Shri Marutrao Ghule Patil Shikshan Sanstha's

JIJAMATA COLLEGE OF SCIENCE AND ARTS

At. Dnyaneshwarnagar, Po. Bhende (Bk). Tal. Newasa, Dist. Ahmednagar
PIN- 414605; Phone: 02427-255304 Fax: 02427-255809
Permanently affiliated to Savitribai Phule Pune University, Pune
(Id/No PU./AN/S/043/1992), **ISO 9001: 2015 Certified College**
Winner of Pune University's Best Rural College Award & Accredited at 'B+' Grade
Website: www.jijamatacolleg.ac.in; **E-mail:**principal.jijamatacollege@gmail.com



Late Marutraoji Ghule Patil
1930 -2002

Principal (IC) Dr. Shirish R. Landage Patil (M.A. Ph.D.)

Ref. No. JCSA/2024-25/

Date : 06/06/2024

Clarification for Metrix 7.1.3

7.1.3: Quality audits on environment and energy regularity undertaken by the Institution. The institutional environment and energy Initiatives are confirmed through the following

1. Green audit/ Environment audit
2. Energy audit
3. Clean and Green campus Initiatives
4. Beyond the campus environmental promotion Activities

A-All of above

Justification by HEI:

As per DVV, This is declaring that the HEI has various facilities under these environment related initiatives. Here we are sharing document includes the institution's environmental and energy usage policy, action taken reports and achievements related to green campus initiatives, audit reports, a certificate from an external accredited auditing agency (preferably a government department of the affiliating university), geo-tagged photos with captions and dates and other supporting documents related to environmental initiatives beyond the campus.

Therefore, we confirm the option 'A"

Kindly consider the inputs for the process of verification.

Jijamata College of Science & Arts ★ ID/No.PU/AN/S/043/1992 ★ Bhende-414605 ★

INCHARGE PRINCIPAL
Jijamata College of Science & Arts
Dnyaneshwarnagar Tal.Newasa
Dist.Ahmednagar

7.1. Institutional Values and Social Responsibilities

7.1.3: (QnM) Quality audits on environment and energy regularly undertaken by the Institution. The institutional environment and energy initiatives are confirmed through the following

1. Green audit / Environment audit
2. Energy audit
3. Clean and green campus initiatives
4. Beyond the campus environmental promotion activities

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Shri.Marutrao Ghule Patil Shikshan Santha'

Jijamata College of Science and Arts,

Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar

Report of

ENERGY AUDIT





Ladies Hostel



Ladies Hostel

Energy Audit done by

Department of Physics,

Jijamata College of Science and Arts, Bhende Bk, Ahmednagar,

February – 2020

ACKNOWLEDGEMENT

We are very grateful for Principal Dr. R.R. Saswade (M. Sc, Ph.D.), Jijamata college of Science and Arts Dnyneshwarnagar Bhende (BK), Tal-Newasa, Dist-Ahmednagar for having given opportunity to conduct Energy audit of various facilities in college campus. We are also thankful for various respected HOD, Lecturers, Hostel Rectors & their respective subordinate staffs who have given their valuable contribution for guiding & supporting us during campus round for data collection, network study & measurement for accomplishing successful Energy audit.

We are grateful thank for support information about the energy audit team group. And sincerely acknowledges the co-operation extended by staff members of the institution for extending their help throughout the study. This report made with sincere efforts gives details of the relevant data collected during energy audit study, observation, analysis & recommendations made pertaining to different facilities in campus.

We are pleased to submit this Detailed Energy Audit Report to Principal Dr. R.R. Saswade (M. Sc, Ph.D.), Jijamata college of Science and Arts Dnyneshwarnagar Bhende (BK), Tal-Newasa, Dist- Ahmednagar representing on behalf of management of Shri. Marutrao Ghule Patil Shikshan Santha's Dnyneshwarnager Bhende (BK) and wish him all the best for implementation of identified Energy Conservation Opportunity & cost-effective benefits.

Prof. P. B. Deshmukh

Head,
Department of Physics

Head
Dept. of Physics
Jijamata College of Science & Arts'
Dnyaneshwarnagar, (Bhenda),
Tal.Newasa, Dist.Ahmednagar.

Introduction

Jijamata College of Science and Arts Dnyneshwarnagar Bhende (BK), Tal-Newasa in Ahmednagar District Maharashtra state. This college is affiliated with Savitribai Phule University Pune. This college is established in June 1992 by *Shri.Marutrao Ghule Patil Shikshan Santha'* Dnyneshwarnagar Bhende (BK, premier educational institution founded By Hon. Late Shri.Marutrao Ghule Patil veteran social activist which has been imparting higher education KG to PG level in Science & Arts faculty.

Jijamata college of Science and Arts Dnyneshwarnagar Bhende (BK), campus consists of main buildings with ground, first and second floor. The administrative office , Library, Indoor stadium, various HOD cabins, staff rooms, classrooms, various laboratory like Physics, Chemistry, Botany, Zoology, Computer Sciences, etc. are the part of college campus. The college are functioning with basic motto to impart quality, employment, entrepreneur and higher education to mostly rural as well as marginal urban student. Besides this there are one boy's hostel and two ladies hostel buildings for facilitating student accommodation to many rural boys & girl students. Similarly in campus two building are available for residential purpose for teaching as well as non-teaching staff. This college also provides gymkhana facility in on-door stadium to student undergoing through various type of physical education. There is also well furnished library where student studying in various branches have facility to refer books. The college developed botanical garden & green campus.

Scope of Energy Audit:

The task of energy audit undertaken by Department of Physics has objective to identify energy saving & conservation opportunity with electrical network & equipment load study with measurement & to recommend action plan with saving & financial calculation for implementation to materialize energy saving & conservation opportunity to save input energy cost. The energy audit was conducted during 06/02/2020 to 11/02/2020 & reviewed implementation of energy saving & conservation opportunity already identified as well as quantified it.

1. Inventory of various electrical load.
2. MSEDCL bill study & working out average cost of power.
3. Identification of various energy conservation measures & saving opportunity.
4. Review of Awareness program if any for optimum use of electricity & water as well as its saving.

Jijamata College of Science & Arts ★ Bhende-414605 ★ ID/No.PU/AN/S/043/1992

5. Review of implemented non-conventional energy installation & applications in college campus & its quantification.

Energy Audit Methodology: -

The audit involves visiting physical position of load & carry out inventory of load. Due measurement of electrical load of equipment & circuit is carried out. Energy bill received from MSEDCL is audited & studied for KWH requirement & how efficiently energy is used. Various positions are interacted, familiarized with energy audit & involved for successful & result oriented energy audit. Energy conservation & saving opportunities are identified during round & measurement for implementation

Systems Studied During Energy Audit: -

1. Lighting fixtures have been physically in various campuses verified & recorded.
2. Reviewed implemented non-conventional energy installation & applications in college for use.
3. Electricity bills served by MSEDCL are verified & worked out cost of power.
4. It is reviewed about Awareness program if any for optimum use of electricity & water as well as its saving undertaken at college level.
5. There is tremendous scope to create awareness among user about efficient & optimum use of energy & water to save.
6. Instruction cum Request Sign board shall be displayed near each switch-board & toilet block, bathrooms to influence & guide to user to arrest misuse & wastage of power & water.

Abbreviations

CFL : Compact Fluorescent Lamp
FTL : Fluorescent Tube Lamp
kVA : kilo Volt Ampere
kVAr : kilo Volt Ampere reactive
kW : kilo Watt
kWp : kilo Watt peak
kWh : kilo Watt hour (Unit of Electricity)
LED : Light Emitting Diode
LT : Low Tension
PF : Power Factor
MEDA: Maharashtra Energy Development Agency
MSEDCL: Maharashtra State Electricity Distribution Company
Solar PV : Solar Photo Voltaic



Average Cost of Power-:

There is eighteen numbers of various types of electricity connection being power supplied by MSEDCL. Monthly electricity bill is served by MSEDCL against electricity used & is paid by college. A cost of power is worked out by summing up total KWH of all connections & their amount over the year 2020-2021. By dividing total amount by total KWH works out average cost of power per KWH.

Consumer No: 148389003228 M/S SECTS
Consumer Name: M/S SECT SHRI MARUTRAO GHULE PATIL. S.S
Address: Dnyaneshwarnagar Bhende (Bk), Tal-Newasa, Dist-Ahmednagar, PIN 414605
METER NO:055-X1082842 Connected load(kW): 64, (Rural)

Connection No &Tariff =146 HT-VIII B				
Month	**Unit**	**Bill Demand**	**Bill Amount**	**Average Cost of Powar Rs/KWH**
Jun-20	5783.85	23.85	81316.35	6.547352323
Jul-20	2803.5	18	41220.45	3.17357854
Aug-20	2856.6	18	41882.85	3.233688053
Sep-20	3192.3	18	46044.45	3.613702434
Oct-20	3799.35	18	52561.35	4.300886615
Nov-20	2824.2	18	414980.1	3.197011062
Dec-20	3008.7	18	43918.65	3.40586615
Jan-21	3430.8	18	49196.7	3.883685841
Feb-21	3637.8	18	51571.35	4.118011062
Mar-21	4287.6	18	57335.85	4.853588496
Apr-21	4291.2	18	58127.4	4.857663717
May-21	4287.6	18	60947.55	4.853588496
Total	**44203.12**	**221.85**	**999103.05**	**50.03819556**



Total Electric bill year (2020-2021)

