



Criteria VII

7.1.3 Alternate Energy Initiatives

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Holy-wood Academy, Kolhapur's

SANJEEVAN ENGINEERING AND TECHNOLOGY INSTITUTE

Sanjeevan Knowledge City, Somwar Peth, Panhala, Tal. Panhala, Dist. Kolhapur - 416 201.

Phone : 02328 - 235241, 235493 Fax : 02328 - 235241 Mobile : 9545451966, 9545453831

Website : www.seti.edu.in Email : principal@seti.edu.in / office@seti.edu.in / setipanhala@gmail.com

■ Approved By AICTE - New Delhi ■ Recognized by Govt. of Maharashtra & DTE ■ Affiliated to Shivaji University, Kolhapur

7.1.3 Alternate Energy initiatives such as:

1. Percentage of annual power requirement of the Institution met by the renewable energy sources

Power Requirement met by Renewable energy sources	Total Power requirement	Renewable energy sources	Renewable energy generated and used	Energy Supplied to the grid
Generated 219000 KWH and Remaining Installation under process	576519 KWH	Solar PV panel	Installation Under Process	In Process
		Solar & Wind Hybrid	Installation recently completed	off grid only



Holy-wood Academy, Kolhapur's

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7.1.3: Alternative Energy Sources:

A] SETI Max. Load demand = $1.73 \times 415 \times 236$

$$= 170 \text{ KVA}$$

(Measured using power meter installed on DG set)

B] SETI Solar PV and wind solar hybrid system capacity share = 300 KVA

Average campus Max. Load demand for last 3 years = 154 KVA

Campus Solar PV plant capacity and wind solar hybrid system = 300 KVA

Hence SETI Solar PV and wind solar hybrid system capacity share = $(170/154) \times 300 = 332$
KVA

Percentage of annual power requirement of the institutions met by the renewable energy sources = $(332\text{KVA})/(170\text{KVA}) \times 100$

195%

We have excess generation due to that in future we have increased campus load demand for that application given to MSEDCL

Increased campus load= 300KW

Increased campus load= 240KVA

SETI Max. Load demand = 240KVA

Hence SETI Solar PV and wind solar hybrid system capacity share = $(240/332) \times 300 = 217$
KVA

Percentage of annual power requirement of the institutions met by the renewable energy sources = $(217 \text{ KVA})/(240 \text{ KVA}) \times 100$

90%

7.1.3.1 Annual power requirement met by the renewable energy sources (in kWh)

219000 (75kWh per day x 08 hrs. sunshine duration x 365 days) units generated and utilized and remaining solar Plant installation is in process

7.1.3.2 Total annual power requirement (in kWh) based on energy bills for the year 2017-18

576519 kWh

From Table 1, total units consumed in campus from April 2017 to March 2018 = 640954 kWh

Campus Max. load demand during above period = 189 KVA

SETI Max. load demand during above period = 170 KVA

Hence units consumed from April 2017 to March 2018 by SETI

= $(170/189) * 640954$

= 576519 kWh

Table 1. Electricity Consumption

SETI Campus Monthly Demands / Units Data				
Sr.No	Month /Period	Max Demand in KVA	Power Factor	Total No.of Unit
1	Apr-14	135	1.00	43082
2	May-14	94	1.00	29198
3	Jun-14	90	1.00	29512
4	Jul-14	134	1.00	49250
5	Aug-14	157	1.00	52882
6	Sep-14	134	1.00	46606
7	Oct-14	130	1.00	43698
8	Nov-14	118	1.00	46262
9	Dec-14	135	1.00	51360
10	Jan-15	140	1.00	50160
11	Feb-15	129	1.00	49316
12	Mar-15	136	1.00	49006
13	Apr-15	117	1.00	42614
14	May-15	95	1.00	29214
15	Jun-15	98	1.00	28304
16	Jul-15	141	1.00	51942
17	Aug-15	149	1.00	56808
18	Sep-15	160	1.00	37828
19	Oct-15	148	1.00	56644
20	Nov-15	139	1.00	36248
21	Dec-15	136	1.00	55564
22	Jan-16	142	1.00	51892
23	Feb-16	158	1.00	58996
24	Mar-16	167	1.00	59530
25	Apr-16	125	1.00	43704
26	May-16	125	1.00	31264
27	Jun-16	131	1.00	38172
28	Jul-16	163	1.00	67302
29	Aug-16	163	1.00	69342
30	Sep-16	159	1.00	50228
31	Oct-16	175	1.00	60200
32	Nov-16	150	1.00	51820
33	Dec-16	152	1.00	64274
34	Jan-17	165	1.00	63514
35	Feb-17	165	1.00	59924
36	Mar-17	159	1.00	62926
37	Apr-17	131	1.00	46832
38	May-17	131	1.00	30774
39	Jun-17	139	1.00	37772
40	Jul-17	168	1.00	66292
41	Aug-17	170	1.00	58930
42	Sep-17	184	1.00	64836
43	Oct-17	189	1.00	46796
44	Nov-17	151	1.00	58148
45	Dec-17	144	1.00	61434
46	Jan-18	155	1.00	58778
47	Feb-18	142	1.00	53392
48	Mar-18	142	1.00	56970
49	Apr-18	142	1.00	42336
50	May-18	152	1.00	15612
51	Jun-18	145	1.00	39195
52	Jul-18	146	1.00	69669
53	Aug-18	146	1.00	65910
54	Sep-18	130	1.00	43947
55	Oct-18	136	1.00	66465
		Average Value = 154 KVA	Power Factor = 1	Annual Unit Consumed During period of Apr 2017 To March 2018 =640954 Units


PRINCIPAL
Sanjeevan Engg. & Tech. Institute
 Somwar Peth, Panhala, Dist. Kolhapur. (MS)

CURRENT CONSUMPTION DETAILS						
Reading Date	KWH	KVAH	RKVAH (LAG)	RKVAH (LEAD)	KW (MD)	KVA (MD)
Current 31-03-2018	1560198.000	1560941.000	18601.000		0.000	63.543
Previous 28-02-2018	1531713.000	1532453.000	18434.000			
Difference	28485.000	28488.000	167.000			
Multiplying Factor	2.000	2.000	2.000		2.000	2.000
Consumption	56970.000	56976.000	334.000		0.000	127.086
LT Metering	0.000	0.000	0.000		0.000	0.000
Adjustment	0.000	0.000	0.000			
Assessed Consump	0.000	0.000	0.000		0.000	0.000
Total Consumption	56970.000	56976.000	334.000		0.000	127.000

BILLING DETAILS					
Billed Demand (KVA)	142	@ Rs.	250	Demand Charges	35,500.00
Assessed P.F.		Avg. P.F.	1.000	Wheeling Charge	47,285.10
Billed P.F.	1.000	L.F.	45	Energy Charges	416,714.20
Consumption Type	Units	Rate	Charges Rs.	TOD Tariff EC	17,936.80
Industrial	0	9.10	0.00	FAC	-968.49
Residential	31,010	5.82	180,478.20	Electricity Duty	36,002.04
Commercial	0	9.10	236,236.00	Other Charges	0.00
E.D. on(Rs)	Rate %	Amount Rs.		Tax on Sale @ 8 Ps/U	2,076.80
0.00	9.3	0.00		P.F. Penal Charges/P.F. Inc.	-36,152.73
225,012.75	16	36,002.04		Charges For Excess Demand	0.00
0.00	21	0.00		Debit Bill Adjustment	0.00
TOD Zone	Rate	Units	Demand	Charges Rs.	TOTAL CURRENT BILL
0000 Hrs-0600 Hrs & 2200 Hrs-2400 Hrs	-1.50	18360	113.00	0.00	518,393.72
0600 Hrs-0900 Hrs & 1200 Hrs-1800 Hrs	0.00	20338	118.00	0.00	Current Interest 01-04-2018
0900 Hrs - 1200 Hrs	0.80	7208	127.00	5,766.40	0.00
1800 Hrs-2200 Hrs	1.10	11064	124.00	12,170.40	Principle Arrears
					502,986.28
					Interest Arrears
					0.00
					Total Bill (Rounded) Rs.
					1,021,380.00
					Delayed Payment Charges Rs.
					6,479.92
Amount in Words	TEN LAKH TWENTY ONE THOUSAND THREE HUNDRED EIGHTY ONLY				Amount Payable 16-04-2018 After
					1027860
					Amount Rounded to Nearest Rs (10/-)

Message: Revised Tariff applicable wef 01-Apr-2017/Please refer hard copy of the bill for details./

CONDITIONS	
1. The total bill amount of the bill may be remitted by a Crossed Demand Draft/Cheque drawn in favor of "Maharashtra State Electricity Distribution Co. Ltd." Whenever Security Deposit is demanded separate Cheque/Bank Draft should be sent.	
2. The current bill is payable within fifteen days from the date of issue of the bill. Even if there is any discrepancy in the bill or any other clarification needed, consumers are requested to pay the billed amount in full provisionally or under protest subject to review and subsequent adjustment, so that payment of delayed payment charges is avoided.	
3. This bill is issued subject to the provision of the "Conditions and Miscellaneous charges for supply of Electrical Energy" of the company.	
4. Please quote the Consumer Number on the back of the Cheque. The payment of this bill should be made at Company's office only.	
5. If the cheque is sent by post, the same should be posted three clear days in advance of the due date.	
6. If paid by Cheque/DD/Pay Order, then the Realization date should be considered as payment date.	
Collection Hours : 10-30 to 16-00 Hours (Except on Bank Holidays, Sundays, 2nd and 4th Saturdays)	

