



Oriental University, Indore (M.P.)

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

Response:

All life on earth is supported by the sun. This amazing resource radiates energy and provides us both heat and light by fusing hydrogen into helium at its core. We call this solar radiation. Only about half of this solar radiation makes it to the Earth's surface. The rest is either absorbed or reflected by clouds and the atmosphere. Still, we receive enough power from the sun to meet the power demands of all mankind millions of times over. Solar energy power from the sun is a vast, inexhaustible, and clean resource. Biogas is also a very important source of renewable energy.

In order to cater to the fast growing energy requirements, it is very important to conserve the existing energy resources and at the same time to look for renewable energy resources. At Oriental University Indore, we aim at focusing on development of unconventional energy sources viz solar energy and biogas. While solar energy is used to meet the major energy requirements of the University, the newly installed biogas plant is planned to cater the energy required for providing food to the hostel students.

1. Solar Energy

In the year of 2020, OUI got permission for the installation of a 100 KWp solar PVC plant from the Superintending Engineer, MPPKVVC Ltd, Indore, and since its installation, it is fully operated in on-grid mode, which means some of the electricity generated is also supplied to the grid of MPPKVVC Ltd, Indore. Total Power generated from June-2021 to May-2022 is 78,426 units. It is about 19.86 % of the total Energy consumption of the university. Figure.1 represents the overview of installed solar PVC panels.



Figure.1: Layout of Solar Panels

ORIENTAL		JOINT METER READING					CGEPL
		100kWp SOLAR POWER PLANT					
		Oriental University, Indore (M.P)					
Month	Meter No.	Previous		Present		Difference (kWh)	Remarks
		Date	Reading (kWh)	Date	Reading (kWh)		
Mar-22	XD414878	02-03-22	5103	30-03-22	5287	184	
		Total Net Reading (MF:40)				7360	
Billing Days	28	Grid Outage (Hrs)		Previous Reading		7120	
NOTE: M.F. i.e. Multiplication Factor, For CT Ratio is 200/5, MF = 40							
(Centaurus Green Energy Pvt. Ltd. representative)				(Oriental University)			
Name : Ritesh Kumar				Name : Dhruv Ghai			
Designation: Senior Engineer-O&M				Designation: Pro- VC			
Contact No. 9560966332				Contact No.9589563210			

Figure.2: Solar Bill for March 2022

2. Biogas Plant

Biogas is a mixture of gases, primarily consisting of methane and carbon dioxide, produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste and food waste. It is one of the important renewable energy sources, whose importance cannot be overlooked. The detailed working of a biogas plant is described in the following document:

Considering these aspects, Oriental University Indore is striving to have its own biogas plant, and in this series, the process of installation of a biogas plant in the university has been initiated. Purchase order for this plant is presented below. As per planning, this biogas plant (capacity of this biogas plant is 50 Kg/day food waste and equivalent LPG yield per day 4.5 to 5 kg/day) shall be installed behind the hostels, on account of having ease in obtaining waste materials from hostels, mess and residency of faculty members and staff members.

Biogas use for Cooking

Amount of Biogas yield per day = $10 \text{ m}^3/\text{day}$

1 m^3 of Biogas is equivalent to 0.45 kg of LPG,

Therefore equivalent LPG yield per day = $0.45 \times 10 = 4.5 \text{ kg/day}$. Equivalent LPG yield per year = $4.5 \times 270 = 1215 \text{ kg/year}$.

Number of LPG cylinders produce = $1215/20 = 60.75$ No of cylinders/year
LPG cylinder price (commercial) = Rs.1500/- per cylinder

Amount of money can be saved per year = $60.75 \times 1500 = \text{Rs. } 91,125 \text{ /- per year}$



ORIENTAL UNIVERSITY, INDORE

Established under M.P. Niji Vishwavidyalay (Sthapana avam Sanchalan), Adhiniyam 2007

Ref: -OUI/Reg./004/PO/ 1334

November 11, 2021

To,
Synod Bioscience
3rd floor, Cross 2A,
Kammanahalli, Bengaluru,
Karnataka 560084

Kind Attn: Mr. M.P. Zeeshan (Mob: +91 08073815184, 09686695940)

Subject: Purchase Order for Biogas Plant

Dear Sir,

With reference to your quotation with your email dated November 10, 2021 and telephonic discussions, we are pleased to place this biogas plant as per specifications in quotation having salient features given below:-

S. No.	Particular	Specification	Rate (in Rs.)	Total Amount (in Rs.)
1	Biowaste to Bio Energy plant	a) Biogas plant capacity - Food/kitchen waste 10kg/day b) Gas Production - 1.5-2.0 kg LPG equivalent gas c) Stove - 2 Burner d) Gas pipeline - Flexible pre pipe channeled through UPVC/G.I. pipe with moisture trap.	75,000/-	1,00,000/-
2	IOT System	IOT System	15,000/-	
3	Gas meter	Gas meter	10,000/-	
			G.Total :-	1,00,000/-

(In words: Rupees One Lakhs only)

Note:-

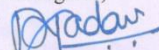
1. Scope of Work: As per item no 3 of your quotation.
2. List of Exclusions: As per item no 8 of your quotation.