	Connection No & Tariff Category					
Month	HT-VI II A (college Campus			HT-VI II B Boys Hostel		
	Unit	Bill Demand	Bill Amount	Unit	Bill Demand	Bill Amount
Jun-20	3855.9	15.9	54210.9	385.59	1.59	5421.09
Jul-20	1869	12	27480.3	186.9	1.2	2748.03
Aug-20	1904.4	12	27921.9	190.44	1.2	2792.19
Sep-20	2128.2	12	30696.3	212.82	1.2	3069.63
Oct-20	2532.9	12	35040.9	253.29	1.2	3504.09
Nov-20	1882.8	12	276653.4	188.28	1.2	27665.34
Dec-20	2005.8	12	29279.1	200.58	1.2	2927.91
Jan-21	2287.2	12	32797.8	228.72	1.2	3279.78
Feb-21	2425.2	12	34380.9	242.52	1.2	3438.09
Mar-21	2858.4	12	38223.9	285.84	1.2	3822.39
Apr-21	2860.8	12	38751.6	286.08	1.2	3875.16
May-21	2858.4	12	40631.7	285.84	1.2	4063.17
Total	**29469**	**147.9**	**666068.7**	**2946.9**	**14.79**	**66606.87**

	Connection No & Tariff Category					
Month	HT-VIII C (Hostel Girls)			HT-VIII D (Staff Quarter)		
	Unit	Bill Demand	Bill Amount	Unit	Bill Demand	Bill Amount
Jun-20	899.71	3.71	12649.21	192.795	0.795	9035.15
Jul-20	436.1	2.8	6412.07	93.45	0.6	4580.05
Aug-20	444.36	2.8	6515.11	95.22	0.6	4653.65
Sep-20	496.58	2.8	7162.47	106.41	0.6	5116.05
Oct-20	591.01	2.8	8176.21	126.645	0.6	5840.15
Nov-20	439.32	2.8	64552.46	94.14	0.6	46108.9
Dec-20	468.02	2.8	6831.79	100.29	0.6	4879.85
Jan-21	533.68	2.8	7652.82	114.36	0.6	5466.3
Feb-21	565.88	2.8	8022.21	121.26	0.6	5730.15
Mar-21	666.96	2.8	8918.91	142.92	0.6	6370.65
Apr-21	667.52	2.8	9042.04	143.04	0.6	6458.6
May-21	666.96	2.8	9480.73	142.92	0.6	6771.95
Total	**6876.1**	**34.51**	**155416.1**	**1473.45**	**7.395**	**111011.45**

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Jijamata college Ladies Hostel (No:01) New Building

Room No	Computer	Printer	Cooler	Fan	TV	LED Light	Tube light	Water Heater	Parch & outside side light	CCTV
1	01	01	01	02	01	01	02			
2	-	-	-	02	01	01	02			
3	-	-	-	02	-	01	02			
4	-	-	-	02	-	01	02			
5	-	-	-	02	-	01	02			
6	-	-	-	02	-	01	02			
7	-	-	-	02	-	01	02	01	06	06
8	-	-	-	02	-	01	02			
9	-	-	-	02	-	01	02			
10	-	-	-	02	-	01	02			
11	-	-	-	02	-	01	02			
12	-	-	-	02	-	01	02			
13	-	-	-	02	-	01	02			
14	-	-	-	02	-	01	02			
15	-	-	-	02	-	01	02			
16	-	-	-	02	-	01	02			
17	-	-	-	02	-	01	02			
18		-	-	02	-	01	02			
19	-	-	-	02	-	01	02			
20	-	-	-	02	-	01	02			
21	-	-	-	02	-	01	02			
22	-	-	-	02	-	01	02			
Total	**01**	**01**	**01**	**44**	**02**	**22**	**44**	**01**	**06**	**06**

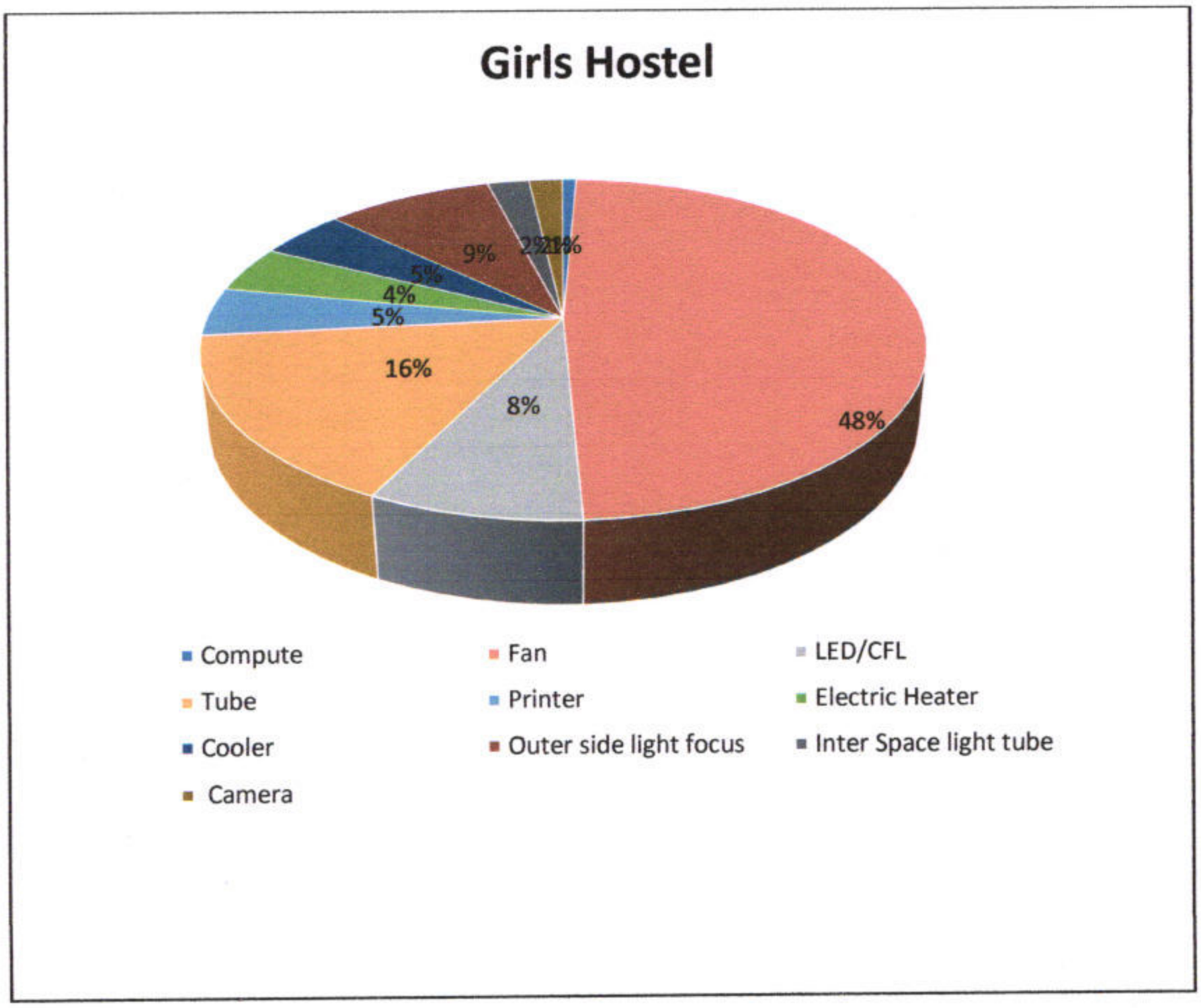
Jijamata college Ladies Hostel (No:02) Old Building

Room No	Computer	Printer	Cooler	Fan	TV	LED Light	Tube Light	Water Heater	Parch & outside Light	CCTV
01	-	-	01	02	-	01	02	01		
02	-	-	-	02	-	01	02	-		
03	-	-	-	02	-	01	02	-		
04	-	-	-	02	-	01	02	-		
05	-	-	-	02	-	01	02	-		
06	-	-	-	02	-	01	02	-	06	08
07	-	-	-	02	-	01	02	-		
08	-	-	-	02	-	01	02	-		
09	-	-	-	02	-	01	02	-		
Canteen	-	-	-	02	01	01	02	-		
Total	**-**	**-**	**01**	**20**	**01**	**10**	**20**	**01**	**06**	**08**

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Jijamata college Ladies Hostel (No:01) New and old Building