Maharashtra State Electricity Distribution
Co. Ltd.**Maharashtra State Electricity Distribution Co.Ltd.****BILL OF SUPPLY FOR THE MONTH OF Mar 2018**

GSTIN: 27AA ECM2933K1ZB Website : www.mahadiscom.in HSN CODE: 27160000

KOLHAPUR CIRCLE : 500 KOLHAPUR R-I : 504 PANHALA SUB DIVISION: 035 1

Consumer No. :	262019054180		
Consumer Name :	M/S HOLYWOOD ACADAMY GAT NO 28TO32,33A,B, 35,38,47		
Address :	94,HOUSE NO 225,17,52/1,2,3 A/P SOMWAR PETH		
Village :	PANHALA	Pincode :	416201

BILL DATE	02-04-2018	1,021,380.00
DUE DATE	16-04-2018	
IF PAID UPTO	09-04-2018	1,016,580.00
IF PAID AFTER	16-04-2018	1,027,860.00
Last Receipt No./Date	2748785 /01-03-2018	
Last Month Payment	0.00	
Scale / Sector	Small Scale /Private Sector	

Email ID :	sanjeevanpanhala@gmail.com		Activity :	SCHL EDUCTNL SRV NEC	
Mobile No. :	9823284444	Meter No.:	053-12022785	Seasonal :	N
Tariff :	146 HT-IX B	Connected Load (KW):	187.00 KW	Urban/Rural Flag :	R
Contract Demand (KVA) :	170.00	50% of Con. Demand(KVA) :	85.00	Feeder Voltage (KV) :	11
Date of Connection :	13-09-2012	Category :		GSTIN :	
Supply at :	HT	Elec. Duty :	99	PAN :	
Prev. Highest (Mth) :	OCT	Bill Demand (KVA) :	189	Express Feeder Flag :	N
Security Deposit Held Rs. :	744,100.00	Addl. S.D. Demanded Rs :	0.00	LIS Indicator :	
Bank Guarantee Rs. :	0.00	S.D. Arrears Rs. :	0.00		

BILLING HISTORY

Bill Month	Consumption (Units)	Bill Demand (KVA)	Bill Amount
Feb 2018	53,392	130	496,777.21
Jan 2018	58,778	155	541,803.65
Dec 2017	61,434	144	540,470.22
Nov 2017	58,148	151	501,834.20
Oct 2017	46,796	189	422,108.37
Sep 2017	64,836	184	563,004.67
Aug 2017	58,930	170	538,531.28
Jul 2017	66,292	168	550,094.45
Jun 2017	37,772	139	374,405.13
May 2017	30,774	111	325,931.49
Apr 2017	46,832	115	390,928.64
Mar 2017	62,926	159	550,909.74

CUSTOMER CARE Toll Free No.
1912, 1800-102-3435,
1800-233-3435

HT image

Important Message

- Consumers can pay online using Net Banking, Credit/Debit cards at <https://wss.mahadiscom.in/wss/wss> after registration.
- Submit / update your E-mail id and mobile number to Circle office for receiving prompt alerts through SMS.
- Submit / update your PAN and GSTIN to circle office with copies of PAN and GSTIN for verification.
- Special desk is operational for HT Consumers, please contact : htconsumer@mahadiscom.in for any clarification / query or grievance.

Connection Information

Consumer Number	262019054180	Circle Code	500 KOLHAPUR CIRCLE
Name	M/S HOLYWOOD ACADAMY GAT NO 28TO32,33A,B, 35,38,47	Connection Type	HT
Address	94,HOUSE NO 225,17,52/1,2,3 A/P SOMWAR PETH PANHALA 416201	Contact Numbers	9637499959

Billing

Payments History



(1).png

download.png

Solar PV panel



Reg. No. F- 8077 / 50P

HOLY - WOOD ACADEMY, KOLHAPUR.

HEAD OFFICE : SANJEEVAN KNOWLEDGE CITY,
SOMAWAR PETH, PANHALA, DIST. KOLHAPUR- 416201

Ph. : (0231) 2686810 Fax : 2686809 Web : www.sanjeevan.edu.in
E-mail : sanjeevanoffice@gmail.com • holywoodacademy@gmail.com

HAK/2017-18/77

Date:25/09/2017

WORK ORDER

To
CONTINUAL RENEWABLE ENERGY PVT LTD.,
F-904, 9th floor, Empire Square, CTS No.4510/1,
Next to Auto Cluster, Off Mumbai-Pune Road,
Chinchwad, Pune - 411019

SUB: WORK ORDER FOR DESIGN, SUPPLY, INSTALLATION, TESTING
AND COMMISSIONING OF 252 KWp GRID TIED ROOFTOP SOLAR
PV SYSTEM THROUGH NET METERING ARRANGMENT AT,
'HOLYWOOD ACADEMY', SOMWAR PETH, PANHALA-416201

Ref: Your quotation no.CREPL/HAP/252Kw/0910/1718 dated 10/09/2017

Dear Sir,

With reference to your above referred offer letter, we are happy to place workOrder on you for Desing, Supply, Installation, Testing and Commissioning of 252 KWp Grid Tied Rooftop Solar PV System through Net Metering arrangement to be installed at 'Holywood Academy', SomwarPeth, Panhala - 416201.

A) Price Schedule

Sr.No.	Item Description	Qty	Rate	Total Amount
1	SRTPV system of 252 KWp Capacity Bill of Material Panels- Waaree/Sova/Vikram/Photon Make Reputed Inverter- Delta/Fronius/ABB/ SMA Make Reputed DC Cables - Apar AC Cables - Polycab Lightning Arrestor & Earthing - Bakiral/JMV ACDB - CREPL Meters - Secure Make	252	52,000/-	1,31,04,000/-
Total Cost of System Excluding GST				1,31,04,000/-
GST @ 5%				6,55,200/-
Total Cost, Incl.GST				1,37,59,200/-
Subsidy from MEDA		252	18,300/-	45,75,000/-
Net Amount to Customer after Subsidy Reimbursement				91,84,200/-

- The total cost is inclusive of all Taxes, duties and transportation etc.
- Tentative System BOM - As per annexure]

B) COMPLETION DATE:- 2 months from the date of work order (Before 31 Oct 2017)

C) TERMS AND CONDITIONS:

1. **Transportation** – Included
2. **Taxes** – Included.
3. **Net Meter** – Cost of Net meter, approvals for the connectivity will be paid on the name of 'Holywood Academy' directly to MSEDCL. CREPL will help the client on the documentation part.
4. **Warrantee/Guarantee** :
 - a) **Solar Module** –
05 Years Limited Warranty on Product and Workmanship
10 Years Limited Warranty on 90% Power Output
25 Years Limited Warranty on 80% Power Output
Warrantee Certificates will be issued by Manufacturer.
 - b) **Balance of Material**
5 Years Warrantee on string Inverters and for BOS 12 Months Limited Warranty

D) Payment Terms –

- 05 Lakh in the month of Oct 2017
- 10 Lakh in the month of Nov 2017
- Remaining in the month of Jan 2018

With above terms and conditions, you are requested to submit duplicate copy of this order signed with seal of Company in token of your acceptance to above work order.

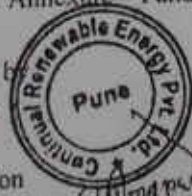
Thanking you,

Yours faithfully.

For HOLYWOOD ACADEMY, KOLHAPUR

Enclosed: Annexure – I and II

Accepted by
Signature
Name
Designation
Company Seal



CHAIRMAN

Holy Wood Academy, Kolhapur
Dist. Kolhapur

(SUNIL KOLI)
Director.


Annexure-I

Tentative System BOM:

Sr. No.	Item	Details	Make	Quantity
1.	SPV Modules	Poly crystalline silicon	Waaree Make	Modules – 800 nos of 315 Wp
2.	Module mounting structure	MS HD Galvanized	CREPL	For 250 kw fixed structure
3.	String Inverters	High efficiency 3 – Phase Grid Tied Solar String Inverter	Delta/SMA	5 No of 50 KW String Inverters with 8 MPPT's suitable for 252 KWp Solar Capacity
4.	DC Cables	IC; 4 or/and 6 sq.mm Cu Cable – IEC standard	Apar/Polycab/KEI	As per requirement
5.	AC Cables	XLPE 16/25/35 sq.mm cu Cable – BIS Standard	Polycab/KEI/Havells	As per site
6.	Solar LT panel with LT witchgear : ACDB's	BIS standard	CREPL Make	AC and DC side Switchgears
7.	Earthing	GI earthing strip, electrode, chemical filling, Lightning Arrestors – as per MNRE/SECI standard	Reputed	1 set
8.	Other hardware & electrical (incl. earthing & lightning protection)	BIS standard	Reputed make	1 set
9.	CT Operated Bi-directional meter	MSEDCL standards	Secure	1 set
10.	Installation		CREPL	Included



