

## **Criterion-7 Institutional Values And Best Practices**

### **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 set to supply load current for 12 hrs during night time automatically with 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 lightening arrester followed by cable sizing. In this computation the shortest day of the year has been assumed. Although the total design is acceptable from 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

N11-5, 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,  
Prahaldapuram,  
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)

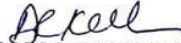
We are herewith paying an advance amount of Rs .1,00,000 /- through RTGS.

**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)  
Correspondent

**Effisol Energy Solutions Private Limited**  
 #16-203, Main Road Prahaladapuram,  
 Prahaladapuram,  
 Visakhapatnam Andhra Pradesh 530027  
 India  
 GSTIN: 37AAEE4349M1Z2

**TAX INVOICE**

Invoice No: Effisol/16-1944  
 Invoice Date: 08/11/2018

Place of Supply: Andhra Pradesh (27)  
 Mode/Terms of Payment: Credit  
 Terms of Delivery: Ex-Works

Bill To: Dadi Institute of Technology  
 National Highway 5, Anakapalle,  
 Visakhapatnam - 531002, Andhra Pradesh.

Ship To: Dadi Institute of Technology  
 National Highway 5, Anakapalle,  
 Visakhapatnam - 531002, Andhra Pradesh  
 India  
 Contact Person: Mr. Dadi Ratnakar  
 Phone: :

| # | Item & Description  | HSN/SAC | Qty  | Rate       | CGST | SGST | Amount     |
|---|---|---------|------|------------|------|------|------------|
| 1 | 2 kW Off-grid Solar PV System<br>1. Solar PV Modules: 330 Wp x 6 Nos<br>2. 3 kVA MPPT technology based off-grid inverter<br>3. Batteries: 8 Nos of 150 Ah (E-1D rating) Solar Batteries<br>4. Mounting structure: GI mounting structure<br>5. DC/AC and AC/DC for protection of solar inverter and solar panels, wiring for DC side<br>6. BOS Cable: 1.5 sq mm of above (for wiring from BOS to inverter)<br>7. Automatic inverter controller | 85      | 1.00 | 155,800.00 | 2.5% | 2.5% | 195,800.00 |

Sub Total: 195,800.00  
 CGST (2.5%): 4,895.00  
 SGST (2.5%): 4,895.00  
 Total: Rs. 205,590.00  
 Payment Mode: 10,00,000.00  
 Balance Due: Rs. 195,590.00

Authorized Signatures: *D. Venkatesh*

Terms & Conditions:  
 1. Warranty 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

**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: 16-10-2018

To: Effisol Energy Solution Pvt.Ltd.  
 816-200,  
 Prahaladapuram,  
 Visakhapatnam-530 027.

Dear Sir,  
 Sub: Purchase Order for 2K W Off-Grid Solar PV System - Reg.  
 Ref: EFFISOL/O/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.    | Off-grid Solar PV System with 2 KVA MPPT Technology Based Solar Inverter, 1.92 kWp Solar Panels and Batteries of 150 Ah Solar Batteries along with required materials for installation, Automatic Tiller 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,  
*Dadi Ratnakar*  
 (DADI RATNAKAR)  
 Correspondent

**Effisol Energy Solutions Private Limited**  
 #16-203, Main Road Prahaladapuram,  
 Prahaladapuram,  
 Visakhapatnam Andhra Pradesh 530027  
 India  
 GSTIN: 37AAEE4349M1Z2

**TAX INVOICE**

Invoice No: Effisol/16-1944  
 Invoice Date: 12/11/2018

Place of Supply: Andhra Pradesh (27)  
 Mode/Terms of Payment: Credit  
 Terms of Delivery: Ex-Works

Bill To: Dadi Institute of Technology  
 National Highway 5, Anakapalle,  
 Visakhapatnam - 531002, Andhra Pradesh.