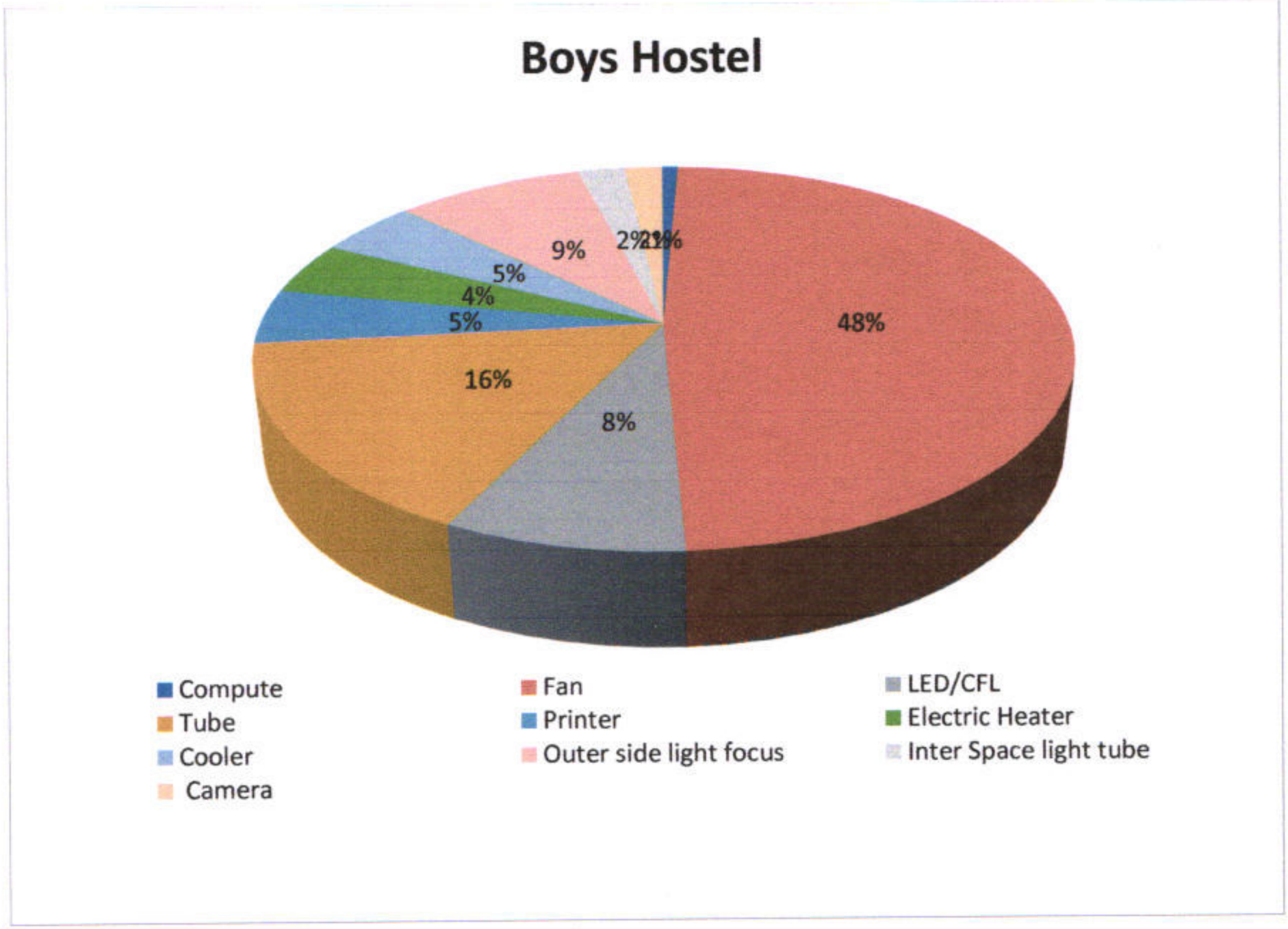
Types	No	Watt per unit	Watt	KW
Computer load	01	40	40	0.04
Tube load	64	20	1280	1.280
Fan load	64	60	3840	3.840
Printer	01	220	5940	5.940
Scanner & Printer	01	250	1250	1.250
Fridge	00	200	1000	1
Xerose	00	1040	5200	5.200
LED bulb load	32	10	1200	1.2400
Parch & outside load	15	24	864	0.864
CCTV Camera	09	12	108	0.108
Total	**178**	**1864**	**20614**	**38.334**





Jijamata College Boys Hostel

Types	No	Watt per Unit	Watt	KW	% Load
Compute	1	40	40	0.04	
Fan	44	60	2640	2.64	
LED/CFL	22	20	440	0.44	
Tube	44	20	880	0.88	
Printer	1	250	250	0.25	
Electric Heater	2	120	240	0.24	
Cooler	1	250	250	0.25	
Outer side light focus	12	40	480	0.48	
Inter Space light tube	6	20	120	0.12	
Camera	8	12	96	0.096	
Total	141	832	117312	117.312	



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Room No	Fan	Tube	LED/CFL	Computer	Printer	Solar Heater	Cooler	Outer side light	Inter Space light	CCTV Camera
1	02	02	01	01	01	01	01	07+04	06	
2	02	02	01	-	-	-	-	-	-	
3	02	02	01	-	-	-	-	-	-	
4	02	02	01	-	-	-	-	-	-	
5	02	02	01	-	-	-	-	-	-	
6	02	02	01	-	-	-	-	-	-	
7	02	02	01	-	-	-	-	-	-	
8	02	02	01	-	-	-	-	-	-	
9	02	02	01	-	-	-	-	-	-	
11	02	02	01	-	-	-	-	-	-	
12	02	02	01	-	-	-	-	-	-	08
13	02	02	01	-	-	-	-	-	-	
14	02	02	01	-	-	-	-	-	-	
15	02	02	01	-	-	-	-	-	-	
16	02	02	01	-	-	-	-	-		
17	02	02	01	-	-	-	-	-	-	
18	02	02	01	-	-	-	-	-	-	
19	02	02	01	-	-	-	-	-	-	
20	02	02	01	-	-	-	-	-	-	
21	02	02	01	-	-	-	-	-	-	
22	02	02	01	-	-	-	-	-	-	
Total	44	44	22	01	01	01	01	07+04	06	08

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Jijamata college campus:

Jijamata College of Science and Arts Dnyneshwarnagar Bhende (BK), Tal-Newasa, Dist.-Ahmednagar It uses majorly electricity as input energy source for application of various college activities. The electricity is procured from MSEDCL by various No LT connection (single phase & three phase) located in various college building. MSEDCL serves monthly electricity bill for payment & on receipt of monthly electricity bill it is paid. Standby power source DG set of 45 KVA is available to use during power failure from MSEDCL

S. No	Department	Computer	Tube	Fan	LED/S-light	Printer/ scanner	Fridge	Xerox Machine	Table fan
1	Principal Cabine	01 +TV-01	03	03	01	01	01	01	00
2	Vice Principal Cabine (Arts)	01	02	01	01	01	00	00	00
3	Vice Principal Cabine (Science)	02	02	01	01	01	00	00	00
4	Admis. Office	14	07	07	06	07	01	02	00
5	Exam Depart	01	01	01	01	00	00	02	00
6	Store Room	01	02	01	01	01	01	00	00
7	VLC	03	07	05	02	02	00	00	00
8	Staff Room	00	05	03	01	00	00	00	00
9	Ladies Room	00	03	01	01	00	00	00	00
10	Multipurpose Hall	00	07	05	03	00	00	00	00
11	Department of Physics	02	11	08	03	02	00	00	00
12	Department of Zoology	02	11	07	03	01	01	00	01
13	Department of Botany	01+TV01	14	12	03		Ac 1	00	01
14	Department of Math	01	02	02	01	00	00	00	00
15	Department of History	01	02	02	01	01	00	00	00
16	Department of BCS	24	10	08	01	01	00	00	00
17	Department of Commerce	01	02	03	01	01	00	00	00
18	Library	07	27	03	13	01	00	00	00
19	Department of Marathi	01	02	02	01	01	00	00	00
20	Department of Hindi	01	06	06	01	01	00	00	00
21	Department of Polities	01	06	06	00	00	00	00	00
22	Recodes Room	01	02	01	01	00	00	00	00
23	Department of Chemistry	03	47	31	04	02	00	00	00
24	Department of Geography	01	06	06	01	01	00	00	00
25	Computer Lab	17	29	05	00	00	00	00	01
26	Lecture Room (13	00	26	26	00	00	00	00	00
	Total	**89**	**260**	**170**	**50**	**25**	**05**	**05**	**03**

Jijamata College of Science & Arts Bhende-414605 ID/No.PUIAN/S/043/1992

Percentage of LED Light Load in Total Lighting Load:

Percentage of LED Light Load in Total Lighting Load Total percentage of various type lighting load based on total lighting load is worked out for information.

Types of Lamps	No	Watt per Unit	Watt	% On Total	Total LED light Load % on total	KWH	%On Total
Incandescent lamp	2	100	200	0.956	----	4800	0.926
Metal Halide lamp Fitting	5	400	2000	9.56	---	48000	9.56
LED light	50	12	600	2.868	2.868	14400	2.818
Tube Light	260	20	5200	24.856	24.856	124800	24.826
CFL light	8	50	400	1.912	1.912	9600	1.812
FTL	100	36	3600	17.208	-----	86400	17.108
Electric	20	15	300	1.434	--	7200	1.334
Magnetic	5	5	25	0.1195	---	600	0.0195
LED solar street light Ground	8	80	640	3.0592	3.0592	15360	3.0492
LED Parch Light load fist flow	5	24	120	0.5736	0.5736	2880	0.4736
Computer Load	89	40	3560	17.0168	---	85440	17.0068
Fan Load	170	60	10200	48.756	----	244800	48.656
LED light load	50	20	1000	4.78	4.78	24000	4.68
Tube Light load	260	20	5200	24.856	24.856	124800	24.756
CFL light load	10	20	200	0.956	0.956	4800	0.856
Printer load / scanner	30	250	7500	35.85	--	180000	35.75
Mean Grounded light Load	12	400	4800	22.944	22.944	115200	22.844
LED Parch Light ground load	8	20	160	0.854	0.845	3840	0.85
Total	**1092**	**1572**	**45705**	**217.7051**	**135.7051**	**1096920**	**217.3251**