Authorized Signatory


CHAIRMAN
Holy Wood Academy, Kolhapur
Dist. Kolhapur

ANNEXURE II

Sr.No.	Particulars	Details
1	System Capacity	252 KWp Rooftop Grid Tied System without Battery Backup
2	Area Requirement	Total South Facing Shadow free roof top area require will be around 25000 sqft for 252 KWp SRTPV system.
3	Project Generation	For 252KW – More than 378000kWH (Units) approximately per annum from system, with a reduction of 1% in Generation every year.
4	Brand name	Module: Sova/Waaree/Equivalent having necessary IEC certificates Inverter: ABB or equivalent having necessary IEC certificates Cables : DC Cables-Apar, AC Cables:Polycab
5	Weight	The weight of the Solar system is @22kg/22. Approx.
6	Mounting Structure	Fixed Structure on floor of roof, mounted with HDGI frames with orientation of solar modules to the south.
7	Completion period	Within Two Months from the date of from the date of receipt of net metering approval from MSEDCL and receipt of principle approval from MEDA for start of work under CFA scheme and after receipt of advance payment as per the terms and conditions.
8	Operation & Maintenance	For a period of one year free O&M will be provided by CREPL, wherein inspection and preventive maintenance will be done. During this period the cleaning of Modules shall be done on regular basis by client based on site conditions and as per the schedule given by CREPL. The cleaning of panels shall be done through periodic wiping or washing. Future after one year; The Project will be operated and maintained under the supervision of CREPL subject to signing of separate AMC agreement.
9	Government Approvals & Clearances	We shall be responsible for getting Government Approvals and Clearances required for the project.




CHAIRMAN
Holy Wood Academy, Kolhapur
Dist. Kolhapur



CONTINUAL

Our Ref: CREPL/HAP/252kW/0910/17-18

Date: 10/09/2017

To,
The Chairman
HOLY-WOOD ACADEMY,
Sanjeevan Knowledge City, A/P - Somwar Peth-Injole, Panhala,
Tal. Panhala, Dist. Kolhapur - 416201

Subject: Techno Commercial Offer for Design, Supply, Installation, Testing and Commissioning of 252KWp Grid Tied Rooftop Solar PV System through Net Metering arrangement (For Captive Use).

Dear Sir,

We thankfully acknowledge the receipt of your enquiry for the above subject requirement and referring your discussion regarding your Grid Tied Rooftop Solar PV System requirement, based on the data/information and documents shared during discussion, we are pleased to submit our offer for above mentioned details.

We sincerely trust that you will find the offer in line with your requirement. We will be more than glad to provide any clarification you may require in connection with said offer.

We would therefore sincerely request you to kindly give us an opportunity to work with your esteemed organization.

Thanking you and assuring you of our best services.

For CONTINUAL RENEWABLE ENERGY PVT. LTD.,

Sunil Koll.



CONTINUAL RENEWABLE ENERGY PVT. LTD.

Corporate Office: F-904, 9th Floor, Empire Square, CTS No. 4510/1, Next to Auto Cluster, Off Mumbai-Pune Road, Chinchwad, Pune - 411019
Regd. Office: C-08, Atharva Apartments, Sector No. 1, Plot No. 57, Indrayaninagar, Bhosari, Pune (MH) - 411039
E-mail: info@crepl.co.in Website: www.crepl.co.in

ANNEXURE – V

Price Schedule, Commercial Terms & Conditions:

Sr. No.	ITEM DESCRIPTION	Qty	Rate / Unit	Total Amount
1	S RTPV system of 250KWp Capacity Bill Of Material Panels - Waaree / Sova / Reputed Inverter - ABB Make / Reputed DC Cables - Apar AC Cables – Polycab Lightning Arrestor & Earthing - Bakiral / JMV ACDB – ABB Meters - Secure Make	252	52,000	13,104,000
Total Cost of System excluding GST				13,104,000
GST @ 5%				655,200
Total Cost Incl. GST				13,759,200
Subsidy from MEDA		250	18,300	4,575,000
Net Amount to Customer after Subsidy Reimbursement				9,184,200
<i>Amount In Words: INR Ninety One Lakhs Eighty Four Thousand Two Hundred Only.</i>				

Applicable Taxes will be extra. Presently 5% GST applicable on solar applications.

Payment Terms:

1. INR 15 Lakhs advance against finalization of MoU and subsequent Purchase Order.
2. INR 76.84 Lakhs shall be paid vide PDC cheque of dated December 2017 against mobilization of manpower for execution and before dispatch of major materials.
3. INR 45.75 Lakhs - Subsidy amount from MEDA will be claimed by CREPL directly / it will be deposited in customer's account. In case subsidy paid by MEDA directly to customer then customer has to pay the same amount to CREPL.


CONTINUAL RENEWABLE ENERGY PVT. LTD.

Corporate Office: F-504, 9th Floor, Empire Square, CTS No. 4510/1, Next to Auto Cluster, Off Mumbai-Pune Road, Chinchwad, Pune - 411019

Regd. Office: C-09, Athava Apartments, Sector No. 1, Plot No. 57, Indrayaninagar, Bhosari, Pune (MH) – 411039

E-mail: info@crepl.co.in Website: www.crepl.co.in

Solar & Wind Hybrid

 **HOLY - WOOD ACADEMY, KOLHAPUR.**
HEAD OFFICE : SANJEEVAN KNOWLEDGE CITY,
SOMAWAR PETH, PANHALA, DIST. KOLHAPUR- 416201
Ph. : (0231) 2086810 Fax : 2688809 Web : www.sanjeevan.edu.in
E-mail : sanjeevanoffice@gmail.com • holywoodacademy@gmail.com

HAK/2017-18/40 Date:21/06/2017

WORK ORDER

To
UNITRON ENERGY SYSTEMS PVT.LTD.,
PLOT NO. 25 SANJAY PARK,
AIRPORT ROAD,
PUNE-411032

**SUB: WORK ORDER FOR FABRICATION, TESTING, INSTALLATION
AND COMMISSIONING OF WIND SOLAR HYBRID SYSTEM CAPACITY
49.6KW(30.4 KW WEG, 19.2 KW SPV) WITH BATTERY BANK
AT, 'SANJEEVAN ENGINEERING & TECHNOLOGY INSTITUTE', SOMWAR
PETH, PANHALA – 416201**

Ref: Your quotation no.UES/2015/R/123, dated 17/07/2015

Dear Sir,


With reference to your above referred offer letter, we are happy to place workOrder on you for fabrication, testing, installation and commissioning of WindElectric Generator and SPV Hybrid System of capacity 49.6KW (8 x 3.8Kw WEG, 19.2Kw Solar PV) to be installed at 'SanjeevanEngineering & Technology Institute' SomwarPeth, Panhala – 416201.

A) **COST DETAILS:**

a)	Total cost of the work is	: Rs.91,50,402.00
b)	Total Central Govt. share is	: Rs.50,00,000.00
c)	The Total User Agency Share is	: Rs.41,50,402.00

- The total cost break-up is given in Annexure-1
- The total cost is inclusive of all taxes, duties and transportation etc.

B) **COMPLETION DATE:- 2 months from the date of work order/ advance issued.**



C] TERMS AND CONDITIONS:

1. This work order will be applicable only after sanction received MNRE
2. The manufacturer will carry out the work strictly according to the specifications of MNRE and complete the work within stipulated time. Technical specifications are given in Annex-II
3. Ammeter & Voltmeter for wind and solar will be installed on generation side separately. You have to install the energy metering system at both the sides i.e. at energy generation side and at consumption side separately.
4. You will provide a test certificate of energy meter issued by Government recognized institute. The energy meter shall be sealed & seal shall not be tampered.
5. You shall provide an indicator, which will show the status of charging
6. Before material inspection you should submit individual solar panel test certificate.
7. You are committed to generate minimum $(2.5 \times 49.6 = 124)$ 3720 units per month that available of 3-4hrs./day and wind speed of 4-5.4 M/S wind monitoring station from proposed 49.6Kw Wind solar Hybrid System.
8. You will submit to 'Sanjeevan Engineering & Technology Institute', Somwar Peth, Panhala-416201 a Certificate regarding performance of the system for a period of 3 months after commissioning of System duly signed by the User.
9. In case of inverter, you will submit the certificate from manufacturer providing all technical details.
10. In case of batteries you will submit the certificate from battery manufacturer that the batteries provided by the company are as per the specification and along with all technical details of the battery certificate. This clause is also applicable for PV Panels. While installation of battery bank the distance between two batteries may be kept 6" and vice versa.
11. You will provide Certificate from the user Agency that the system is erected properly and functioning satisfactorily as per performance details given under technical details and there are no problem whatsoever with the system.





Reg. No. F - 8077 / Kol.

HOLY - WOOD ACADEMY, KOLHAPUR.

HEAD OFFICE : SANJEEVAN KNOWLEDGE CITY,
SOMAWAR PETH, PANHALA, DIST. KOLHAPUR- 416201

Ph. : (0231) 2686810 Fax : 2686809 Web : www.sanjeewan.edu.in

E-mail : sanjeevanoffice@gmail.com • holywoodacademy@gmail.com

D] Payment Terms –

1. Rs.5,00,000/- along with purchase order.
State Bank of India – Ch no. 524692 dated 27/06/2017
2. 80% payment on the cost of material on site will be paid at delivery time.
3. Balance payment will be paid after 20 days of successful installation and Commissioning of the project.

E] About project material.

We would like to recommend you the following points about the material you are supplying.

