00	9%	1,188.00	2,376.00
	<b>Total:</b> 13,200.00		<b>1,188.00</b>		<b>1,188.00</b>	<b>2,376.00</b>

Tax Amount (in words) : **INR Two Thousand Three Hundred Seventy Six Only**

Company's PAN : **AAMCS8086K**

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

**OUR BANK DETAILS CHANGED TO**

Bank Name : **Bank of Baroda**  
 A/c No. : **05160500000053**  
 Branch & IFS Code : **Governorpet, Vijayawada-520002 & BARBOVIJAYA**

Customer's Seal and Signature



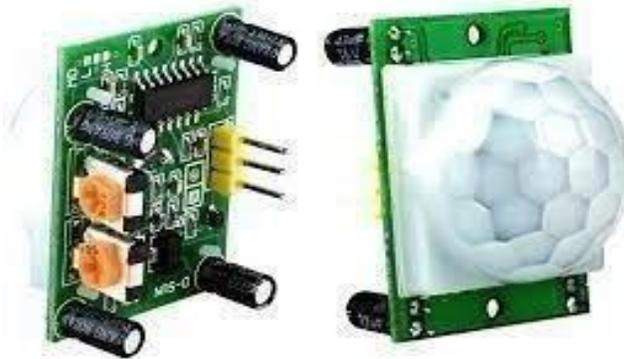
**Invoice of the wheeling to the grid**

### 3. Sensor Based Energy Conservation

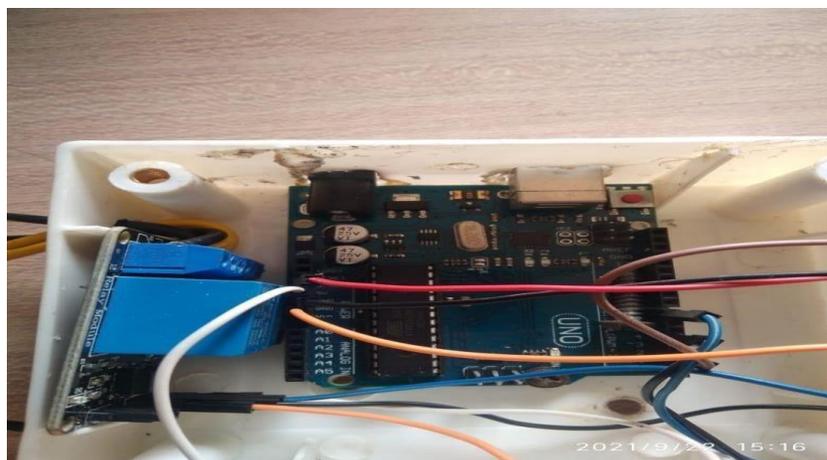
At DIET, the concept of Home Automation is introduced to reduce the usage of power through different mechanisms in which the PIR sensor plays a key role which detects if any movement occurs in specified range, in case of any motion detected, the sensors give the signal of motion to the microcontroller.

The ARDUINO UNO is the micro controller used to process the data in this model, where the data pins in the controller are used to recognize the signal from the PIR sensor, if the signal received from PIR is high, the output device will be switched ON and if the signal received from the PIR is low then the output device will be switched OFF. RELAY is used to protect the electronic devices from the high-power AC supply and act as a switch.

Also, an Android Application has been developed where, through the Bluetooth from mobile control signals are relayed through wireless medium to Bluetooth HC-05 Module. From Bluetooth Module control signals are relayed to Arduino Micro Controller where it controls the output pins. Output is connected to Relays (Magnetic Switch).