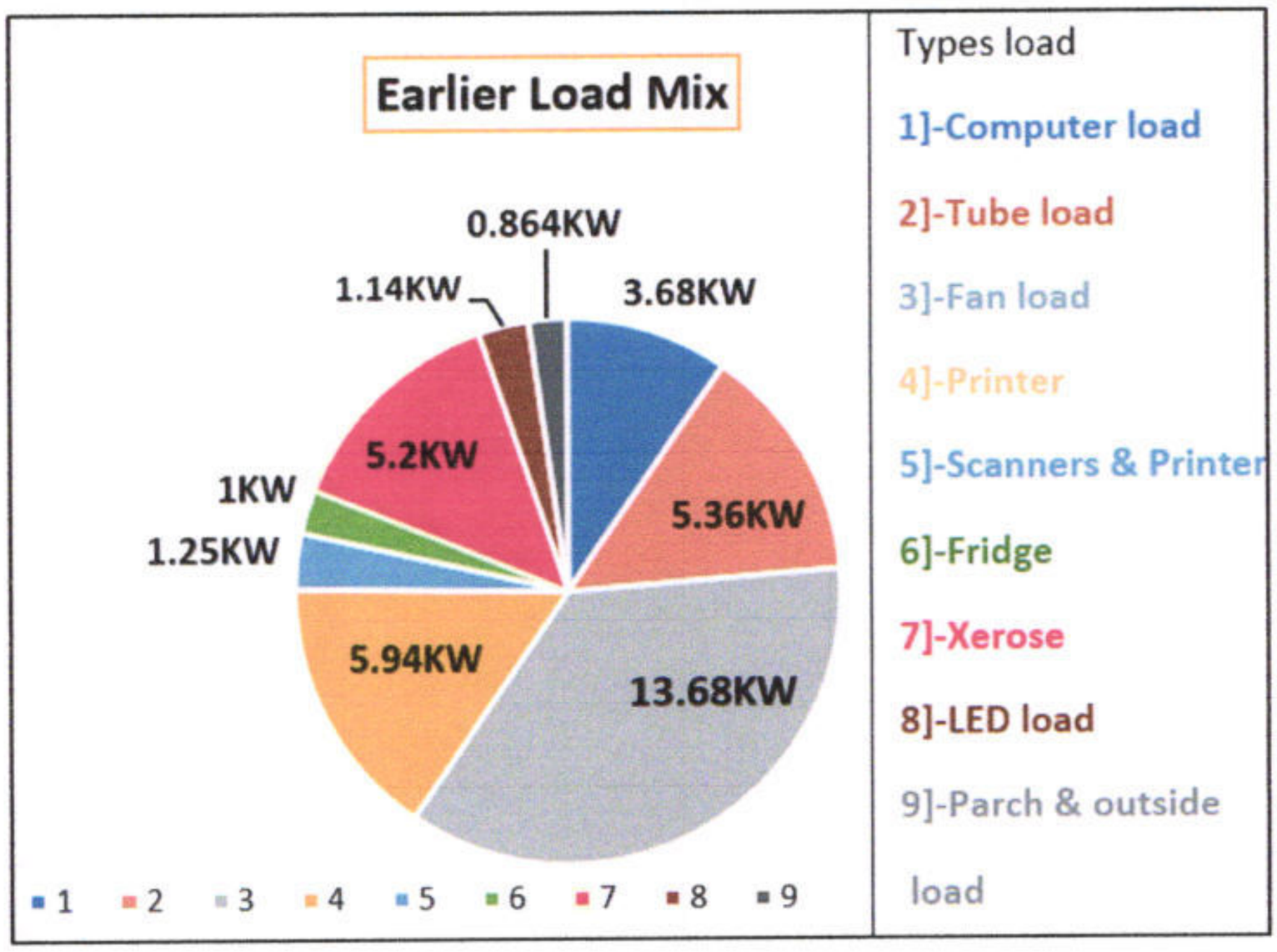
Relief in Load on Split Air conditioner in instrument Principal Cabin & laboratory Botany department (senior)-

There are some instruments placed requiring-maintained temperature in lab. If instrument is shifted one side & room is partitioned for making confined space for instrument, one Split AC will be spared & electricity will be saved as below.

No of AC	AC Rating in Watt	Operation Hours per day	Operation days per year	Total KWH consumption per year	Average cost of tariff Rs/KWH	Total operating cost Rs per year
01	1250	12	365	5475	9	49275

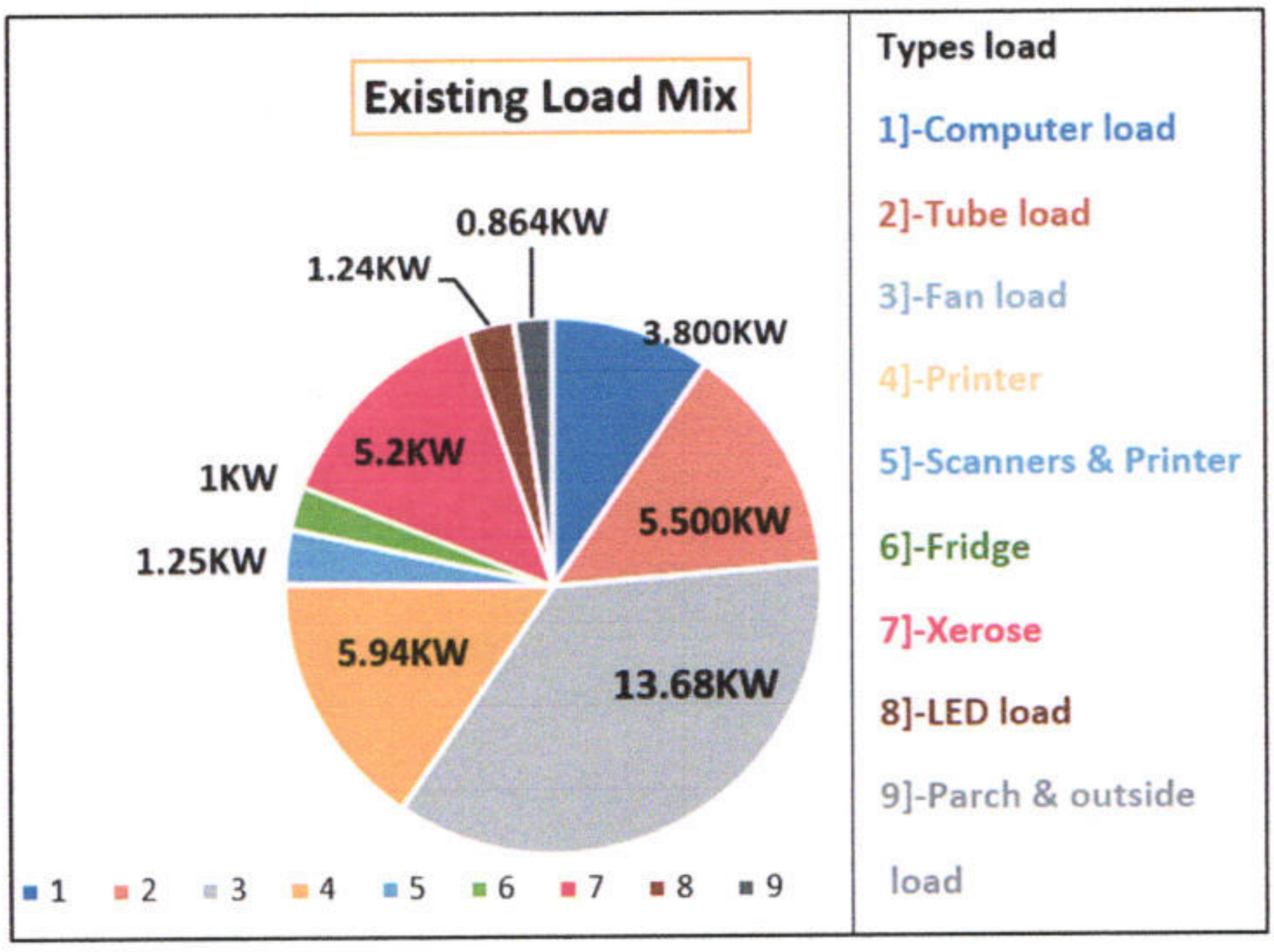
Jijamata College of Science & Arts
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Types	No	Watt per unit	Watt	KW	% Load
Computer load	95	40	3800	3.8	
Tube load	270	20	5400	5.5	
Fan load	228	60	13680	13.68	
Printer	27	220	5940	5.94	
Scanner & Printer	5	250	1250	1.25	
Fridge	5	200	1000	1	
Xerose	5	1040	5200	5.2	
LED load	120	10	1200	1.24	
Parch & outside load	36	24	864	0.864	
Total	791	1864	38334	38.334	



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Types	No	Watt per Unit	Watt	KW	% Load
Computer load	92	40	3680	3.68	
Tube load	268	20	5360	5.36	
Fan load	228	60	13680	13.68	
Printer	27	220	5940	5.94	
Scanner & Printer	5	250	1250	1.25	
Fridge	5	200	1000	1	
Xerose	5	1040	5200	5.2	
LED load	114	10	1140	1.14	
Parch & outside load	36	24	864	0.864	
Total	780	1864	38114	38.114	



College of Science & Arts
ID/No.PU/AN/
2/1992
+14605

Percentage Of Annual Power of College Met by Renewable Energy Sources –

Power requirement met by renewable energy source in KWH	Total power requirement in KWH	Renewable Energy source	Renewable energy generated & used in KWH	% Of Renewable Energy on total requirement	Energy supply to grid
228243	324301	Solar photovoltaic panel	-	-	Nil
-	-	Solar LED Street light	-	-	Nil
-	-	Solar water heater			Nil
-	-	Turbo ventilator	-		Nil

Installation of turbo ventilator:

College management has installed turbo ventilator for ventilation of various halls in college campus. These tub ventilators absorb pressure energy from blowing natural air & convert into velocity of buckets of turbo ventilator to rotate it about axis. In this way green energy is used. If college management had installed electrical exhaust fan in halls, operational cost of these fans would have been spent by management. So, this requiring energy & operational cost is saved as well as CO_2 emission resulting from this energy use is also reduced to protect environment. This is illustrated as below.

No of Turbo Ventilator installed	Turbo ventilator Working hours per day	If expulsion of air from hall would have done with electrical exhaust fan						
	No of Hrs	No of fan	Wattage of each fan	Total watt	Total working hrs per year	Total KWH required per year	Cost of power Rs/KWH	Amount per year in Rs
15	24	15	90	1350	8724	11825	9	106425

Assessed Annual energy saving in KWH	11825
Total Assessed Annual Energy cost saving in Rs	106425

Jijamata College of Science & Arts Bhende-414305 ID/No.PU/AN/S/043/1992

Solar Water Heater:

College has installed solar water heater in boys & Girl's hostel to harness cost free solar green energy for heating water requiring to be bathed by student. This reduces demand of conventional commercial energy. This will also help to reduce greenhouse gas emission mitigating environmental damage. Application of this hot water in various laboratory can be explored which is generated without input energy cost

Sr. No	(SH) Location	No of Student occupancy	No of Solar Heaters	Each SH Capacity in Ltrs/Day	Average Water Temp		THS gained by water per Day in Kcal	Equivalent Electricity saving in KWH per year	Average Electricity Cost in Rs/KWH	Electricity Cost saving in Rs per year
	Ladies Hostel-J1	100	02	3000	140	70	210000	89127.9	9	802151.16
1	Ladies Hostel-J2	70	01	1500	70	35	105000	44563.95	9	401075.58
2	Boys Hostel	100	00	000	00	00	00.00	00.00	0	00.00
	Total	**270**	**03**	**4500**	**210**	**105**	**315000**	**133691.85**		**1203226.74**

Awareness program & sign Board Display near switch board.