1. Batteries – 'Southern' made – T-Gel.
2. Inverter should be of branded company (Delta /SMA)
3. Cabling – Polycab make
4. Solar panel – warrie.

F] In the final meeting you became ready to supply and install me one more wind turbine (of 5.1 kw capacity) along with tower and accessories. Now there will be nine wind turbines.

With above terms and conditions, you are requested to submit duplicate copy Of this order signed with seal of Company in token of your acceptance to above Work order.

Thanking you,

Yours faithfully,

For

CHAIRMAN

Holy Wood Academy, Kolhapur
Dist. Kolhapur



Enclosed: Annexure – I & II

Accepted by
Signature
Name
Designation
Company Seal



॥ विद्यायां विदुः संजीवनी ॥

Reg. No. F - 8077 / Kolp.

HOLY - WOOD ACADEMY, KOLHAPUR.

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E-mail : sanjeevanoffice@gmail.com • holywoodacademy@gmail.com

Annexure-I

COST DETAILS OF THE PROJECT:

Sr. No.	Item	Qty	Rate	Cost (inRs.)
1.	Wind Aero generator UE42plus*/240V [IEC average power 3.8kw, *IEC peak power 4.8kw, *instantaneous peak power 5.4kw] with Charge Controller One additional Wind Aero Generator 5.1 KW	8 Nos.	4,02,000/-	32,20,000/-
2.	Photovoltaic Panels KWP	19.2 KW	100/-	19,20,000/-
3.	Cabling - From Tower top to bottom & up to control room and Solar PV to control room (up to 50M only) with misc. switch gear etc.	1 SET	2,05,000/-	2,05,000/-
4.	20KVA /240V AC single phase Pure sine wave Inverter	1 No.	2,52,000/-	2,52,000/-
5.	18M Tower & Erection material	8 Nos.	74,000/-	5,92,000/-
6.	2V Tubular Stationary Batteries 240V/1100AH [life approx. 5 to 7yrs. water topping needed once in 6 months. warranty 4 yrs.]	1SET.	22,18,049/-	22,18,049/-
7.	Photovoltaic Panels structure		Included	Included
8.	Wind charge controller and solar Photovoltaic charge controller	Included	Included	Included
9.	Instrumentation (ammeter, voltmeter Energy meter, wind and solar monitoring equipment, Ah meter, battery level indicator)	1 SET	20,000/-	20,000/-
10.	Ex-Work Cost Total (total of 1 to 9)			88,48,402.00
11.	System, Design, Erection, Testing, Commissioning			2,60,000.00
12.	Transportation, Loading & Unloading			42,000/-
13.	Total (total of 11 to 12)			7,23,353.00
14.	Grand Total (10 + 13)			91,50,402.00



Authorized Signatory

CHAIRMAN
Holy Wood Academy, Kolhapur
Dist. Kolhapur



॥ विद्यानां विद्या संजीवनी ॥

Reg. No. F - 8077 / Kop.

HOLY - WOOD ACADEMY, KOLHAPUR.

HEAD OFFICE : SANJEEVAN KNOWLEDGE CITY,
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Ph. : (0231) 2686810 Fax : 2686809 Web : www.sanjeevan.edu.in

E-mail : sanjeevanoffice@gmail.com • holywoodacademy@gmail.com

	Make	"UNITRON"
	Efficiency	Approx. 90%
	Diversity Factor	50 to 100% of inverter rated capacity
	Power Factor	0.8
5.	Solar P.V. Panels	19200Watts
	Capacity	19.2KW
	Make	MNRE APPROVED
6.	Power Centre for Aero Generator consists of charge regulator PF Capacitor, diversion load, MCB assisted stop switch, manual diversion load with all required displays (analog & digital)	
7.	Cabling from SPV Modules to power centre including inter connection	ISI Make of required size
8.	Cabling from WEG top to Power Centre	ISI Make of required size
9.	Support structure for Solar PV panels	With anti-corrosive coat and silver paint
10.	Instrumentation for power measure	Amphere hour meters on generation side and KWH meter on consumption side
11.	Transportation	From Factory to site
12.	System Design, Erection and Commissioning	System design as per the MNRE specification
13.	Civil work	RCC construction 1:3:6

Handwritten signature



Handwritten signature

CHAIRMAN

Holy Wood Academy, Kolhapur
Dist. Kolhapur



Ref:UES/2016/10049

To,
Sanjeevan Public School
Somwar Peth, Panhala - 416201

Kind Attn: Mr. P.R. Bhosale [Chairman]

Sub: 50KW Wind-solar hybrid system for electrification.

Dear Sir,

Thanks for the enquiry. Please find here below our best offer for your requirement:

Site : Sanjeevan Public School, Panhala
Load : 15-20KVA load for 6 to 10 hours.
Energy requirement : 140 to 260 KWH / day
System Suggested : 50KW Hybrid system
[10kw x 3=30KW WEG with 20KW SPV]

Energy Generation through WEG : 145kwh to 280kwh / daily [assuming wind speeds 4 to 5.4 m/s]

SL#	Description	Qty.	Rate	Amount (Rs.)
1	"UE10K" / 240V 11.0kw peak, Wind Electric Generator with Charge Controller	3 Nos.	4,02,500/-	32,20,000.00
2	Solar PV with controller, switchgear, Structure Modules with Crystalline Class "A" cell	20KW	100/-	19,20,000.00
3	12M Triangular Welded Guyed Lattice tower with accessories, hardware and anti-corrosive coat with silver paint	3 Nos.	74,000/-	5,92,000.00
4	LMLA Batteries 240V/1050AH [life approx. 7-8 yrs. water topping needed once in 6 months.]	1 Set	22,18,049/-	22,18,049.00
5	Amphere Hour Meter to monitor the Generated energy from Wind & Solar PV	1 Set	20,000/-	20,000.00
6	20KVA /240V AC single phase Inverter	1 No.	2,52,000/-	2,52,000.00
7	Cabling - From Tower top to bottom & up to control room and Solar PV to control room (up to 50M only) with misc. switch gear etc.	1 Set	2,05,000/-	2,05,000.00
	Sub Total			84,27,049.00
	VAT @ 5.5%			4,63,487.00
8	Installation & Commissioning charges			2,17,866.00
9	Transport, Loading & Unloading charges			42,000.00
	Total			91,50,402.00

You will be eligible for a subsidy of Rs.70,000 per kW which comes to a total of Rs.35,00,000/-. We can pass on the subsidy benefit upfront without waiting for the release of funds from MNRE.

Notes: the shortage of energy is experienced only during lean months normally during part of Jan and /Dec /Nov viz about 9 to 10 months the system will adequately meet the MAX load demand and the rest of the period it will be able to meet MIN load demand

TERMS & CONDITIONS :

- **EVACUATION CABLE:** from control room to different load points is User's responsibility. Any negligence in this can lead to improper functioning of the system. Any cable fault connected to our systems arising out of not related problems such as digging, shorts-in adjacent cables not connected to our cables.
- To get proper energy generation cleaning of Solar PV every week is User's responsibility
- On receipt of material at site, designated person from user's side shall acknowledge the receipt of

Net metering Application

 MAHAVITARAN Maharashtra State Electricity Distribution Co. Ltd. (A Govt. of Maharashtra undertaking) CIN : U40105MH20055GC153645		1 st Floor, Administrative Building, Tarabai Park Kolhapur – 416003
Tel : 2650581 to 84 (P) Fax : 2656316 Email: sekolhapur2013@gmail.com Website: www.mahadiscom.in		

SE/KC/T/HT/LS/ M/s. Holywood Academy/

No 8579

Date: 25 SEP 2017

To,
 M/s. Holywood Academy,
 At Gat No. 28 to 32, 33A,33B, 35,38,47,94, House No. 225,17,52,52/1,52/2,52/3,
 Somwar Peth, A/p.Panhala,
 Tal:- Panhala, Dist Kolhapur.

Sub:- Load Sanction to proposal for additional HT power supply of Existing 187+Addl 113 =300KW/Existing 170+Addl 70=240 KVA on 11 KV in r/o. M/s. Holywood Academy, at Gat No. 28 to 32, 33A,33B, 35,38,47,94, House No. 225,17,52,52/1,52/2,52/3, Somwar Peth, A/p.Panhala, Tal:- Panhala, Dist Kolhapur.

Ref: 1) Consumer Application on Dtd. 19.08.2017
 2) EE/R I/Tech/5029 dtd.06.09.2017.

Dear Sir,

This has reference to your application for additional HT power supply of Existing 187+Addl 113 =300KW/Existing 170+Addl 70=240 KVA on 11 KV level. In exercise of powers delegated to MSEDCL as per Electricity Act 2003, The Competent Authority has accorded approval for sanction of additional in power supply of of Existing 187+Addl 113 =300KW/Existing 170+Addl 70=240 KVA KVA connected load on 11 KV Injoli VG feeder from 33/11 KV Panhala substation having transformer capacity of (1x3.15+1x5) 8.15 MVA in the name of M/s. Holywood Academy, at Gat No. 28 to 32, 33A,33B, 35,38,47,94, House No. 225,17,52,52/1,52/2,52/3, Somwar Peth, A/p.Panhala, Tal:- Panhala, Dist. Kolhapur under DDF scheme vide technical sanction No. SE/KC/T/HT/ DDF-1.3%/ R I/ 96/17-18 Dtd.16.09.2017. The copy of the detailed estimate is enclosed herewith. As per letter no.5029 dtd.06.09.2017 of Executive Engineer MSEDCL O&M R I Division the estimate amounting to Rs. 286580/-.