Terms & Conditions:

1. Tax : GST 5% (Extra)
2. Delivery Period : 04 weeks from the date of PO.
3. Payment Terms : 70% advance with order
30% on successful commissioning of the biogas plant (Please provide your bank details for online payment).
4. GST No. : 23AAATO3730B1Z8
5. Freight : Extra at actual
6. Warranty : One year

Please acknowledge receipt & acceptance of the order for processing advance payment.

With regards,


(Dr. Pradyumna Yadav)
Registrar

Oriental University, Indore

Opp. Reoti Range Gate no. 1, Post Aurobindo Sanwer Road, Jakhya, Indore 453 555 (M.P.)
Website: www.oui.edu.in e-mail: registrar@orientaluniversity.in Phone 0731-3565000

Figure.3: Purchase order of Biogas Plant



Figure.4: Biogas Plant installed at Oriental University Indore Campus

3. Wheeling to the Grid

In electric power transmission, wheeling is the transportation of electric energy from within an electrical grid to an electrical load outside the grid boundaries. In the present scenario, wheeling to the grid has emerged as an additional advantage of solar energy. The university power requirements are met by the energy generated by the solar panels. The MPPKVVCL's power grid is also connected to the power output of the solar panels. MPPKVVCL has subsidized the university's electricity consumption by providing the excess power produced by the solar panels to the grid. The data of Wheeling to the grid facility may be analysed for the year 2021 to 2023 from the table attached below.

Table.1: Details of Wheeling to the Grid (Year: 2021)

Year	Month	Export	Export Adj. (KWH)	C/F
2021	January	137	137	0
	February	398	398	0
	March	186	186	0
	April	109	109	0
	May	853	853	0
	June	519	519	0
	July	159	159	0
	August	93	93	0
	September	86	86	0
	October	41	41	0
	November	75	75	0
	December	4	4	0
	Total	2660	2660	0

Table.2: Details of Wheeling to the Grid (Year: 2022)

Year	Month	Export	Export Adj. (KWH)	C/F
2022	January	1	1	0
	February	100	100	0
	March	32	32	0
	April	0	0	0
	May	12	12	0
	June	4	4	0
	July	15	15	0
	August	20	20	0
	September	1	1	0
	October	10	10	0
	November	20	20	0
	December	5	5	0
	Total	220	220	0

Table.3: Details of Wheeling to the Grid (Year: 2023)

Year	Month	Export	Export Adj. (KWH)	C/F
2023	January	322	322	0
	February	72	72	0
	March	170	170	0
	April	60	60	0
	May	12	12	0
	June	59	59	0
	July	146	146	0
	August	122	122	0
	September	133	133	0
	October	245	245	0
	November	651	651	0
	December	104	104	0
	Total	2096	2096	0