It is reviewed about Awareness program if any undertaken at college level for optimum use of electricity & water as well as its saving. There is still tremendous scope to create awareness among user about efficient & optimum use of energy & water to save. Instruction cum Request Sign board shall be displayed near each switch-board, toilet block & bathrooms to influence & guide to user to arrest misuse & wastage of power & water. s

Electrical Safety Audit –

Considering huge human occupancy in building Electrical Safety Audit is recommended to identify unsafe location & condition to comply to ensure electrical safety with human being, property & equipment. This is very serious thing & is priority issue.

List Of Instrument used for measurement in Energy Audit:

Sr. No	Name of Instrument
1	3- Phase Electric Power Analyzer
2	Lux Meter
3	Thermometer & Hygrometer
4	Measuring steel tape
5	IR Thermometer

Jijamata College of Science & Arts
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CERTIFICATE OF ENERGY AUDIT

This is a certified that, the department of Physics, Jijamata college of Science and Arts, Dnyneshwarnagar, Bhende (BK), Tal- Newasa, Dist.-Ahmednagar has conducted energy Audit in **06-02-2020 to 11-02-2020** for knowing present electrical energy consumption, identification of energy conservation and Saving opportunities for implementation to mitigate greenhouse gas emission for environment protection.

This energy audit is also aimed to assess impact of installed various Renewable energy application.

Mr. D.V. Naik
Co-ordinator,
Energy audit

Dr. K.A. Lande
Head
Criteria VII

Dr. M.E. Navgire
Co-Ordinator
IQAC
Jijamata College of Science & Art's,Bhende Bk.

Dr. R.R. Saswade
PRINCIPAL
Jijamata College of Science & Arts
Bhende, Tal. Newasa, Dist. A'Nagar

Jijamata College of Science & Arts Bhende-414605 ID/No.PU/AN/S/043/1992

Date: 11/02/2020

Place: Bhende Bk

Shri.Marutrao Ghule Patil Shikshan Santha'

Jijamata College of Science and Arts,

Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar

Report of

Rain Water Harvesting



Audit done by

Department of Chemistry,

Jijamata College of Science and Arts, Bhende Bk, Ahmednagar,

March – 2020

ACKNOWLEDGEMENT

We are very grateful for **Principal Dr. R.R. Saswade,** Jijamata college of Science and Arts Dnyneshwarnagar, Bhende (BK), Tal- Newasa, Dist- Ahmednagar for having given opportunity to conduct **Rain Water Harvesting** audit of various facilities in college campus. We are also thankful for various respected Head of Department, Lecturers, Physical director, Hostel Rectors & their respective subordinate staffs who have given their valuable contribution for guiding & supporting us during campus round for data collection, network study & measurement for accomplishing successful audit.

We are grateful thank for support information about audit team group. And sincerely acknowledges the co-operation extended by staff members of the institution for extending their help throughout the study. This report made with sincere efforts gives details of the relevant data collected during this audit study, observation, analysis & recommendations made pertaining to different facilities in campus.

We are pleased to submit this detailed Audit Report to **Principal Dr. R.R. Saswade,** Jijamata college of Science and Arts, Dnyneshwarnagar, Bhende (BK), Tal- Newasa, Dist- Ahmednagar representing on behalf of management of Shri. Marutrao Ghule Patil Shikshan Santha's Dnyneshwarnager Bhende (BK) and wishes him all the best for implementation of identified water conservation Opportunity & cost-effective benefits.

(Dr. R. M. Naval)

Head

Department of Chemistry

Date: 10/03/2020

Jijamata College of Science & Arts ★ ID/No.PU/AN/S/043/1992 ★ Bhende-414605

Rain Water Harvesting in the Campus

Due to rapid increase in day-to-day demand for water among fast growing human population, there lies a great opportunity of harvesting rainwater to meet the scarcity of water and avoid destruction of the normal groundwater level. The boon of rainwater harvesting is that the unused or extra water can be sent down the aquifer to charge the groundwater level. Rainwater harvesting is an important environment friendly approach. It is a Green Practice having double benefit of keeping the groundwater level undisturbed and charging the aquifer. This green practice can be encouraged in the form of Community Development Program. Rainwater and run-off water, stored in a planned way, can save the earth from soil erosion and flood and recharge the aquifers to increase the groundwater level. The extensive and unplanned use of groundwater has not only disturbed the natural water level but also has made the ground water contaminated and unfit for use.

Objectives

- To increase recharge of groundwater by capturing and storing rainwater, by rainwater harvesting from rooftop run-offs.
- To store the water for gardening & washing purpose.
- Most use of rain water is it use as distil water in various laboratory such as chemistry Botany Zoology to make practical solution. Because rain water free from any salt.

Need for rainwater harvesting

Increasing water demand

- The rapid rise in human population has made optimum use of fresh water imperative.
- Urban water supply systems in particular are under tremendous pressure to meet the needs of the population as well as industry and large-scale construction.
- The increased need for water results in lower groundwater levels and depleted reservoirs.
- Consumption of polluted water creates health hazards.
- The use of rainwater is a useful alternative.

Variations in water availability

- The availability of water from sources such as lakes, rivers and shallow groundwater can fluctuate strongly
- Unchecked rainwater runoff is causing soil erosion
- Collecting and storing rainwater can provide water for domestic use.



- Rainwater may also provide a solution when the water quality is low or varies during the rainy season in rivers and other surface water resources.

Responsibilities towards protecting Nature.

- Using more rainwater helps to conserve & augment the storage of ground water.
- It helps to arrest sea water intrusion in coastal areas.
- It helps to avoid flood & water stagnation in urban areas.
- Reduces water and electricity bills

Quality of water supplies.

- Water supplies can become polluted either through industrial or human wastes or by intrusion of minerals such as arsenic, salt or fluoride.
- Rainwater is the ultimate fresh water.
- Rainwater is generally of good quality.

Practice

In the Jijamata college campus rainwater harvesting system has been installed in roof of college. The roof runoff water is collected through network of pipe lines and stored in the tank. There are two wells in the campus where the roof runoff water is stored. The total capacity of storage is 10,000 litres. The remaining roof runoff water is allowed to infiltrate in the ground for recharge. The stored water is used for gardening and laboratory as distilled water.

Water Harvesting Capacity of Jijamata College Campus

- Organic chemistry lab =450 m^2 , Physical chemistry lab =450 m^2 ,
- Inorganic chemistry lab =550 m^2, Chemistry HOD cabin = 60 m^2

Total Area= 1510 m^2

Rain fall calculate with following formula = Annual rain fall in mm X Area in mm X Run Off factor

= 120 X 1510 X 1

Area m^2	Average Depth of Rainfall (mm)	Expected Volume of water (Litre)	30 % losses Total	Total Quantity (Litre)
1510 m^2	120 mm	181200	54360	126840

Total Quantity of Water = 1,26,840 litre

The available total capacity of harvesting in Jijamata campus = 10,000 litre

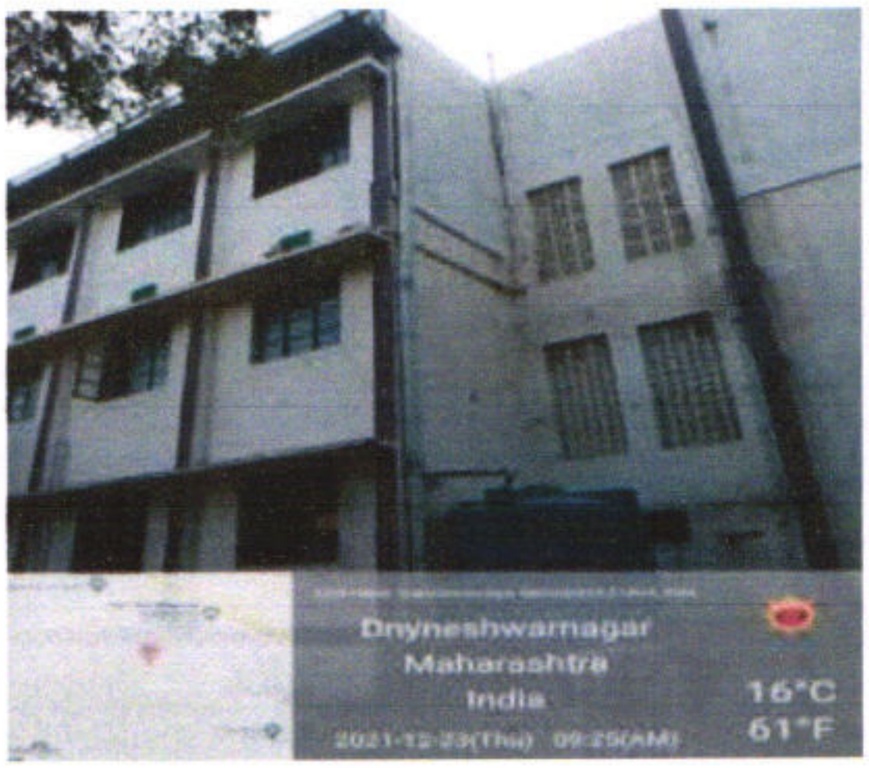
Jijamata College of Science & Arts ID/No.PU/AN/S/043/1992 Bhende-414605



Side view rain harvesters building



Side view rain harvesters building



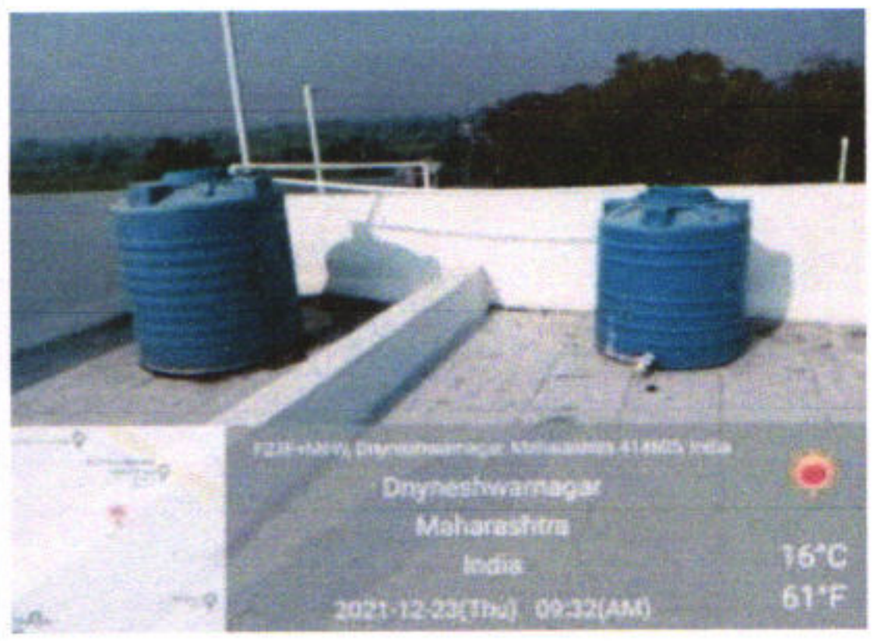
Collection Storage tank 10,000 lit .