Ship To: Dadi Institute of Technology  
 National Highway 5, Anakapalle,  
 Visakhapatnam - 531002, Andhra Pradesh  
 India  
 Contact Person: Mr. Dadi Ratnakar  
 Phone: :

| # | Item & Description                            | HSN/SAC | Qty  | Rate     | CGST | SGST | Amount   |
|---|---|---------|------|----------|------|------|----------|
| 1 | Installation of 2 kW Off-grid Solar PV System | 59      | 1.00 | 9,916.00 | 5%   | 5%   | 9,966.00 |

Sub Total: 9,966.00  
 CGST (5%): 498.30  
 SGST (5%): 498.30  
 Total: Rs. 11,799.88  
 Balance Due: Rs. 11,799.88

Authorized Signatures: *V. Venkatesh*

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

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

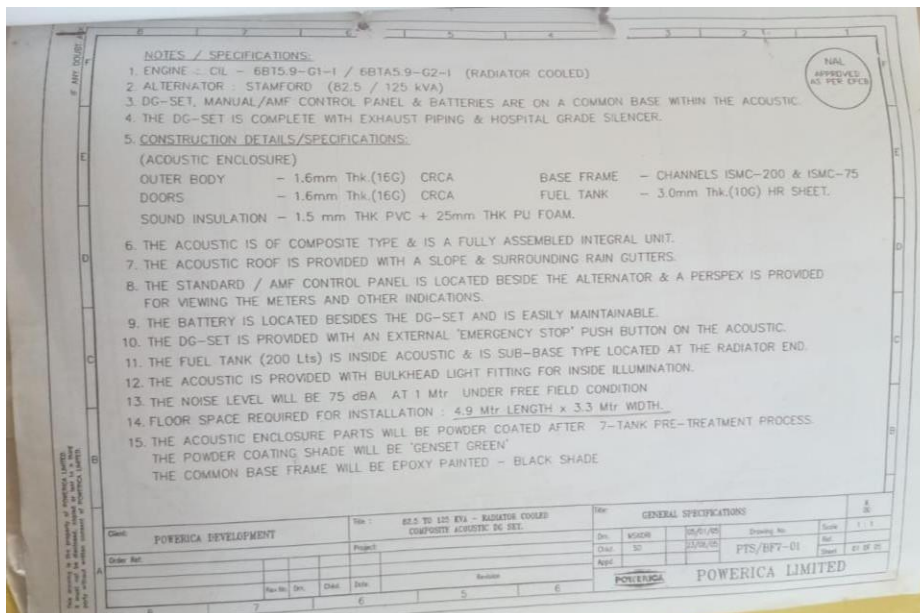
| S.No. | Description  | Specification               |
|-------|--|-----------------------------|
| 1     | Eastern Power Distribution Company of Andhra Pradesh Ltd No Load Voltage | 11 KV [HV]<br>433V [LV]     |
| 2     | Amperes  | 8.4A [HV]<br>213.4A [LV]    |
| 3     | No. of Phases  | 03                          |
| 4     | Frequency  | 50Hz                        |
| 5     | Type of Cooling  | ONAN Vector Group<br>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



Transformer and Wheeling to the Grid at South-East portion of the Institution



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

NAAC Self-Study Report (SSR)

(ORIGINAL FOR RECIPIENT)

**TAX INVOICE (Page 2)**

|   |  |  |  |
|---|--|--|--|
| <b>SRINIVASA SALES AND SERVICE PVT LTD</b><br>Authorised Dealer for Cummins India Ltd (DBU)<br>Plot No 99/3, D Block<br>Autonagar, Gajuwaka, Visakhapatnam - 530012<br>GSTIN : 37AAMCS8086K1ZG<br>State Name : Andhra Pradesh, Code : 37<br>PAN No: <b>AAMCS8086K</b> |  | Invoice No.<br><b>AMCVSP2122000311</b> | Dated<br><b>1-Dec-21</b>               |
|   |  | Delivery Note                          | Mode/Terms of Payment<br><b>Credit</b> |
| Consignee (Ship to)<br><b>DADI INSTITUTE OF ENGINEERING AND TECHNOLOGY</b><br>NEAR NH-5, ANAKAPALLI,<br>VISAKHAPATNAM<br>State Name : Andhra Pradesh, Code : 37   |  | Reference No. & Date.                  | Other References                       |
|   |  | Buyer's Order No.                      | Dated                                  |
| Buyer (Bill to)<br><b>DADI INSTITUTE OF ENGINEERING AND TECHNOLOGY</b><br>NEAR NH-5, ANAKAPALLI,<br>VISAKHAPATNAM<br>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 |
|--------------|----------|-----------------------------------|---------|----------|------|-----|--------|----------|--------------------|---------------|------------------|--------------------|----------------|------------------|--------------|
|              |          | <b>SGST-Tax on Service-Output</b> |         |          |      |     |        |          | 1,188.00           |               |                  |                    |                |                  |              |
| <b>Total</b> |          |                                   |         |          |      |     |        |          | <b>₹ 15,576.00</b> | 13,200.00     | 9%               | 1,188.00           | 9%             | 1,188.00         | 15,576.00    |