MPPKVCL		M.P. PASCHIM KSHETRA VIDYUT VITARAN CO. LTD.	
MPPKVCL, G.P.H. Compound, Polo Ground, Indore - 452003 GSTIN of Company - 23AADCM7397N1ZU			
htcellmppkvcl@gmail.com		Website : http://www.npwz.co.in/	
HSN Code of Electricity:- 271600 PAN of Company: AADCM7397N			
Bill ID : H4426904000-202309-1	ICICI Virtual A/c No: PKVVCL4426904000		
Date Of Issue : 27-SEP-2023	Last Dates Of Payment		1. By Online 12-OCT-2023
Bill month : September-2023			
M/S DEVI SHAKUNTALA THAKRAL CHARITABLE FOUNDATION K.NO. 81/2,81/3, VILL-JAKHIYA TEH-SANWER. - INDORE. 453111 Mob. No. *****9997 Email Id cfao@orientaluniversity.in		Loc Code 3424200, Circle : Indore O M Cons. Code H4426904000 Old Cons. Code 3424200548009 PAN : AAATD2943B S/C No : 158 Total SD Held : Rs. 521000.00 Connection Date : 29/09/2007 Supply Voltage : 33 KV Purpose : FOR NON-INDUSTRIAL PURPOSE	
Cont. Demand 150 KVA [TempCd 0] [Standby CD 0] * Tariff HV-3.2.B Non-Industrial on 33KV * ANNUAL GMC : 1200 per KVA			
Feeder Name: 33 KV INDUSTRIAL			Fixed Charges
Meter No. XI071393 MF	1.000000	0.000000	150 * 501 75150.00
* AMR Reading	I	II	Fixed Charges
Max Demand Recorded	184.40000	0.00000	30 * 501 15030.00
Transformer Loss	0.00000	0.00000	Additional Fixed Charges
Total Max Demand	184.40000	0.00000	4.00 * 501 * 1.30 2605.20
Adjustment	0.00000	0.00000	Energy Charges
Net Max Demand	184.00000	0.00000	35394 * 7.53 266516.82
Billing Demand	184.00000	0.00000	Energy Charges
Energy Units (KWH) Reading			7079 * 7.53 53304.87
On 23-SEP-2023	1108476.00000	0.00000	Additional Energy Charges
On 23-AUG-2023	1064926.00000	0.00000	944 * 7.53 7108.32
DIFFERENCE With MF	43550.00000	0.00000	FPPAS on Energy Charges
Transformer Loss	0.00000	0.00000	319821.69 * 0.0486 15543.33
Adjustment	0.00000	0.00000	FPPAS on Additional Energy Charges
Total Units	43550.00000	0.00000	7108.32 * 0.0486 345.46
Net Units Supplied	43417.00000	0.00000	Electricity Duty
KWH EXPORT :	133.00000		43417 * 15% 6512.55
KWH EXPORT Adj :	133.00000		TOD Rebate
Current CF Units :	0.00000		13630.00 * 7.8960 * 0.10 -10762.25
Previous CF Units :	0.00000		Rebate On Online Payment
TOD1 :	13630.00000	0.00000	-1000.00
TOD2 :	4926.00000	0.00000	Rebate@1Rs. on Incremental Units 27007.00
TOD3 :	15821.00000	0.00000	-27007.00
TOD4 :	9040.00000	0.00000	Round Off Adj
Demand in excess of CD.	34	0	0.25
KVAH Units Reading			CURRENT MONTH BILL
On 23-SEP-2023	1193763.00000	0.00000	448258.00
On 23-AUG-2023	1146676.00000	0.00000	Atrears Inc. Cumm. Surch. 0.00
DIFFERENCE With MF	47087.00000	0.00000	SD Int on 521000 @ 6.75% -2768.00
Transformer Loss	0.00000	0.00000	IDS on 2768 @ 10.00% 277.00
Adjustment	0.00000	0.00000	SD Installment 3 81400.00
Total Units	47087.00000	0.00000	NET BILL PAYABLE
Net KVAH Units Supplied	46943.00000	0.00000	Rs. FIVE LAKH TWENTY SEVEN THOUSAND ONE
Kvah Export	144.00000	0.00000	HUNDRED AND SIXTY SEVEN ONLY
Kvah Export Adj	144.00000	0.00000	NET BILL PAYABLE AFTER DUE DATE 533757.00
Avg PowerFactor 0.92	Avg Load Factor 34.000		
Progressive KWH Consumption Upto	251536.000		
Current Month			
REQUIRED TMM	93400.00		
ASD ARREAR BALANCE	0		
Progressive Current Month Bill Total(Rs)	0.00		
Month Year	CD	Consumption	
September-2015	100	16410.00	
Previous Month Bill Amount		434576.00	
Last Month Payment Details: Total Amt. 434576			
Date	Mode	Receipt No.	Amt (Rs.)
06-SEP-2023	NEFT	628843105712	434576
Previous Reading Details			
MTH	Type	Date	MF KWH Reading
AUG-23	AMR	23-AUG-2023	1.000000 1064926.00
JUL-23	AMR	23-JUL-2023	1.000000 1028823.00
JUN-23	AMR	23-JUN-2023	1.000000 997140.00
MAY-23	AMR	23-MAY-2023	1.000000 948918.00
APR-23	AMR	23-APR-2023	1.000000 901137.00
MAR-23	AMR	23-MAR-2023	1.000000 856408.00

Accounts Officer (HT Billing Cell)
M.P.P.K.V.V.C.L., INDORE

**This bill is system generated hence does not require a signature, also no hard copy of bill, will be sent by the Company.
E. And O. E.



हर वोट है जरूरी
कोई भी मतदाता मतदान से ना छूटे

- "No Voter to be Left Behind".
- Please check and verify your PAN number, Email ID, Mobile No. mentioned on Bill. In case of any statutory/legal obligation the consumer will be solely responsible for the same.
- The amount of this HT bill payable at HT Billing Cell Indore by SBI Collect/RTGS/NEFT in Favor of Collection a/c MPPKVCL HT REVENUE COLLECTION, INDORE. Account No.34846687179, IFSC code-SBIN0010527, Bank Name-State Bank of India, Branch-MPSEB Campus Branch Indore.
- Pay your HT Bill with your ICICI Virtual Account No. which is mentioned at top of the bill. IFSC Code is ICIC0000106, Account name is MPPKVCL HT Revenue Collection a/c. Account No. is your ICICI Virtual A/c No.
- AT PAR cash will only be treated by SBI Collect and RTGS/NEFT, made in our above mentioned account.
- After Making Payment, Please Inform the same on our email Id htcellmppkvcl@gmail.com
- For Billing Issues, Nodal Officer Shri Naresh Shivhare, Dy. Director (HT Billing Cell) may be reached at 0731-2426229 email htbillcomplaintnpwz@gmail.com
- The bill is payable within the due date, even if consumer feels that there is a discrepancy and/or clarification are called for, the consumer is requested to pay in full provisionally or under protest subject to subsequent adjustment.
- Any inquiry/information may be sought on email id htcellmppkvcl@gmail.com/0731-2426125/2426126.
- The ITR Acknowledgement no. of the company for the FY2018-2019 is 233762501301019 and for the FY2019-2020 is 686977261301020.