Storage tank on Building



Storage tank supply to chemistry lab.



Bore Well and Tanks

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Borewells and tubewells, are very similar. Both are basically **vertical drilled wells**, bored into an underground aquifer in the earth's surface, to extract water for various purposes. The difference in the two lies in the type of casing used the depth of this casing and the type of soil where they are drilled.

Total area of the college campus is about nearly 37 acre, on that only area of i.e. 33% on total area was developed as academic zones and the balance area is about i.e. 77% on total area was earmarked for greenery. The college campus depends on ground water for all its needs and the daily need of water in the campus is around 10,000 liters (approx.,). To compensate the mentioned daily need. We had total 2 borewell with different depths as per the sub soil water position and all are recharge regularly with of harvesting ponds.

1. Near to Main building
2. Near to chemistry lab

Near to Main building



Near to chemistry lab



Regularly recharge tank



Transfer water to plant



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Water Over head Tank

Institute provides 24 hours water for drinking as well as other uses. It has constructed 1,00,000 litre capacity elevated service reservoirs tank in hostel campus. Water is pumped into the tank from filter unit and then supplied to consumers. This tank is made up of R.C.C. steel concrete.



This special activity is done by Department of Chemistry

Mr. P.D. Ghare	**Dr. K.A. Lande**	**Dr. M.E. Navgire**	**Dr. R.R. Saswade**
Co-ordinator	Head Criteria VII	**Co-Ordinator** **IQAC** **Jijamata College of Science & Arts**	PRINCIPAL Jijamata College of Science & Arts Bhende, Tal. Newasa, Dist. A'Nagar

Date: 10/03/2020

Jijamata College of Science & Arts ★ Bhende-414605 ★ ID/No.PU/AN/S/043/1992

Shri.Marutrao Ghule Patil Shikshan Santha'

Jijamata College of Science and Arts,

Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar

Report of

- **Solid Waste Management**
- **Liquid Waste Management**
- **Hazardous waste management**
- **E-Waste management**
- **Liquid Waste Management**



Audit done by

Department of Chemistry,

Jijamata College of Science and Arts, Bhende Bk, Ahmednagar,

March – 2020

ACKNOWLEDGEMENT

We are very grateful for **Principal Dr. R.R. Saswade,** Jijamata college of Science and Arts Dnyneshwarnagar, Bhende (BK), Tal- Newasa, Dist- Ahmednagar for having given opportunity to conduct **Solid Waste Management, Liquid Waste Management, Hazardous waste management, E-Waste management, Liquid Waste Management** audit of various facilities in college campus. We are also thankful for various respected Head of Department, Lecturers, Physical director, Hostel Rectors & their respective subordinate staffs who have given their valuable contribution for guiding & supporting us during campus round for data collection, network study & measurement for accomplishing successful thisaudit.

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(Dr. R. M. Naval)

Head,

Department of Chemistry

Date: 10/03/2020

Solid Waste Management in the College Campus

1. The Background

Waste materials are substances that are no longer required by one or a group of individuals. Solid waste means garbage and refuse coming out of consumption and production activities. Municipal solid waste is a waste type consisting of everyday items that are discarded by the public. Unscientific disposal of solid waste leads to air, water, soil or solid waste pollution thereby causing damage to the environment and hazards to life. There are major health impacts of improper disposal of solid waste. Therefore, it is essential to have efficient waste management systems in order to control solid waste pollution in communities where waste generation is significantly large on a daily basis. Proper recycling of solid waste may also be perceived as a resource yielding recyclable value for the economy.

2. Objectives

2.1 The Sustainable Development Goals

The Sustainable Development Goals (United Nations Development Program, 2015) form a universal call to act towards attaining a good quality of life, protecting the planet and ensuring a sustainable common future for all by 2030. Goal 3 focuses on healthy life and well-being for all, thereby painting the canvass for a host of targeted areas of development. Goals 11 and 12 focus on the safe, resilient and sustainable living through sustainable consumption and production. Goals 13 through 15 call for necessary action to combat climate change as well as to conserve terrestrial, marine and forest ecosystems.

The above-mentioned goals have sustainable waste management embedded in them. While sustainable production and consumption imply reduction in waste generation, the safe and resilient safe life requires efficient management of waste through reuse and recycling. Unscientific disposal of waste causes threat to all forms of life in the biosphere. Thus, waste management and clean environment are necessary conditions for our common sustainable future. Waste management has been identified as a matter of immediate concern all over the world. Among all forms of solid waste, plastic waste has become the greatest menace. The United Nations announced 'beat plastic pollution' as the theme of the World Environment Day in 2018.

2.2 The Solid Waste Management Rules, 2016

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As a necessary action towards solid waste management, the Government of India introduced the Solid Waste Management Rules, 2016. These rules provide procedures to be followed for segregation, collection, removal and disposal of solid waste.

- Operationalize segregation at source;
  - ➢ organic or bio-degradable waste (wet waste)
  - ➢ recyclable or non-bio-degradable waste (dry waste)
  - ➢ domestic hazardous waste, if any
- Every commercial/residential/institutional unit to maintain two types of dustbins with lid, namely, green for wet waste and blue for dry waste;
- Local authorities to strengthen systems of collection, transportation and processing of the segregated waste;
- Local authorities to train the collectors (formal and informal);
- Developing decentralized/ semi-decentralized systems for processing and disposal;
- Imposing user fees and penalties.

2.3 The College as a Sustainable Unit

Jijamata College is an academic institution with a large campus that comprises of academic area, sports area, hostels and Working woman hostel for students and residential area for teachers and non- teaching staff. It is an archetype of a self-sufficient social community with self-sustaining practices, the solid waste management program for campus is an initiative on campus that is visualized as an all-inclusive and participatory project for the entire college community. All members of the community are stakeholders and thus are perceived as contributors to the overall action plan. The ultimate aim of the project is to make a waste-neutral campus. Since the major part of waste management is associated with environmental behaviour of people, the project aims to follow the fundamental approach of sensitization and awareness generation. The current practice of unorganized waste generation, collection and disposal does not allow effective segregation of waste at both source and sink. While the institution is committed to provide full infrastructural and logistical support, the role of the community lies in generating awareness and following sustainable practices.

The College will run the project through active participation of all members of the College community. It will function through the principle of participative waste management with the target that no waste will leave the campus. While some forms of waste will be recycled

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in house, some others will be channelized through partner organizations. Actions will establish sustainable practices for waste collection, segregation at source and scientific disposal with a commitment to work towards the stated Sustainable Development Goals. It will further extend to community outreach and fulfill an institutional social responsibility.

3. The Action Plan

Project of solid waste management action plan is a consolidated program aimed to reduce, reuse and recycle the waste generated on campus. The project is aimed to achieve the target that 'no waste leaves the campus. It rests on the leadership of the relevant components of the College and active participation of the entire community. While there are some waste management systems already in practice that will have to be streamlined for greater efficiency, there are some more to be introduced. The College will be divided into smaller working units to implement the waste management systems.

4.1 Core areas of waste management

- Plastic
- Paper
- E-waste
- Laboratory glass wear
- Food/kitchen waste
- Garden waste
- Domestic hazardous waste

4.2 Mode of operation

- Reduction of waste through control over waste generation
- Recycling of waste through segregation at source and scientific disposal

4.3 Targeted locations

- **Canteen**
  - Pet cold drinks bottles to be replaced with glass bottles
  - Sale of water in single use plastic bottles to be restricted
  - Usage of disposable plastic or thermocol/Styrofoam tableware (cup, plates and spoons) to be discontinued
  - Usage of plastic straw to be restricted (except where it is attached with tetra pack)

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- Use of paper napkins to be minimized Water /Tea / Coffee to be served in paper /ceramic/ glass cups instead of plastic /thermocol
- Segregated waste to be disposed in color-coded dustbins

- ***Hostels***
  - Waste segregation in the residential floors and rooms
  - Segregation of waste at every possible source
  - Color coded dustbins to be installed in every floor
  - Specific locations of color-coded dustbins for the visually challenged
  - Red dustbins to be installed in the toilets
  - Incinerators for sanitary disposal
  - Proper use of waste paper baskets in rooms
  - Waste segregation in the kitchen and mess
  - All disposable cutlery to be banned
  - Color coded dustbins to be installed in the mess, kitchen, cooking area and washing area
  - Food waste to be disposed along with wet waste
  - Use of biodegradable disposal bags instead of black polythene bags
- ***Academic Area***
  - Color-coded dustbins (green for wet and blue for dry waste) to be installed uniformly all over the campus
  - Dustbins (in pairs of blue and green) to be installed only at one place in every floor of the academic blocks, department blocks and office area
  - Red dustbins to be installed in the toilet blocks for disposal of sanitary and other medical waste
  - Incinerators to be installed for scientific disposal of sanitary napkins
  - Separate carts (colored blue and green) to be used for unloading of waste from the blue and green dustbins respectively
  - Segregated wet/organic waste collected from the green dustbins to be transported and dumped into the compost pits
  - Segregated non-biodegradable waste collected from the blue dustbins to be dumped