The details are as below:

Particulars	Connected Load (KW)	Maximum Demand (KVA)	Tariff /Purpose
Existing	187	170	HT IX B (Educational Institute)
Additional	113	70	
Total	300	240	

1) VALIDITY

- I. The validity of this sanction letter is for a period of SIX months from the date of issue.
- II. You will have to make the necessary payments within ONE month and will ensure that you will avail the power supply within validity period of sanction letter.
- III. You will have to avail the supply within one month / three months on the intimation of our readiness to give power supply to you, failing which you will be liable to pay minimum charges as per the applicable tariff.
- IV. The company reserves the right to revalidate the power sanction to the conditions prevailing at the time of revalidation.

Major Scope of Estimate – 1] 11 KV Metering cubicle CT 15/5 A (0.5s class) with VA burden 10VA-03 Nos. & 95 sqmm XLPE cable 20 Rmt are considered in the estimate.

2) SUPPLY VOLTAGE

Your load will be supplied on 11 KV Injoli feeder from 33/11 KV Panhala substation.

3) INSTALLATION

Your installation arrangement/drawing is required to be got approved from Electrical Inspector office Kolhapur. The installed capacity of transformer shall not be more than 315KVA capacity.

4) Transformer to be utilized should be BIS marked, BEE certified and as per IS 1180(Part I): 3014. The manufacture should be either from approved vendor of corporate office or should have obtained approved. GTP and drawing with valid type test from O & M Circle Office, Kolhapur. As per gazette notification issued by Ministry of Power dtd.17.02.2017 and Chief Engineer (MM Cell) letter No.604 dtd.23.02.2017 MSEDCL shall allow level -II/Star-I Energy Efficient Distribution Transformer of as per IS-1180 (Part-I):2014.

5) PAYMENT

Please arrange to make the payment as detailed below:-

Particulars	Amount in Rs.
Connection charges	456/-
1.3 % supervision charges	368/-
Registration	1,700/-
Security Deposit	236500/-
Agreement bond	440/-
Total	2,39,464/-

Say (Rs. Two Lacs Thirty Nine Thousand Four Hundred & Sixty Four only)
Please note that the amount as shown above is payable by you at this office by a DD/Bankers Cheque payable at Kolhapur in favor of MSEDCL.

6) CLEARANCES

You shall have to obtain necessary clearances if any from respective authorities as applicable, before release of supply.

7) DOCUMENTS

You will have to furnish the following document before agreement.

- Power of attorney through resolution passed by the meeting of Directors of the Board for putting common seal of the company and signature of Directors.
- Manufacturer's test certificates of equipments (Transformer, CT, PT, Kiosk, Capacitor, etc.)
- The installation test report from Licensed Electrical Contractor along with details of machinery installed.
- Permission from Electrical Inspector for energizing the installation.
- The Xerox copies of bills/documents towards purchase of materials for above work along with handing over of assets to concerned EE (O&M) MSEDCL on Rs 200/- stamp paper in the standard format.

8) METERING

You will have to provide a compact HT metering cubical (kiosk) having 3-CTS and 3-PTS (epoxy molded type) with 3-Ph, 4-wire Static TOD meter as per MSEDCL specification.

Particulars	Burden	Ratio	Class
3-CTs	10 VA	15/5 A	0.5 S
3-PTS	50 VA	11 KV/110 V	0.5

9) If you opts to purchase your own energy meter the same shall be as per specifications provided by SE (TQA), Pune/EE (Testing) Kolhapur. The metering KIOSK/energy meter shall be erected at such a height so that meter display is at eye level. The metering kiosk and energy meter shall be installed on ground floor at the point of supply approved by SE (TQA) Pune/EE(Testing) Kolhapur.

10) Kiosk Shed

The consumer will have to provide closed shed of size 15 ft x 12 ft x 8 ft to the compact kiosk. The consumer will also construct a plinth of size 3 ft x 4 ft x 4 ft for testing equipments. One no plug point should be provided in kiosk shed in working condition. Fencing should be provided for metering installation. There should be separate entry for the metering kiosk premise, i.e. MSEDCL's employees should be able to enter the metering kiosk premises without knowledge & permission of the factory security guard.

11) Earthing of metering kiosk

Total 9 nos. of earth pits are required for HT metering cubical which needs to be meshed i.e. interconnected at bottom of each pit to get effective earth resistance. Same earth pits be connected separately by using copper strips of size 20 mm x 4 mm or copper round bar having equivalent current carrying capacity to following equipment:

- A. CT body & PT body four pits (Two earth pits each for PT & CT separately)
- B. CT secondary Earthing one pit
- C. PT secondary Earthing one pit
- D. Incoming HT cable Earthing one pit
- E. Outgoing HT cable Earthing one pit
- F. Cubicle body Earthing one pit

G. Earthing strips should be visible and not be concealed in foundation and should have tap arrangement for watering the pits.

12) Installation of Lightening Arrestors

The consumer will have to install Lightening Arrestors at the tapping point of incoming cable.

13) Cable trench for incoming cable

Incoming HT cable is to be brought up to HT cubical through open cable trench and same should not be buried in ground. It should be visible for inspection. You should provide grill covers to the trench throughout its length in your premises, for cable protection.

14) Check meter

If necessary, you will have to provide check meter with same make, ratio and specification as that of billing meter as per the point of supply approved by SE (TQA) Pune/EE (Testing) Kolhapur.

15) Digital Multifunction meter on LT incomer side

You will have to install separate, appropriate ratio, CT's, PT's and digital energy meter, ammeter, voltmeter or digital multifunction meter on the LV side of all his transformers for cross checking purpose during load test.

16) SPACE FOR EQUIPMENTS

You will have to provide and maintain proper space for the MSEDCL's metering equipment having horizontal clearances of minimum 1.5 meters on all side.

17) POWER FACTOR

You shall maintain the power factor of your load within the limits as prescribed by the MSEDCL in conditions of supply, as may be applicable from time to time and you shall be liable for penalty for violation of the said provisions in accordance with the provision of tariff as may be determine by MERC.

18) HARMONICS CONTROL

You shall ensure that total harmonics generated and injected in MS.FTCL/MSEDCL system by your load shall not be more than 3% and individual harmonics shall not be more than 1%. Any default on your part shall be corrected immediately. You will have to submit the harmonics analysis report within 3(three) months from the date of release of load.

19) VOLTAGE VARIATION CONTROL

You shall provide necessary static VAR SOURCES of last response to avoid voltage flickering due to your load and shall maintain voltage variation within +/- 1%.

20) AGREEMENT

After completing all formalities as above, you are required to execute stamped agreement as per our standard agreement form at this office. The cost of the stamp will be borne by you.

21) CONDITIONS OF SUPPLY AND TARIFF

The power supply shall be governed by, the prevailing provisions of the MSEDCL's Conditions of supply & prevailing tariff as may be applicable in this regard and shall further be subject to such other provisions as may be prescribed by the MSEDCL from time to time.

22) G-7 FORMS

You shall have to maintain necessary information regarding energy consumption, Maximum Demand recorded etc. on a day to day basis in the format as prescribed by the MSEDCL and shall produce the same on demand/shall handover to every month to authorized representative of the MSEDCL at the time of meter reading.

23) POWER RESRTICTION

The power supply shall be governed by the load Restriction orders as may be prescribed by MERC/ Government of Maharashtra from time to time. You shall also observe & follow the staggering Holiday/ Load Shedding day as may be informed by MSEDCL and shall not consume any power on such Staggering/Load Shedding Day. Government load restriction orders as prescribed and amended from time to time shall be applicable to you. You will have to observe the staging holiday as decided by the Government which is as present Monday for Kolhapur Dist.

24) ADDITIONAL CONDITION

You will have to obtain sanction / approval whenever there is any change in name / installation / equipment etc. Other than sanctioned you will have to submit an application in the Board prescribed form along with necessary document / certificate test from concerned authorities.

25) Way leaves for new HT/LT connections

Where the applicant has no frontage abutting a public street and where the service line has necessarily to cross over or go under or through other's property, the applicant shall, if so required by the MSEDCL, obtain the necessary way leaves and permission at his own expense, and continue them as long as supply is to be maintained. Should, however the way leaves or permission be withdrawn, the supply will be cut of forthwith. Any extra expenses incurred with the way leaves shall be at the expenses of the consumer.

26) No HT/LT line in consumer's premises

There should not be any HT/LT supply lines/ MSEDCL's distribution transformers in the consumer's premises. If any such lines or transformers are already erected in the consumer's premises before load sanction, the consumer will have to shift the same at his own cost.

27) Two or more connections in one premises not allowed

No other HT or LT connection is allowed in this premise. The existing all HT/LT connections will have to be permanently disconnected and the energy bill of the permanently disconnected connection must be paid by you before release of this HT supply.

28) GTP Approval of Material

You are requested to procure all above material under sanctioned estimate as per MSEDCL Specification & approved GTP from the undersigned. Also before dispatch of material from the supplier you have to carry out factory inspection from Authorized Testing Engineer/ O&M Engineer.