Figure.5: Electricity Bill (September 2023) showing Transfer of Solar Electricity to the Main Grid

4. Sensor Based Energy Conservation

Considering energy saving using sensor based technology, OUI has started taking initiatives. So far, timer based systems are employed, and very soon we are planning to switch to sensor based systems.

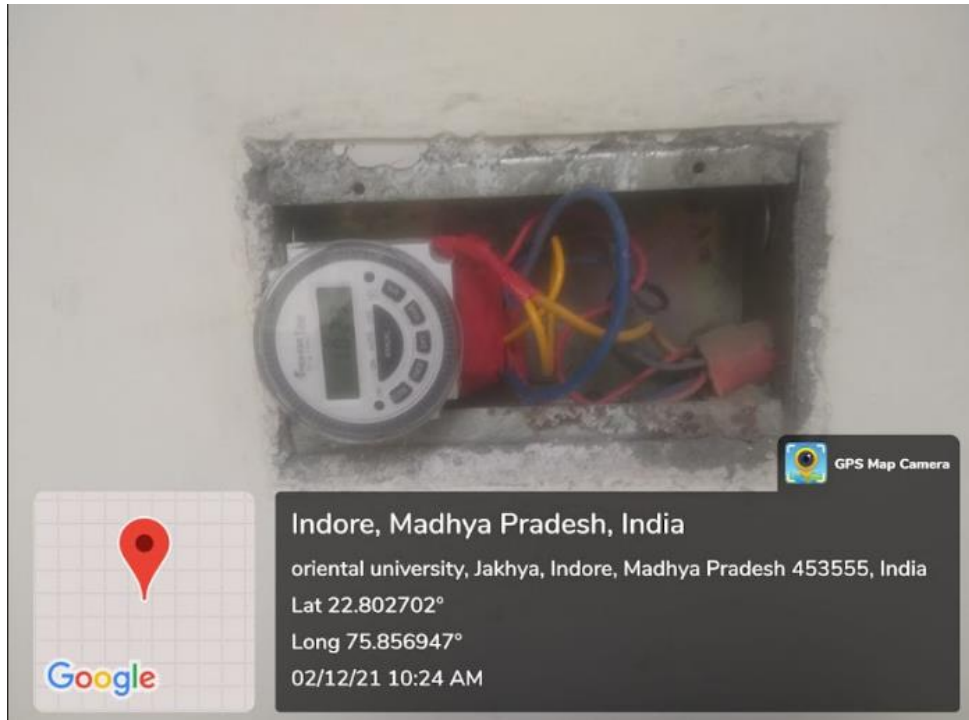


Figure.6: Timer for Automation of Lights



Figure.7: Relay Switch for Generator

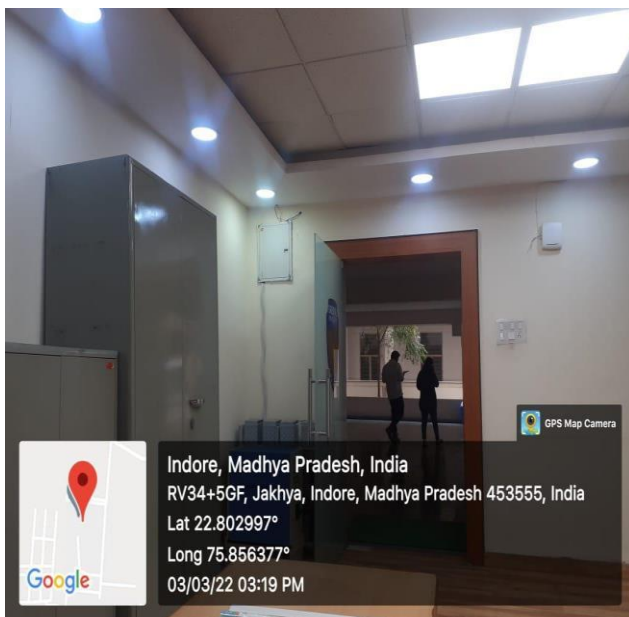


Figure.8: System for Automation of DG Set

In coming days, sensor based technologies shall be adopted in different facilities in the university, like stairs, Divyangjan washrooms, hostel areas, etc. to facilitate students and Divyangjans.