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in the plastic collection room

- Representatives student to be contacted for collection of the dry waste including plastic, glass, tetra pack, metal cans etc.
- Compost pits to clear off the accumulated pile of garbage immediately and to be continued in tandem with automatic composter
- Waste paper recycling to continue with Green-O-Bin
- Plastic and e-waste management with student representatives to continue as initiated
- Domestic hazardous wastes like tube lights, bulbs etc. are to be segregated for disposal through student representatives and local authority
- Food/kitchen waste management through canteen manager
- Used marker pens to be collected centrally and refilled with ink for reuse in the classrooms

- ***Residential Area***
  - Separate dustbins to be used at home for waste segregation at source
  - Polythene bags for waste disposal to be banned
  - Segregated waste to be disposed in the green and blue dustbins installed in the residential area or elsewhere on campus
  - Segregated waste to be transported to the demarcated collection centers
  - Domestic hazardous waste to be segregated for disposal through student representatives

4.4 Operational Practices in College Events

- Water not to be served in single use plastic bottles
- Water dispensers and paper cups to be kept in the venue for large gatherings
- Water to be served in glass during small events
- Reusable plates to be used instead of disposable plates and cutlery
- Water/Tea/Coffee to be served in paper /ceramic /glass cups instead of plastic /thermocol
- Societies/departments/units to keep set of glass bottles and serving glasses

4. Community Participation



The solid waste management project includes all members of the College. Student volunteers under the mentorship of the faculty advisors/conveners/coordinators will work for the appropriate implementation of the waste management protocol. The student volunteers will spearhead the drive through various teams with duly specified targets, timelines and tasks.

Table 1. Plan of Action

Operating Unit	Designated Task
• Nursing College committee	• Awareness campaign and sensitization
• Hostel Union	• Waste management in hostels
• Department of B.C.S and National ServiceScheme (NSS)	• Periodic e-waste collection drives
• Department of Geography	• Monitoring waste reduction and segregation in canteen
• Department of B.C.S	• Social media campaign
• Garden Committee and Department of ENVS	• Organic composting (compost pits and automatic composters)
• Sports Committee	• Sports field and other sports facilities
• Science Society	• Refilling and reuse of marker pens
• Resident Faculty	• Segregation and proper disposal of domestic Waste & maintain clean area
• Nursing College committee	• Training the volunteer team from among the children of the non-teaching staff

5. Manpower Requirement

- Students from all societies/committees/units
- Faculty advisors/coordinators/conveners for mentorship
- *Safai karamcharis* for waste collection, transportation and disposal
- *Malis* for natural composting and automatic composting
- Dedicated *malis* in charge of running the automatic composter
- Dedicated persons to supervise the running of the incinerators
- Caretakers for overall physical supervision of infrastructure and logistics

6. Budget Heads

- Purchase
  - ➢ Dustbins in required numbers
  - ➢ Labels for all dustbins

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- Transportation carts
- Automatic composter
- Incinerators

- Electricity bill as a running cost
- Printing of certificates, badges, posters and banners

7. Expected Outcomes

The Solid Waste Management action plan for Jijamata College of Science and Arts bhende is visualized as a comprehensive action plan for sustainable living in the campus of an educational institution. Widespread awareness and sensitization about waste management are the necessary conditions for creating a society that exhibits environmentally conscious behaviour. The project has the potential to succeed in reducing the waste generation and in efficiently organizing scientific disposal of the waste for recycling through significant behavioural changes. The project aims at meeting the recent national agenda as well as achieving multiple of the global developmental goals.

8. Target Beneficiaries

The entire college community is expected to benefit out of the project. Students, teachers and staff form a large body who will have a safer and more resilient living condition. While the resident members will have a cleaner environment at their residential areas, the non-resident members are going to enjoy a cleaner environment at workplace. Moreover, it is expected that the benefits thus generated will extend to communities through the members who will spread awareness outside College and help forming the necessary habits. Thus, the sustainable waste management practices of Jijamata College will go beyond the campus and create a larger environment for sustainable living.

9. Scope for Further Work

The project rests entirely on the active involvement of all members of the College community. The major thrust is on generating awareness, sensitization and bringing in changes in behavioral patterns. The project is expected to result in a significant reduction in the generation of solid waste and recycling of the waste.

Once the first phase of the project is carried out successfully with solid waste, it has the scope to be extended to waste water management in the campus in the second phase and make the campus truly waste-neutral.

Jijamata College of Science & Arts
ID/No.PU/AN/S/043/1992
Bhende-414605

Appendix I: Improvement Targets

Collection of biodegradable and non-biodegradable solid waste from college campus

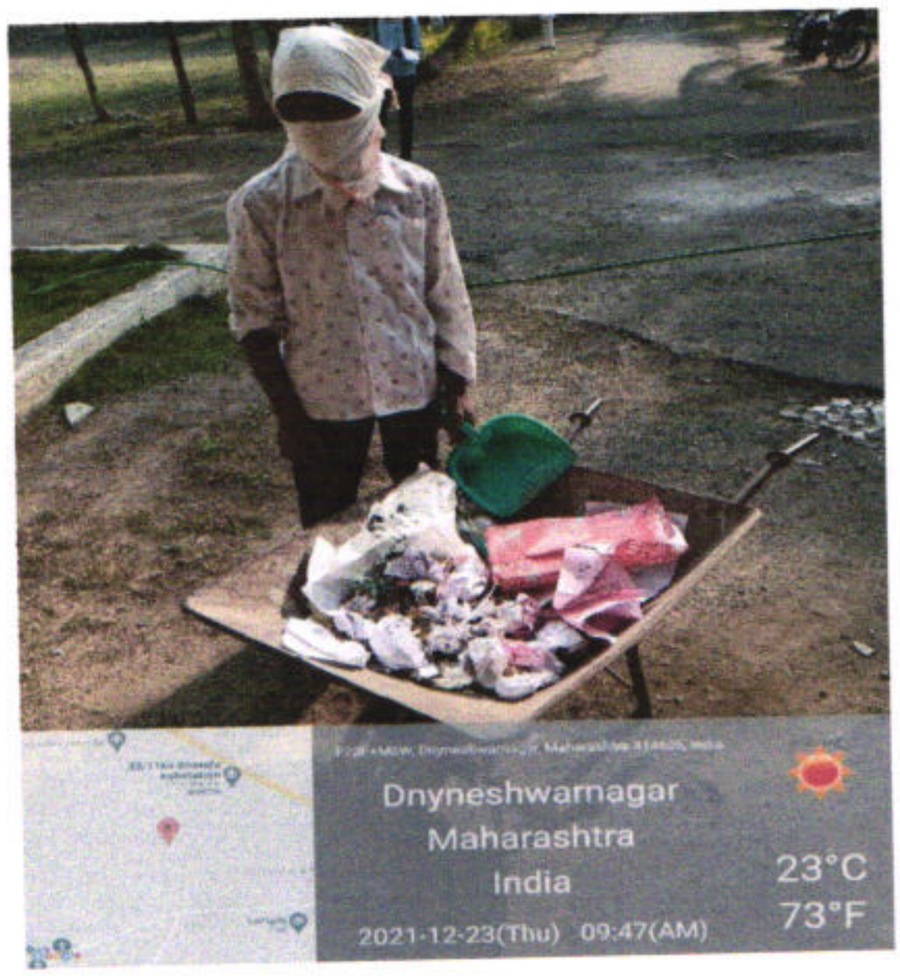
cleaning and collection college campus



Waste collection box



Cleaning Worker



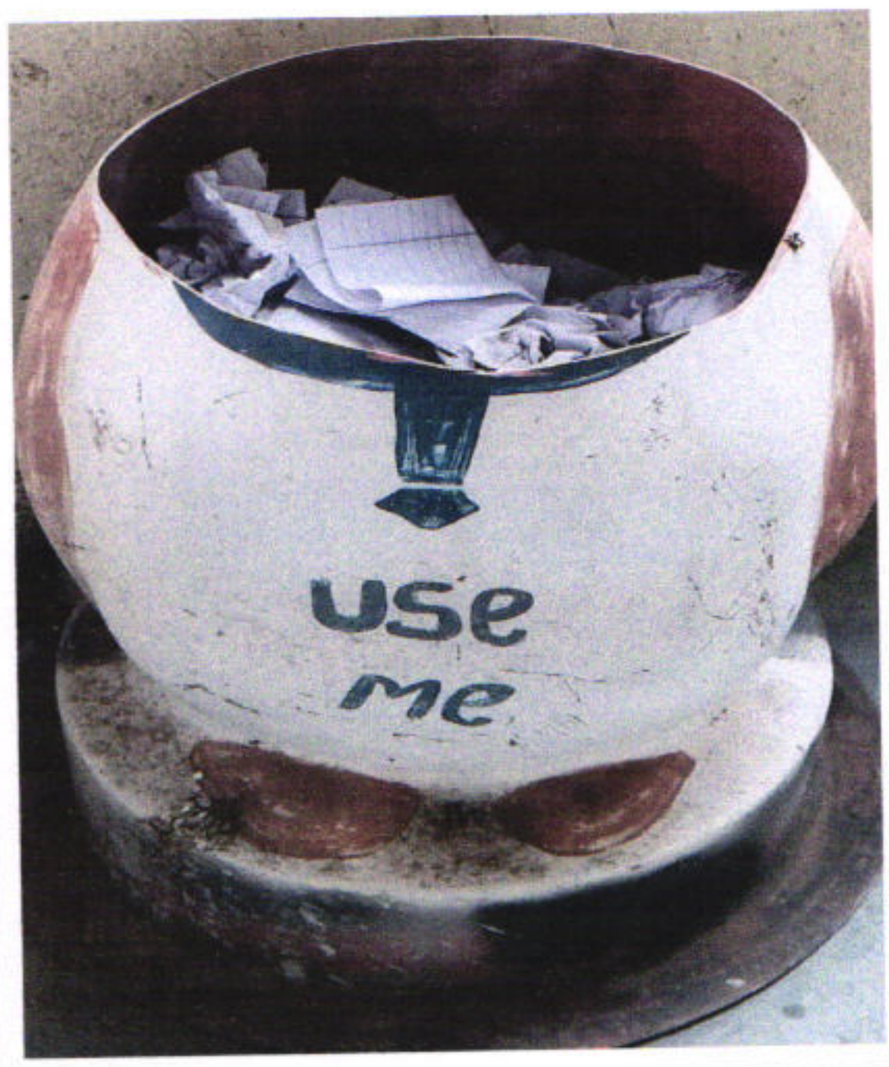
Biodegradable (wormicompost Plant)