E & O E

| Amount Chargeable (in words) <b>INR Fifteen Thousand Five Hundred Seventy Six Only</b> | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Taxable Value</th> <th>Central Tax Rate</th> <th>Central Tax Amount</th> <th>State Tax Rate</th> <th>State Tax Amount</th> <th>Total Tax Amount</th> </tr> <tr> <td style="text-align: right;">13,200.00</td> <td style="text-align: center;">9%</td> <td style="text-align: right;">1,188.00</td> <td style="text-align: center;">9%</td> <td style="text-align: right;">1,188.00</td> <td style="text-align: right;">2,376.00</td> </tr> <tr> <td><b>Total:</b></td> <td></td> <td style="text-align: right;"><b>1,188.00</b></td> <td></td> <td style="text-align: right;"><b>1,188.00</b></td> <td style="text-align: right;"><b>2,376.00</b></td> </tr> </table> | 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> |  | <b>1,188.00</b> |  | <b>1,188.00</b> | <b>2,376.00</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>  |   | <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.


Customer's Seal and Signature

**OUR BANK DETAILS CHANGED TO**

Bank Name : **Bank of Baroda**  
 A/c No. : **0516050000053**  
 Branch & IFS Code : **Governorpet, Vijayawada-520002 & BARBOVIJAYA**

for **SRINIVASA SALES AND SERVICE PVT LTD**

*[Signature]*  
 Authorised Signatory



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.

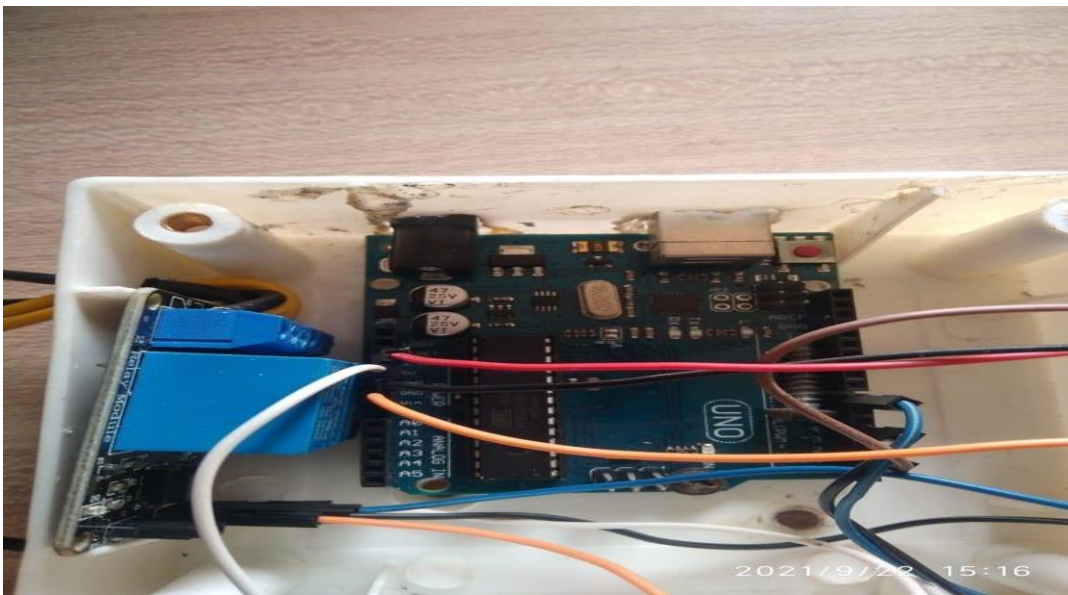
Also, an Android Application has been developed where, through the Bluetooth from mobile control signals are relayed through wireless medium to Bluetooth HC-05 Module. From Bluetooth Module control signals are relayed to Arduino Micro Controller where it controls the output pins. Output is connected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