29) ACCEPTENCE

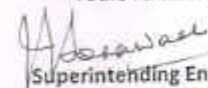
Please arrange to submit your acceptance in writing for the above terms and conditions.

On completion of the formalities further action for extending supply facility will be taken from our end. In case of any doubt / difficulty or clarification needed, may please contact this office on any working day during working hours.

You are requested to note the requirement/formalities carefully and arrange to comply the deficiencies, if any, before making payment in your own interest so as to avoid any inconvenience / delay at the time of supply to you and ensure prompt payment so as to enable us to proceed further.

Thanking You.

Yours Faithfully,


Superintending Engineer
Kolhapur Circle

Copy to:-

1. The Sr. Manager.(F&A), MSEDCL, Kolhapur Circle
2. The Executive Engineer, MSEDCL, R I Division, Kolhapur.
3. The Executive Engineer MSEDCL Testing Div. Kolhapur.
4. The Dy. Executive Engineer, MSEDCL, O&M Subdivision, Panhala.

Solar Power system installed at Roof Top of the building



Wind Solar Hybrid Power system installed near Basket Ball Ground



Energy Storage Room (Battery Bank)



Energy Audit Report

Project done by Electrical Engg. Student

Need of Energy Audit

Energy demand is an increasing pressure for any government. The energy generated decides the economic growth of the country. Being the 5th largest generator and fourth largest power consumer in the world, energy demand and scarcity rules the country. Energy demand in our country is increasing exponentially. "Energy conservation" can be the best solution for the rising energy demand. "Energy Audit" is the best solution for energy conservation where the system is well analyzed and report stating the possible e system no negative output is evaluated. Globally the building sector accounts for more electricity use than any other sector, 42 per cent. No wonder considering that we spend more than 90 per cent of our time in buildings. With increasing urbanization, higher in developing countries, the number and size of buildings in urban areas will increase, resulting in an increased demand for electricity and other forms of energy commonly used in buildings. In many developing countries there is normally very little margin between existing power supply and electricity demand. With increasing electricity demand, new generation needs to be brought in. Although renewable sources of electricity such as hydro, geothermal or wind provide electricity at a much lower cost, their capital outlay is large, they are complex and take much longer to implement. Diesel based generation is usually brought in the short term to meet this demand, which results in increased cost of electricity. Our focus on the importance of energy auditing is by considering the conventional lightning load of our educational institution. In this energy conservation project, we are going to consider the factors such as lightning load, fans, personal computers consumption and network ports and take the appropriate measures to save energy and the cost. The overall effort is towards the saving of energy and cost which would result in energy efficient building of the institute.

Duration of Energy Audit

One month - October 2015

Procedure of Energy Audit

4. FLOW CHART.

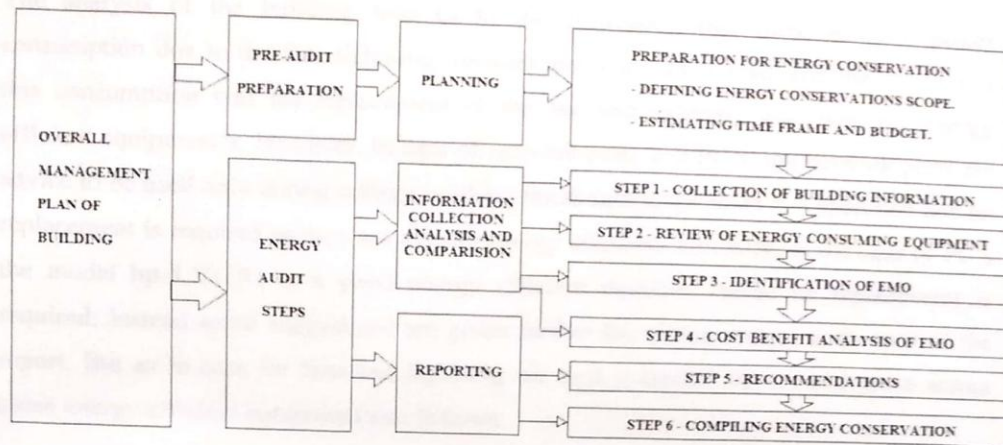


Figure 4.1

The above flow chart shows the procedure of the project that has been carried out to accomplish the aim of the project in A and D section of our sanjeevan engineering campus. It includes various blocks which shows the steps taken to carry out the work, the first block named as the "Overall management plan of building" is the base of every task to be carried out which has two blocks named as "Pre-audit preparation" and "Energy audit steps". The "Pre-audit preparation" or "Planning" includes the analysis of conservation scope that can be achieved in the particular sector and the time and budget that may require proceeding further. This includes six steps; the first is 'Collection of building data' in which every power consuming sectors in the building are determined. The second step is the 'Review of energy consuming equipment' in which the maximum energy consuming equipment's are determined (Such as in this project fans, lightning, PC's etc.) The next step is to determine the excellent opportunities to save the energy, which is called as EMO (Energy management opportunities) that is step 3 and with that analysis the economic benefit i.e. 'Cost benefit analysis of EMO' step 4. These four steps are the part of "Information collection analysis and comparison". The fifth step includes the recommendation that should be given to save the energy and cost and then it's a necessary job to take action in the last sixth step to achieve the aim of the project which lies under the reporting part of the above chart i.e. "Energy audit steps".

General Calculation

ENERGY CONSERVATION

6. GENERAL CALCULATIONS.

In order to understand the way, the factors are calculated for a particular room or of a particular load let us consider an example of a load which we have taken in to account. Let us consider there are four fans in a room, and then the data sheet of that room for the four fans can be done by the following ways:

- Each fan is of **80 W**. Then multiple 80 W with the number of fans (**i.e. four**).
- **4 fans × 80 W = 320 W**. Now after that multiple the values by four as we have assumed the working period of **four hours per day** instead of **eight working hours** of college, as all equipment's aren't in use during the whole day. Therefore, we considered the complete load and reduced the working period for better analysis and results.
- **320 W × 4 hours per day = 1280 WH**.
- After determining the above value now let us multiply it by 24, as we considered only **24 days a month** (neglecting the holidays).
- **1280 WH × 24 days per month = 30720 WH**. Then multiply it by 12 as to determine the value for a year.
- **30720 WH × 12 months = 368640 WH**. Then divide it by 1000 we get the value in KWH as **368.64 KWH (POWER CONSUMPTION IN KWH)**, which are **368.64 units**.
- Now as the cost of per unit is **Rs. 7**, then to determine the billing cost multiply the above units with 7.
- We get **368.64 units × Rs. 7 = Rs. 2580.48**, which is the **bill** for 4 fans of 80 W.
- Now similarly we can determine the parameters for the four fans of **50 W**.
- Each fan is of **50 W**. Then multiple 50 W with the number of fans (**i.e. four**).
- **4 fans × 50 W = 200 W**. Now after that multiple the value by four as we have assumed the working period of **four hours per day**.
- **200 W × 4 hours per day = 800 WH**.
- After determining the above value now let us multiply it by 24, as we considered only **24 days a month** (neglecting the holidays).

ENERGY CONSERVATION

- $800 \text{ WH} \times 24 \text{ days per month} = 19200 \text{ WH}$. Then multiply it by 12 as to determine the value for a year.
- $19200 \text{ WH} \times 12 \text{ months} = 230400 \text{ WH}$. Then divide it by 1000 we get the value in KWH as **230.4 KWH (POWER CONSUMPTION IN KWH)**, which are **230.4 units**.
- Now as the cost of per unit is **Rs. 7**, then to determine the billing cost multiply the above units with 7.
- We get $230.4 \text{ units} \times \text{Rs. 7} = \text{Rs. 1612.8}$, which is the **bill** for 4 fans of 50 W.
- Now by the above calculations we have determine the following factors:

Factors	Before	After
Power consumption in KWH.	368.64 KWH	230.4 KWH
Energy bill in Rupees.	Rs. 2580.48	Rs. 1612.8

Table 6.1

- **Total investment = Cost of per equipment \times Quantity of equipment.**
- Total investment = 1900×4
- Total investment = Rs. 7600
- **Annual saving in Rupees = Energy bill before implementation – Energy bill after implementation.**
- Annual saving in Rupees = Rs. 2580.48 - Rs. 1612.8
- Annual saving in Rupees = Rs. 967.68
- **Payback period = (Total investment + maintenance cost) / annual saving.**
- Payback period = $(7600 + 0) / 967.68$
- Payback period = 7.85 Years.
- **(IMPORTANT: The maintenance cost in the above equation has been taken as zero, due to the reason that the above factor is unpredictable. Though if we assume that 2 out of 4 fans might need maintenance, then maintenance cost of per fan is Rs. 500. Which if we consider in above equation then it would increase the payback period by hardly one year. However due to the unpredictable point of view it has been neglected in below data sheet calculations).**

Specimen energy conversion

ENERGY CONSERVATION

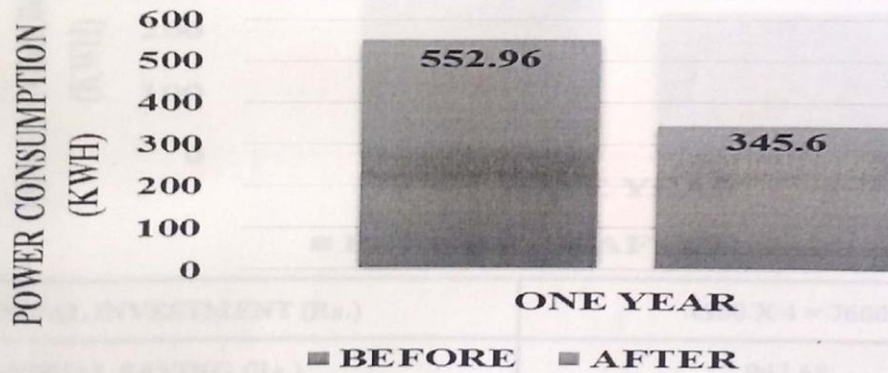
7. A – SECTION FANS SHEETS.