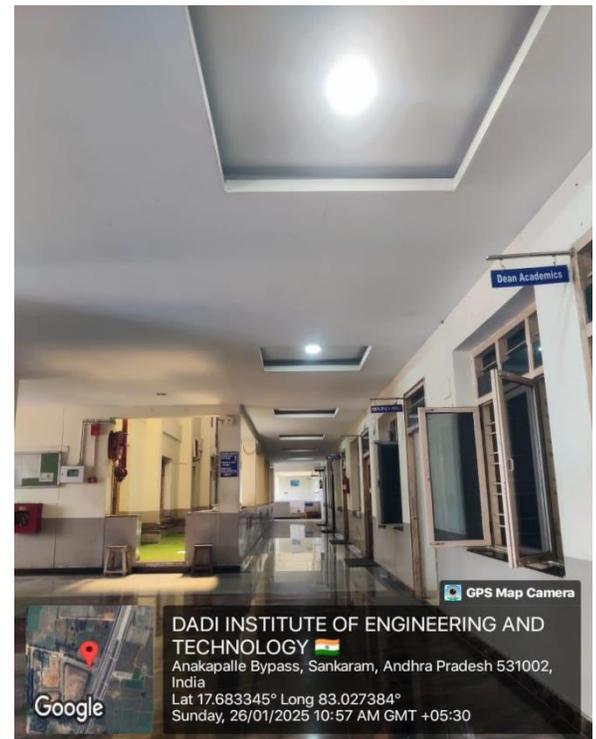
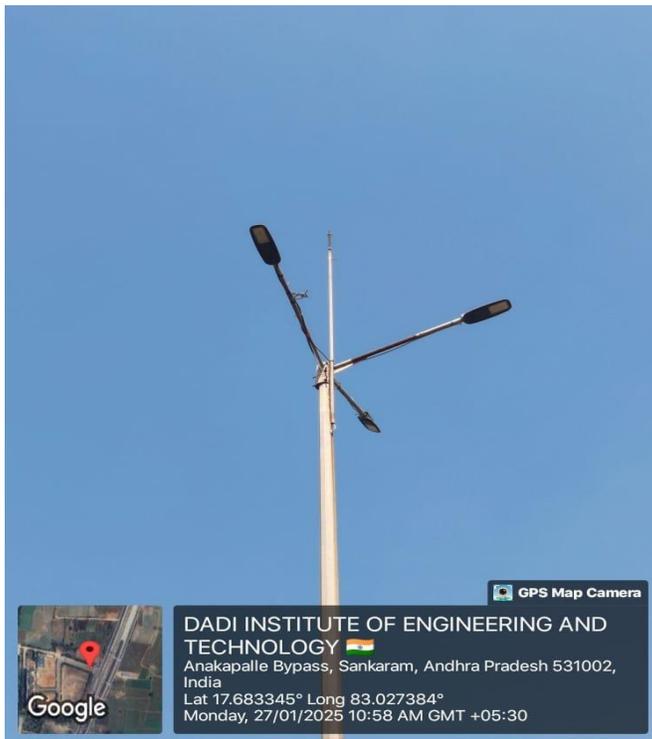
**Sensor PIR**



**Sensor Kit**

#### 4. Use of LED Bulbs/Power Efficient Equipment

DIET is illuminated with Environmental friendly LED [Light Emitting Diode] Lights all over the campus with ratings as per the required luminous intensity at a given location. The details of exterior and interior lighting are provided below:



**LED Lights in the camp**

**External Lighting:**

List of LED Lights used for External Lightings

S.No	Description	Count of LED Bulbs
1	40W LED Lights at the Main Gate Cost-Rs.4000 each	4
2	120W Solar based Lights Cost-Rs.8000each	9
3	24W - Street Lights - Ground Cost-Rs.2500 each	40
4	80W - Ground Cost-Rs.6000 each	9

**Interior Lighting:**

List of LED Lights used for Interior Lightings

S.No	Description	Count of LED Bulbs
1	24W - Ground Floor Corridor Cost-Rs.2500 each	30
2	12W - Ground Floor Corridor Cost-Rs.120each	60
3	15W - Ground Floor Corridor Cost-Rs.600each	10
4	1 <sup>st</sup> Floor to 5 <sup>th</sup> Floor - 10 LED Lights per each floor Cost-Rs.120 each	50
5	LED Tube Lights of 24W are placed at Admission Office, Exam Cell, Principal Office, Diploma Office, SeminarHall2, Music Room, Library and Chairman Office with Cost-Rs.300each	45
6	Seminar Hall lighting - 40W Flood Lights 4000each	2
7	100W Lights costing Rs.5500 each	2



  
Dr. R. Vaikunta Rao  
Principal  
Dadi Institute of Engineering & Technology  
Autonomous  
Anakapalle - 531002