Sensor PIR

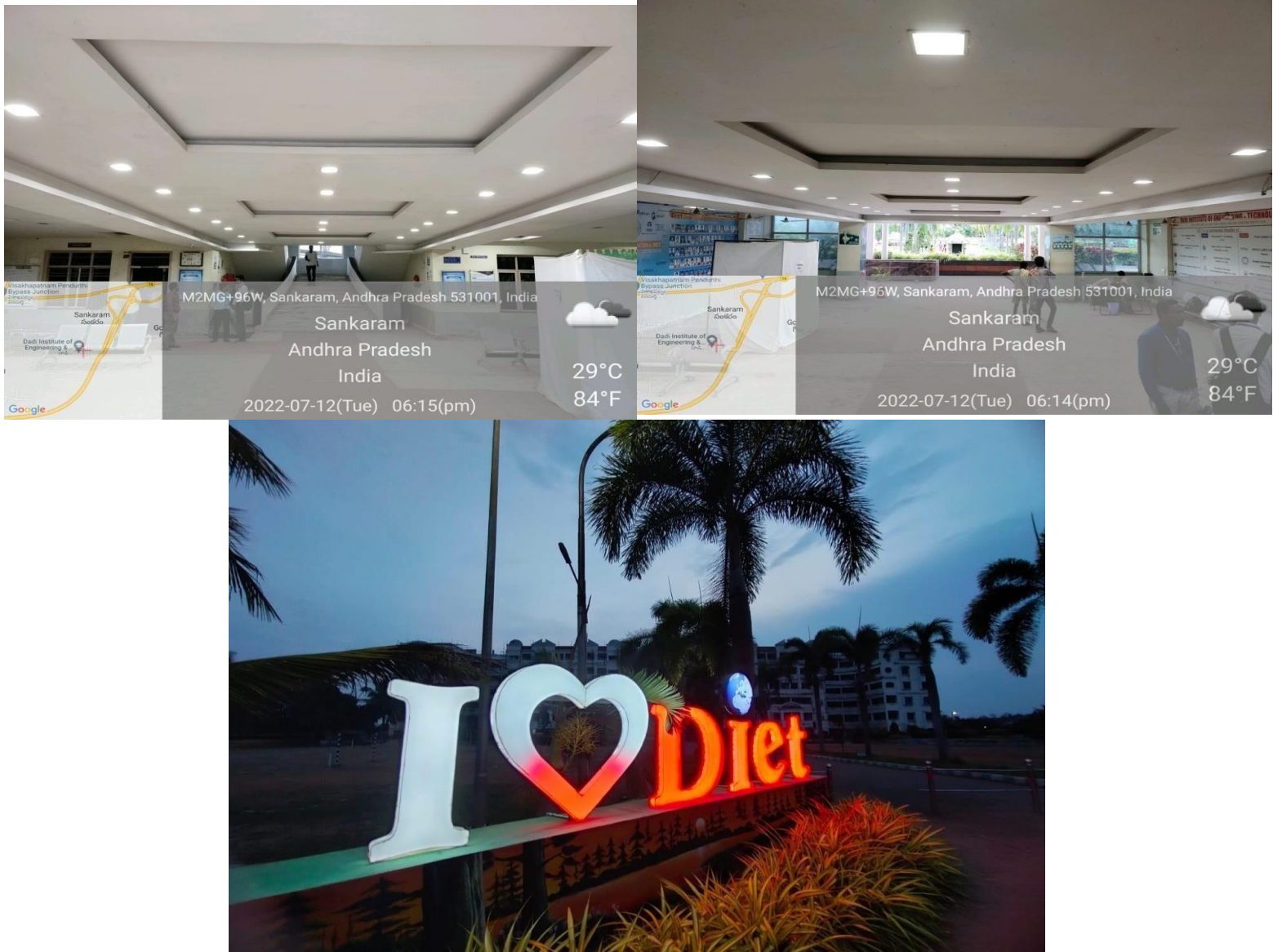
Sensor Kit



#### 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 campus

**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<br>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<br>Flood Lights 4000each   | 2                  |
| 7    | 100W Lights costing Rs.5500 each   | 2                  |