5. Use of LED Bulbs/ Power Efficient Equipment

LED lights are one of the great inventions of scientists for reducing the negative effects of conventional bulbs to the cost as well as environment. University has already started the replacement of conventional tube lights/bulbs with LED bulbs/power efficient equipment.



(a)



(b)

Figure.9: LED Bulbs at different locations

Past, Present and Future Scenarios:

Past Scenario	Present Scenario	Future Scenario
Before adoption of solar energy systems, university was facing huge electricity bills.	Now, university enjoys great savings in electricity bills, plus wheeling to grid raises the profit values.	In future, more and more emphasis shall be made on sensor based technologies and biogas based energies.



Oriental University, Indore (M.P.)

Additional Information

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

- Solar energy
- Biogas plant
- Wheeling to the Grid
- Sensor-based energy conservation
- Use of LED bulbs/ power efficient equipment.

1. Solar energy

Following are the details of solar energy implementation@OUI.

M.P. PASHCHIM KSHETRA VIDYUT VITARAN CO. LTD.,
(A Wholly Owned Government of M.P. Undertaking)
Registered & Corporate Office: GPH COMPOUND, POLOGROUND, INDORE-452003
(EPABX Phone No. 0731- 2426252, 360, 308 & Fax No. 2423300 / 2421345)
CIN : U40109MP2002SGC015121; Website: www.mpwz.co.in; E-mail – technicalcellwz@gmail.com

No. MD/WZ/SOLAR/2020/ 527 Indore Dated: 11 3 JAN 2020

To,
The Superintending Engineer (MT),
M.P.P.K.V.V.C. Ltd.,
Indore

Sub:- Installation of Net Meter at the customer's premises of HT Consumer M/s Devi Shakuntala Thakral Charitable Foundation, K.No. 81/2, 81/3, Village Jakhiya, Tah. Sanwer, Indore.

Ref:- RTP No. 3333

Net Meter agreement for proposed load 53 KW with the applicant (details mentioned below) has been finalized on dated 07.01.2020. You are hereby advised to instruct your field officer to install the Net Meter along with MODEM at consumer's premises and inform to this office after Net meter installation with installation reports.

Name of Consumer : M/s Devi Shakuntala Thakral Charitable Foundation, Indore.
Address : M/s Devi Shakuntala Thakral Charitable Foundation, K.No. 81/2, 81/3, Village Jakhiya, Tah. Sanwer, Indore.
Contact No : 95895-63110

The agreement with the said customers is done.

Superintending Engineer (Technical-Cell)
O/o MD (WZ), MPPKVCL, Indore

Copy to:-

- 1) The Superintending Engineer (O&M), MPPKVCL, Indore.
- 2) The Superintending Engineer (HT Billing), MPPKVCL, Indore.
- 3) The Executive Engineer (O&M) Div., MPPKVCL, Indore.
- 4) The Executive Engineer (STM) O&M Div., MPPKVCL, Indore You are advise to install L.T. generation meter on same premises on same date (Cons. Code No. 4426904000).
- 5) M/s Devi Shakuntala Thakral Charitable Foundation, K.No. 81/2, 81/3, Village Jakhiya, Tah. Sanwer, Indore. The agreement copy attached here.

Superintending Engineer (Technical-Cell)
O/o MD (WZ), MPPKVCL, Indore

Figure 1: Details of Sanctioned Load



Oriental University, Indore (M.P.)