LOCATION	PROJECT NAME	TECHNOLOGY
A001	ENCON	FANS

DESCRIPTION OF ENERGY CONSERVATION MEASURES

Use of energy efficient fans (havells) of 50W/350 RPM/1200 MM Sweep/ 2 Years Warranty, instead of ordinary fans (bajaj) of 80W/1200 MM Sweep. As it proves to be more effective in conserving the energy.

BEFORE & AFTER MODIFICATION GRAPH



TOTAL INVESTMENT (Rs.)	1900 X 6 = 11400
ANNUAL SAVING (Rs.)	1451.52
PAYBACK PERIOD	7.85 YEARS
IMPLEMENTATION DATE	
ENERGY SAVING IN LAST YEAR (W)	

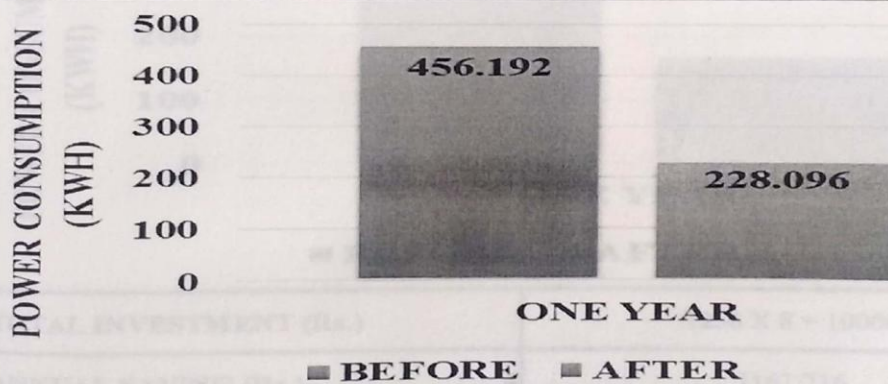
8. A – SECTION LIGHTNING SHEETS.

LOCATION	PROJECT NAME	TECHNOLOGY
A001	ENCON	LED TUBES

DESCRIPTION OF ENERGY CONSERVATION MEASURES

Use of LED tubes (PHILIPS ECO2) of 18W and replacing the ordinary CFL tubes of 36W, as LED's have less power consumption and have life span and lumens of 50,000 hours and 1650 lumens respectively.

BEFORE & AFTER MODIFICATION GRAPH



TOTAL INVESTMENT (Rs.)	1250 X 11 = 13750
ANNUAL SAVING (Rs.)	1596.67
PAYBACK PERIOD	8.61 YEARS
IMPLEMENTATION DATE	
ENERGY SAVING IN LAST YEAR (W)	

13. A + D SECTION SHEETS.

LOCATION	PROJECT NAME	TECHNOLOGY						
A+D - SECTION	ENCON	FANS						
DESCRIPTION OF ENERGY CONSERVATION MEASURES								
Use of energy efficient fans (havells) of 50W/350 RPM/1200 MM Sweep/ 2 Years Warranty, instead of ordinary fans (bajaj) of 80W/1200 MM Sweep. As it proves to be more effective in conserving the energy.								
BEFORE & AFTER MODIFICATION GRAPH								
POWER CONSUMPTION (KWH)	<table border="1"> <thead> <tr> <th>Category</th> <th>Power Consumption (KWH)</th> </tr> </thead> <tbody> <tr> <td>BEFORE</td> <td>21288.96</td> </tr> <tr> <td>AFTER</td> <td>13305.6</td> </tr> </tbody> </table>		Category	Power Consumption (KWH)	BEFORE	21288.96	AFTER	13305.6
Category	Power Consumption (KWH)							
BEFORE	21288.96							
AFTER	13305.6							
TOTAL INVESTMENT (Rs.)	1900 X 231 = 438900							
ANNUAL SAVING (Rs.)	55883.52							
PAYBACK PERIOD	7.85 YEARS							
IMPLEMENTATION DATE								
ENERGY SAVING IN LAST YEAR (W)								

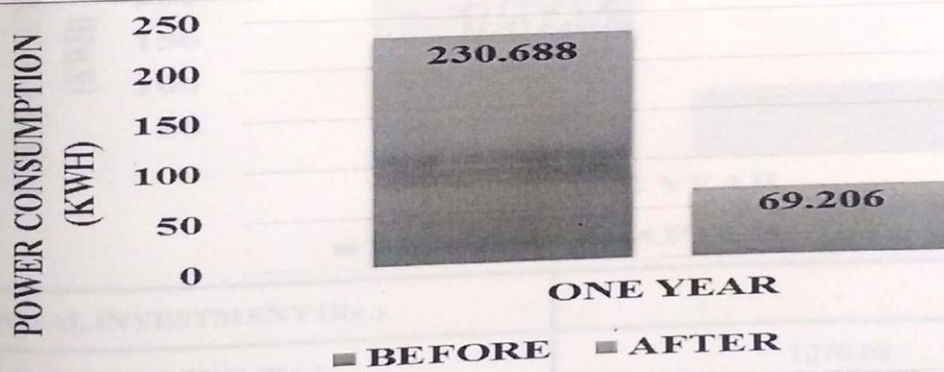
12. D – SECTION NETWORK PORTS SHEETS.

LOCATION	PROJECT NAME	TECHNOLOGY
F1	ENCON	NETWORK PORT - 24

DESCRIPTION OF ENERGY CONSERVATION MEASURES

Use of the network software port (24 port) only during the college working hours, which would result in less energy consumption and reduce the cost.

BEFORE & AFTER MODIFICATION GRAPH



TOTAL INVESTMENT (Rs.)	-
ANNUAL SAVING (Rs.)	1130.376
PAYBACK PERIOD	-
IMPLEMENTATION DATE	
ENERGY SAVING IN LAST YEAR (W)	

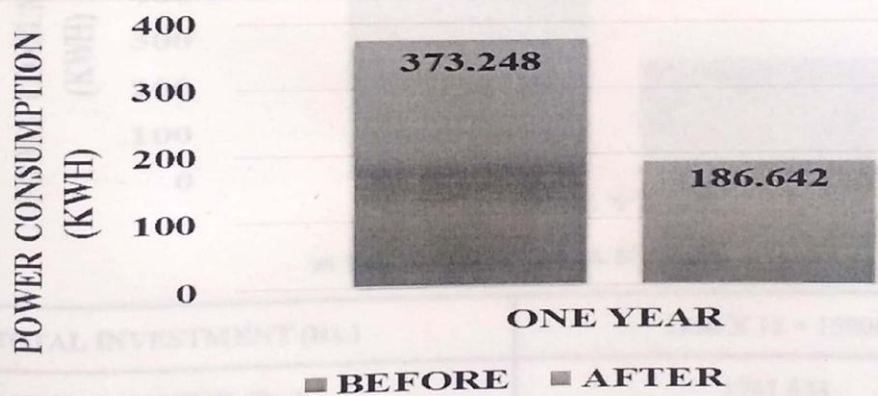
11. D – SECTION LIGHTNING SHEETS.

LOCATION	PROJECT NAME	TECHNOLOGY
G1	ENCON	LED TUBES

DESCRIPTION OF ENERGY CONSERVATION MEASURES

Use of LED tubes (PHILIPS ECO2) of 18W and replacing the ordinary CFL tubes of 36W, as LED's have less power consumption and have life span and lumens of 50,000 hours and 1650 lumens respectively.

BEFORE & AFTER MODIFICATION GRAPH



TOTAL INVESTMENT (Rs.)	1250 X 9 = 11250
ANNUAL SAVING (Rs.)	1306.368
PAYBACK PERIOD	8.54 YEARS
IMPLEMENTATION DATE	
ENERGY SAVING IN LAST YEAR (W)	

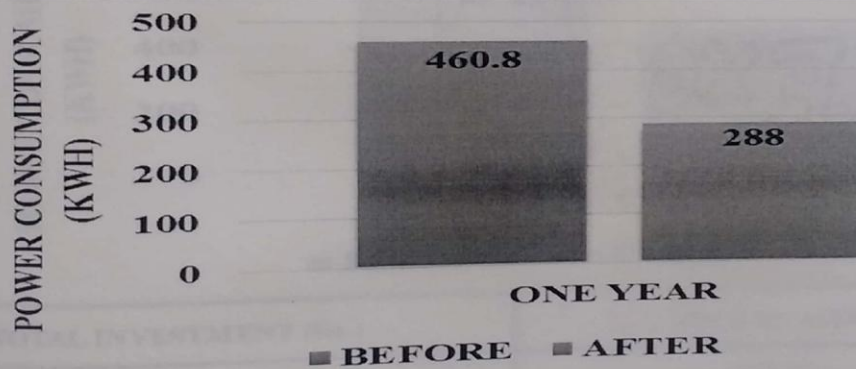
10. D – SECTION FANS SHEETS.