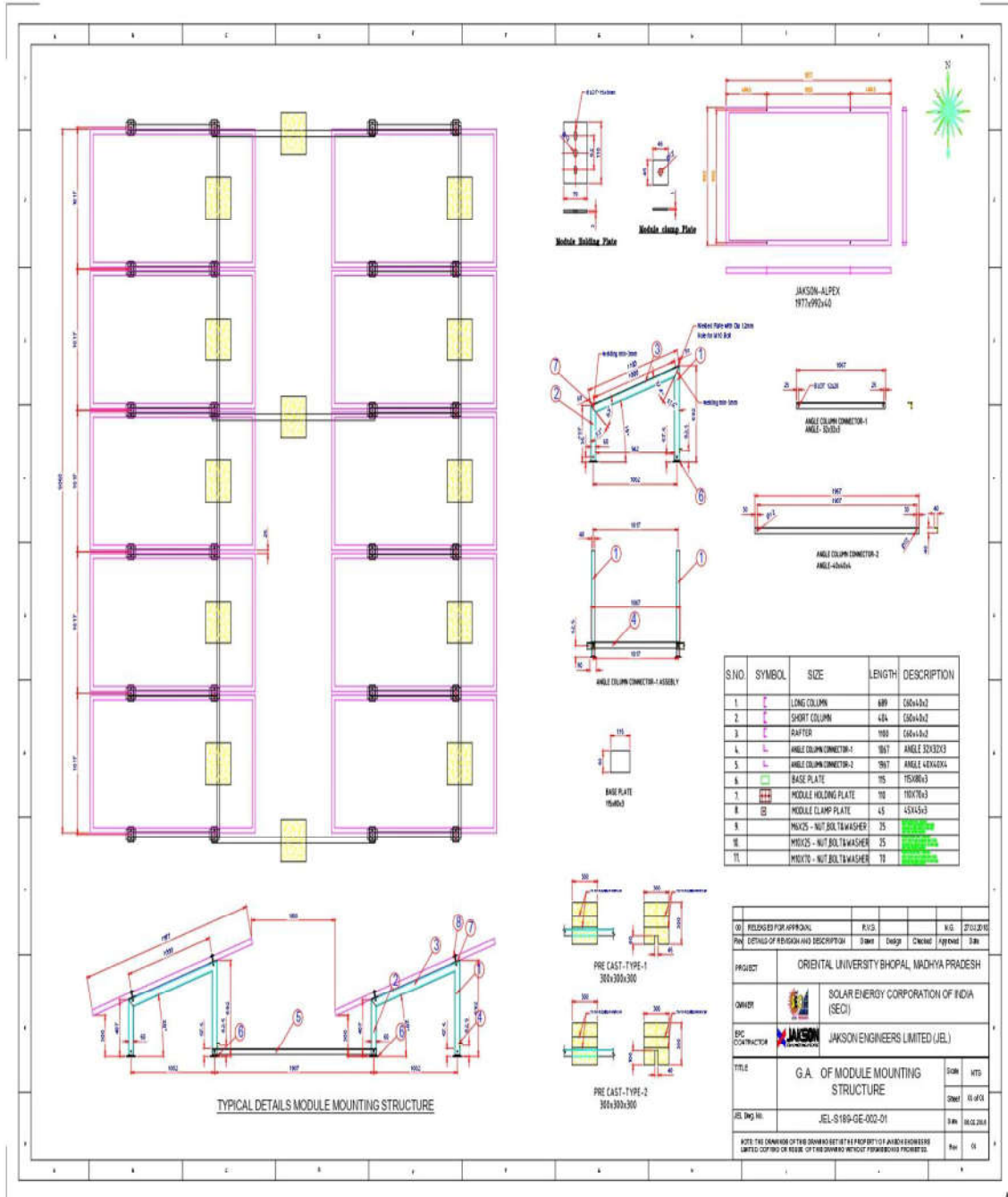


Figure 2: Technical Details of Mounting Structure



Oriental University, Indore (M.P.)

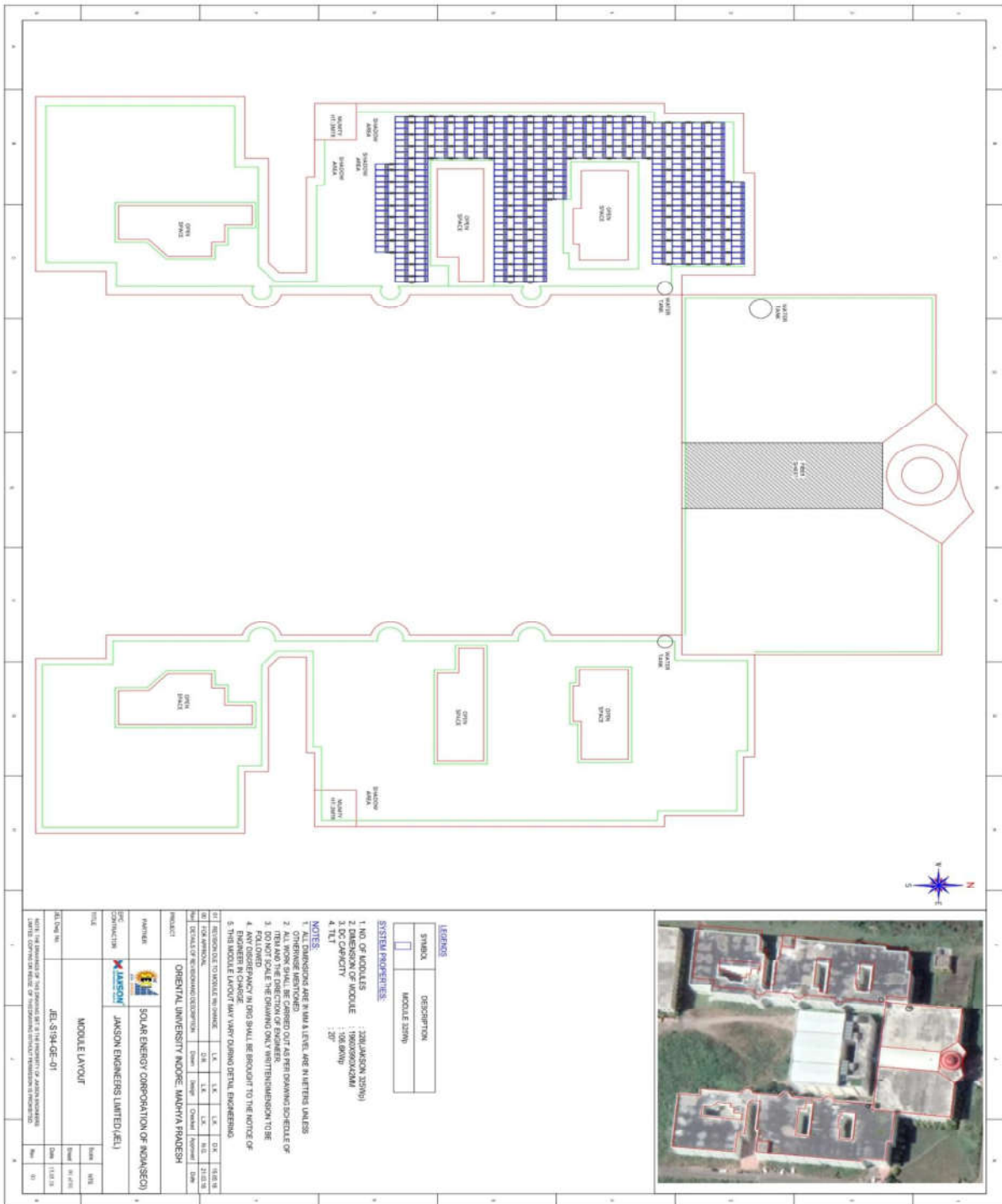


Figure 3: Module Layout



Oriental University, Indore (M.P.)

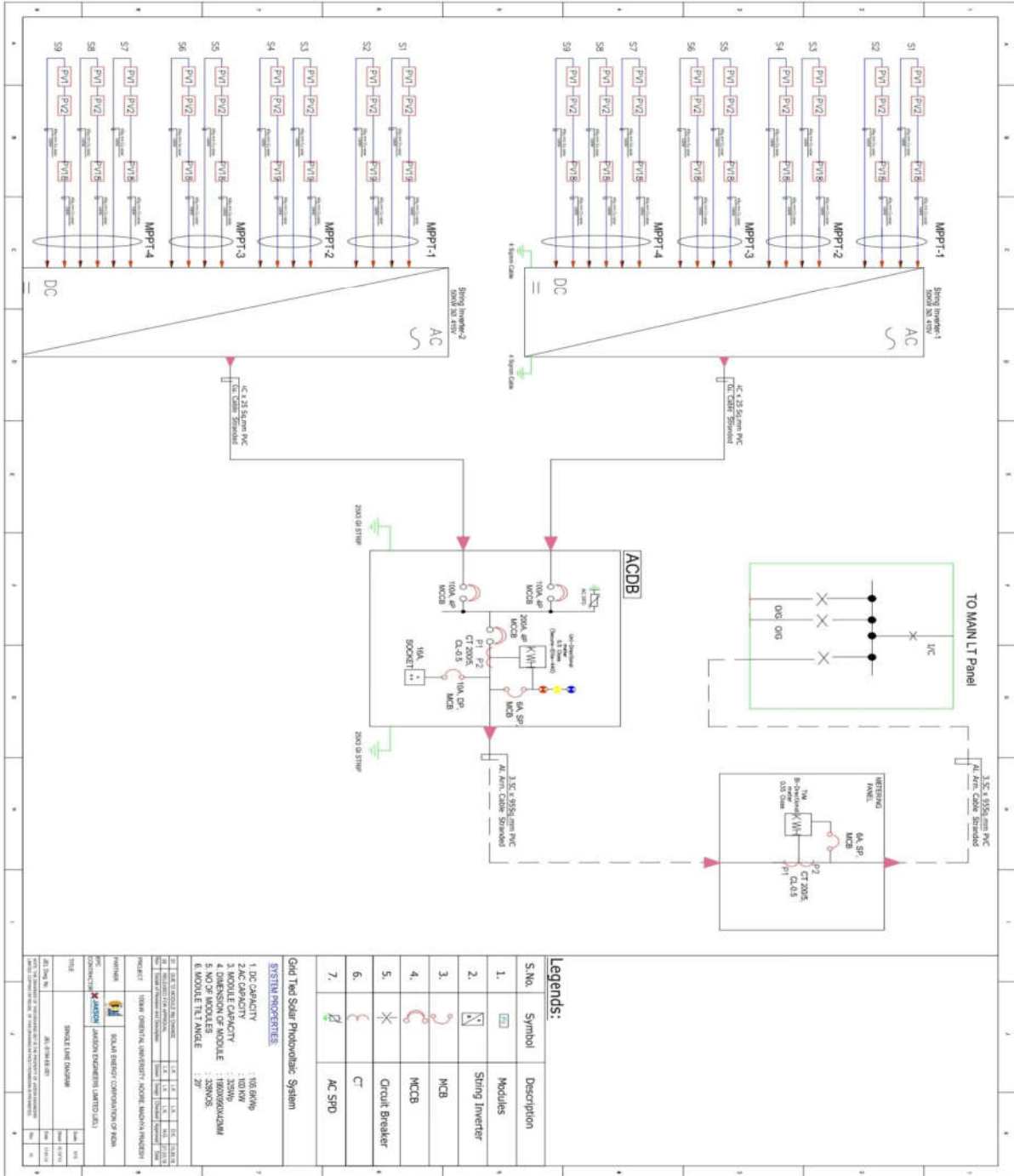


Figure 4: Single Line Diagram



Oriental University, Indore (M.P.)