LOCATION	PROJECT NAME	TECHNOLOGY
G1	ENCON	FANS

DESCRIPTION OF ENERGY CONSERVATION MEASURES

Use of energy efficient fans (havells) of 50W/350 RPM/1200 MM Sweep/ 2 Years Warranty, instead of ordinary fans (bajaj) of 80W/1200 MM Sweep. As it proves to be more effective in conserving the energy.

BEFORE & AFTER MODIFICATION GRAPH



TOTAL INVESTMENT (Rs.)	1900 X 5 = 9500
ANNUAL SAVING (Rs.)	1209.6
PAYBACK PERIOD	7.85 YEARS
IMPLEMENTATION DATE	
ENERGY SAVING IN LAST YEAR (W)	

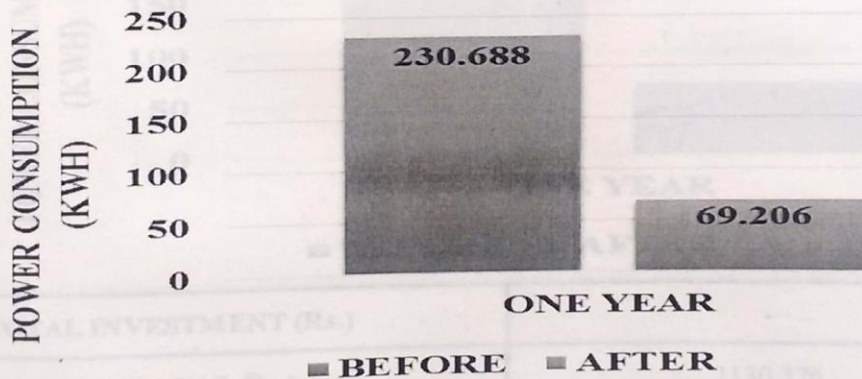
9. A – SECTION NETWORK PORTS SHEETS.

LOCATION	PROJECT NAME	TECHNOLOGY
A006	ENCON	NETWORK PORT - 24

DESCRIPTION OF ENERGY CONSERVATION MEASURES

Use of the network software port (24 port) only during the college working hours, which would result in less energy consumption and reduce the cost.

BEFORE & AFTER MODIFICATION GRAPH



TOTAL INVESTMENT (Rs.)	-
ANNUAL SAVING (Rs.)	1130.376
PAYBACK PERIOD	-
IMPLEMENTATION DATE	
ENERGY SAVING IN LAST YEAR (W)	

14. PRACTICAL ANALYSIS.

The above part showed us the theoretical analysis of the A and D section of our sanjeevan campus. In order to prove the above results, we implemented the energy conserving equipment's in the department room to obtain the results as follows:

LOCATION	PROJECT NAME	TECHNOLOGY						
F1	ENCON	FANS & LIGHTS						
DESCRIPTION OF ENERGY CONSERVATION MEASURES								
Use of energy efficient fans (havells) of 50W/350 RPM/1200 MM Sweep/ 2 Years Warranty, instead of ordinary fans (bajaj) of 80W/1200 MM Sweep. As it proves to be more effective in conserving the energy & Use of LED tubes (PHILIPS) of 9W and replacing the ordinary CFL tubes of 36W, as LED's have less power consumption and have more life span.								
BEFORE & AFTER MODIFICATION GRAPH								
<p>The bar chart displays power consumption in KWH over a 20-day period. The vertical axis ranges from 0 to 25 KWH in increments of 5. The 'BEFORE' bar reaches 22 KWH, and the 'AFTER' bar reaches 10 KWH. A legend at the bottom identifies the bars as 'BEFORE' and 'AFTER'.</p> <table border="1"> <caption>Power Consumption Data</caption> <thead> <tr> <th>Period</th> <th>Power Consumption (KWH)</th> </tr> </thead> <tbody> <tr> <td>BEFORE</td> <td>22</td> </tr> <tr> <td>AFTER</td> <td>10</td> </tr> </tbody> </table>			Period	Power Consumption (KWH)	BEFORE	22	AFTER	10
Period	Power Consumption (KWH)							
BEFORE	22							
AFTER	10							
TOTAL INVESTMENT (Rs.)	13000							
20 DAYS SAVING (Rs.)	84							
PAYBACK PERIOD	10.74 YEARS							
IMPLEMENTATION DATE	21-Feb-16							
ENERGY SAVING IN 20 DAYS	12 KWH							

Suggestions

15. SUGGESTIONS.

15.1. Corridor lightning:

In order to save more energy and cost in the corridor lightning, it is suggested to use the LED's which operate with the inbuilt motion sensor. For that purpose, we recommend to use the 'OREVA' surface sensor LED's (ORSNL-R-18W-S) costs around Rs. 2726, having 30000 hours of life span and wattage of 18 W, which are capable to operate in the temperature range of - 20 degrees to 35 degrees providing 1425 lumens. As in the sanjeevan campus corridor lightning are not used during the day time. This sensor model LED automatically turns ON while live motion detected during the dark and turns off automatically, if no motion is detected within 90 ± 10 seconds which makes it the perfect alternative to save energy and cost.

15.2. Interior colour:

The interior colour used in the campus building is not effective to reflect the light of the lightning load. In order to utilize the light emitted by the tubes it is recommended to use white oil paint in the room which reflects the light uniformly throughout the room and also light required due to reflection is less which reduces the use of lightning load and helps in energy consumption.

15.3. Computer load:

The PC'S used in our campus are already effective and energy saving, but this PC's are left ON unnecessarily which increases the billing cost. In order to reduce the factor of consumption it is recommended to put the PC's to the setting of auto-sleep mood after 2 minutes of stand by time. And if not necessary shut them down periodically.

Results

ENERGY CONSERVATION

16. RESULTS.

16.1. Theoretical:

Therefore, by considering the theoretical calculations we determined that the overall power consumption is reduced from 40417.174 KWH to 22461.102 KWH. By the same the economic benefit achieved is Rs. 125692.504. Thus it has helped to reduce energy consumption up to 55.57 %.



Figure 16.1



Figure 16.2

ENERGY CONSERVATION

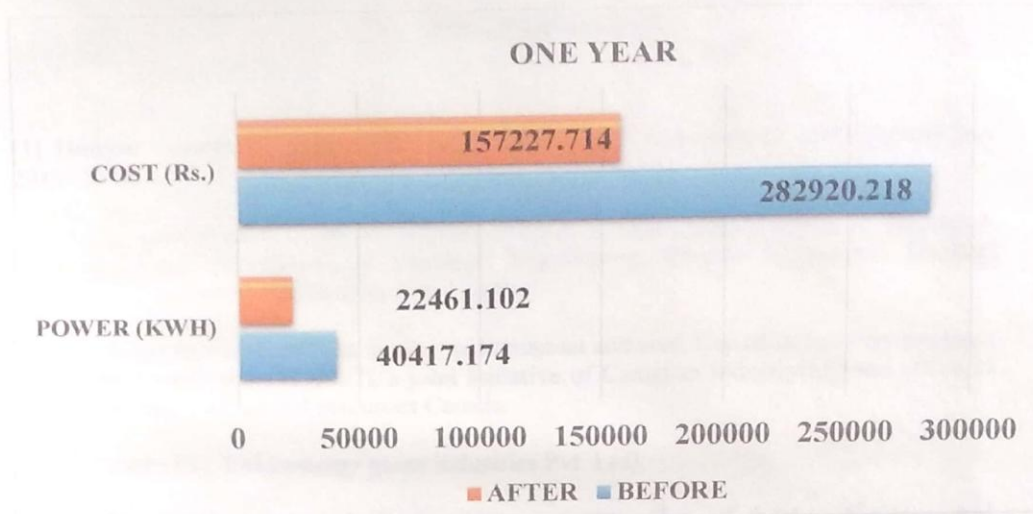


Figure 16.5



Figure 16.6

Figure 16.5 and Figure 16.6 shows the graphical representation of theoretical and practical analysis respectively. Comparing the above two results on average concluded that about 50 % of the power and cost would be saved, which would help to make the two sections (i.e. A and D) of the sanjeevan campus energy efficient.

Hollywood Academy

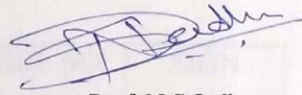
Sanjeevan Engineering and Technology Institute, Panhala.

CERTIFICATE

This is to certify that the report entitled “**ENERGY CONSERVATION**” submitted by students, Roll No. 45,48,17,39 is a record of Bonafide work carried out by them, under my guidance, in partial fulfillment of the requirement for the award of the final Year degree of Bachelor of Electrical Engineering of Shivaji University.

Date: 13/5/2016

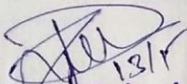
Place: Panhala, Kolhapur



Prof. N.S Jadhav

Guide

SETI, Panhala.



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H.O.D Electrical Engineering

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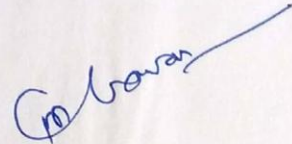
Ph.D Mulgund

Principal

SETI, Panhala



(Internal Examiner)



(External Examiner)