Figure 5: Details of Installed Solar Panels

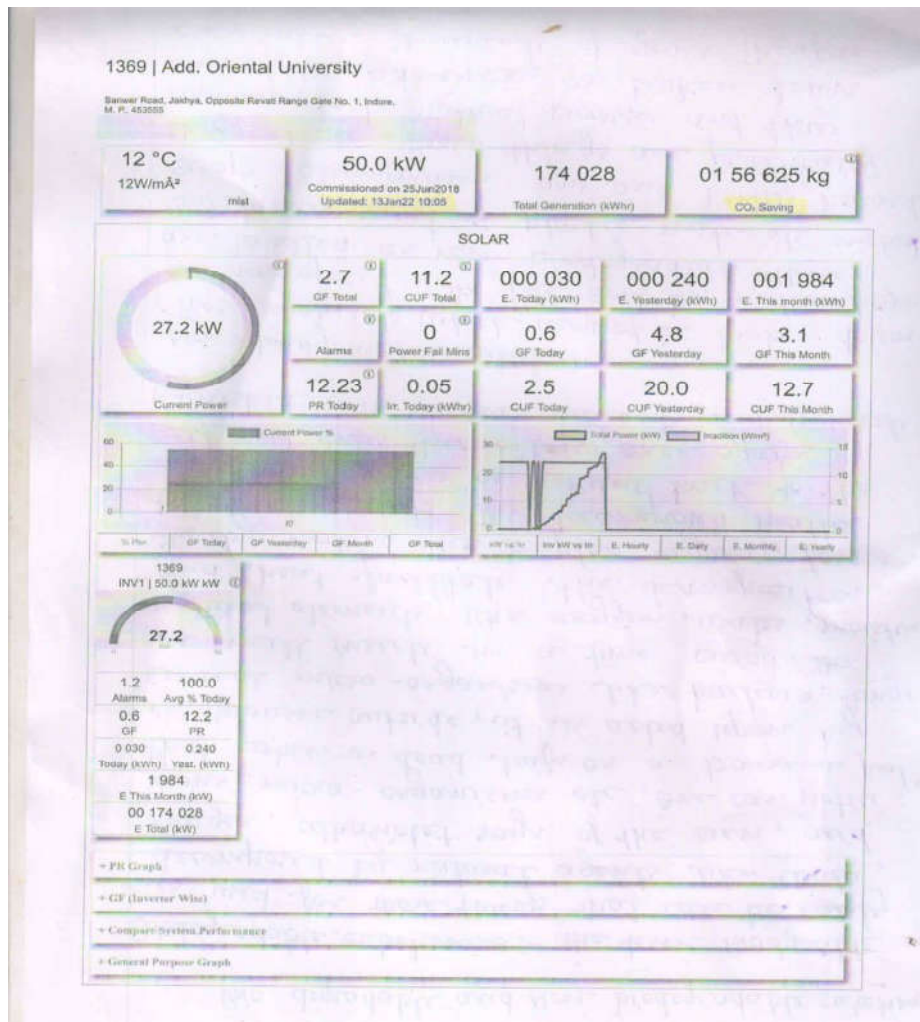


Figure 6: Solar Plant Log



Oriental University, Indore (M.P.)

SOLAR PV PLANT LOG

Net metering date: 30/01/2020

Plant rating: 53kw

Plant ID: 1369

Period : 2020					
Month	KW Gen (JMR)		CO2 Neutralized		Additional Information
	Month	Todate	Date	KG	
3	8560	8560			
4	8072	16632			
5	8576	25208			
6	6240	31448			
7	6487	37935			
8	4064	41999			
9	5489	47488			
10	7616	55104			
11	6130	61234			
12	5547	66781			

Period : 2021					
Month	KW Gen (JMR)		CO2 Neutralized		Additional Information
	Month	Todate	Date	KG	
1	5547	5547			
2	6360	11907	12	96213	
3	7360	19267	13	102269	
4	7440	26707	9	108680	
5	7920	34627			
6	8400	43027	10	123057	
7	4640	47667			
8	4520	52187	27	135343	
9	5000	57187	30	138190	
10	6480	63667	5	139121	
11	6240	69907			
12	5080	74987	6	150803	

Figure 7: Solar PV Plant Log