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Bhende-414605

Appendix II: Collection Targets

Collection of waste at designated sites

Dustbin in college Campus	Dustbin in college Campus
	
Target site collection	
	

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Liquid Waste Management in the College Campus

At our campus in Jijamata College Bhende, we do not get much rainfall either from the South-West or the North-East monsoons, because we are located in the rain-shadow area of the Western Ghats. Average annual rainfall is only 120 mm. During the past twenty-five years, we have planted thousands of trees. Water was needed to grow all these trees. Since water was scarce, we relied on careful and sustainable water use practices since the early days. In our campus, we have both liquid waste management as well as solid waste management. This time, is confined to mainly liquid waste management. As you know, water is very precious for all. Demand for fresh water is increasing due to growing population. Rapid industrialization and urbanization has led to pollution of water bodies. More water is being used and wasted to.

That water which is adversely affected in quality due to human activity and contains urine, faeces, food materials, oil, dissolved soap, chemicals and other contaminants is waste water. In 2020, over 75 billion litres of untreated wastewater flowed into India's rivers and coastal waters every day. Existing treatment capacity is only able to treat less than 30% of the wastewater generated.

Sustainable waste water treatment involves processing waste water, ridding it of all contaminants, so that it can be used again. It also helps prevent pollution of our water bodies. Wastewater is typically treated using physical, chemical and biological means. Sedimentation is the most common physical method used in most parts in India. Chlorination, ozonisation and other such methods constitute chemical wastewater treatment. Biological methods such as bioremediation involve the use of microorganism metabolism to remove pollutants.

At our Jijamata College campus, we treat wastewater through bioremediation. Over the past twenty years we mainly use this water for gardening. We have planted over 1646 trees in the campus. Our College campus extends over 27 acres of land. We are still planting to this day. This is possible only because of the recycled waste water. Our campus is spectacularly clean and green and I am proud to say that it is considered as one of the best campuses Maharashtra.

Reduction in generation of Effluents, Emissions and Hazardous/Solid waste: The institution does not produce any effluents, emissions or solid waste which violates the environmental ethics. Our institution provides best academic environment which sensitizes

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everyone associated regarding the need to maintain a healthy ecological balance in their respective regions.

Runoff rainwater is properly managed through under-ground soak-pits and one small tank.

Waste Water Tank	Under ground Soak Pit
	

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Hazardous waste management

Plastic bags have already been banned in the state by the Government of Maharashtra and the ban is properly enforced within the college premises. Plastic waste is collected in the dustbins and disposed separately through the Municipal authorities. The College is trying to minimize the use of hazardous and toxic chemicals. The college is encouraging the use of safer alternatives. Dilute solutions are being used in quantitative analysis, which again minimises the use of chemicals. In Science laboratories, experiments are carried out with all precautions. Biological waste from life sciences laboratories are made harmless through autoclaving and then disposed. In chemistry laboratory practical carried out in less toxic chemical and use alternative chemical to toxic chemical. Practical liquid west dispose in special soak pit.

All glassware and microbial cultures used are first sterilised by autoclaving and then the cultures are discarded properly.

Liquid Waste Hazardous transfer in to pit	Hazardous Solid waste collection
	

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Water Over head Tank

Institute provides 24 hours water for drinking as well as other uses. It has constructed 1,00,000 litre capacity elevated service reservoirs tank in hostel campus. Water is pumped into the tank from filter unit and then supplied to consumers. This tank is made up of R.C.C. steel concrete.



This special activity is done by Department of Chemistry

Mr.P.D. Ghare	**Dr.KA. Lande**	**Dr.ME. Navgire** **Co-Ordinator** **IQAC** **Jijamata College of Science & Art's,Bhende Bk.**	**Dr. R. R. Saswade** PRINCIPAL Jijamata College of Science & Arts Bhende, Tal. Newasa, Dist. A'Nagar
Co-ordinator, Energy audit	Head Criteria VI		

E-Waste management:

- The College maintains all its computer peripherals, all old systems are stored in safe place within the campus and are sold to the recycling agencies after fulfilling local formalities.
- Defective systems are upgraded by replacing their parts.
- Most of the defective computer and other e-material repair in our B.C.S. department.
- Awareness is also generated among the students by B.C.S. department organizing the exhibitions and programs on waste management.
- The Institution as undertaken a number of E-waste Management initiatives with the objective of creating an eco-friendly environment in the campus. E-waste such as computers and its peripherals are upgraded regularly to continue usage and to avoid its wastage.
- Reuse is the most eco-friendly and cost effective method for e-waste disposal.
- E-wastes such as electronic components (plastic/metallic) are handed over to agencies which help recycle these materials.
- By recycling the electronic components, we have recovered valuable materials from old electronics components which can be used to make new products.
- E-Waste disposal process through solution providers like "ENVIRONMENTAL & RECYCLING SOLUTIONS INDIA" has been initiated.
- The awareness programs have been undertaken in the institution where the students are made aware of the E-waste management techniques.

This special activity is done by Department of Chemistry

Mr.P.D. Ghare	**Dr.K.A. Lande**	**Dr.M.E. Navgire**	**Dr. R.R. Saswade**
Co-ordinator	Head Criteria VII	Co-Ordinator IQAC Jijamata College of Science & Art's,Bhende Bk.	PRINCIPAL Jijamata College of Science & Arts Bhende, Tal. Newasa, Dist. A'Nagar

Date: 10/03/2020

Shri.Marutrao Ghule Patil Shikshan Santha'

Jijamata College of Science and Arts,

Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar

Report of

Carbon Footprint & Carbon Sequestration



Audit done by

Department of Chemistry,

Jijamata College of Science and Arts, Bhende Bk, Ahmednagar,

February – 2020

ACKNOWLEDGEMENT

We are very grateful for **Principal Dr. R.R. Saswade,** Jijamata college of Science and Arts Dnyneshwarnagar, Bhende (BK), Tal- Newasa, Dist- Ahmednagar for having given opportunity to conduct **Carbon Sequestration** audit of various facilities in college campus. We are also thankful for various respected Head of Department, Lecturers, Physical director, Hostel Rectors & their respective subordinate staffs who have given their valuable contribution for guiding & supporting us during campus round for data collection, network study & measurement for accomplishing successful this audit.

We are grateful thank for support information about audit team group. And sincerely acknowledges the co-operation extended by staff members of the institution for extending their help throughout the study. This report made with sincere efforts gives details of the relevant data collected during this audit study, observation, analysis & recommendations made pertaining to different facilities in campus.

We are pleased to submit this detailed Audit Report to **Principal Dr. R.R. Saswade,** Jijamata college of Science and Arts, Dnyneshwarnagar, Bhende (BK), Tal- Newasa, Dist- Ahmednagar representing on behalf of management of Shri. Marutrao Ghule Patil Shikshan Santha's Dnyneshwarnager Bhende (BK) and wishes him all the best for implementation of identified these various Carbon Sequestration report & cost-effective benefits.

(Dr. R. M. Naval)

Head,

Department of Chemistry

INTRODUCTION

Climate change is the hottest issue all over the globe. The four major greenhouse gases (NO_2, CH_4, CFC and CO_2) are responsible for capturing heat energy in the atmosphere and in turn increase in global temperature. The contribution of carbon dioxide in this process is as high as 60%. Therefore carbon sequestration has been considered to be the best possible solution for avoiding the disaster due to climate change. This kind of externalities has been internalize wisely by continuous efforts done by Jijamata College campus. The college has very good carbon pool in the form of luxuriant growth of forest in a dedicated area of **15.24 hector (38.10 acres)**, along with presence of tall trees within the campus. In addition to this the soil layer covered with grasses and bushes is also far more than the areas covered by roads, buildings and platforms. Thus qualitatively best practices in the college offer extraordinary scope for carbon sequestration. This report attempts to quantify the amount of carbon emission due to consumption of electricity and fossil fuels. This is compared with the carbon pool observed in the college. This report also highlights the measures taken by the college and its importance in the context of externalities of climate change. Hopefully college management would appreciate the competitive work and continue to document related activities in future so that success stories can be built which can be followed by other educational institutes.

Table No 1: Jijamata College Campus

Name of institute	Staff	Student	Total
Jijamata college of Science & Arts	**100**	**1500**	**1800**
Jijamata public School	**42**	**934**	**976**
Jijamata nursing college	**10**	**60**	**70**
Industrial training institute (ITI) College	**25**	**150**	**175**
TOTAL			**3021**

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CARBON FOOTPRINT

The term "carbon footprint" refers to a person or organization's carbon consumption, or the CO_2 or GHG emitted directly or indirectly during the life cycle of an activity or a product [*TERI,* 2008]. Therefore, carbon footprint can be used to evaluate an object's (including a region, an organization, or a product) impact on environment. According to the original footprint calculations, energy consumption of human activities is generally converted to bio-productive area so as to evaluate the sustainability of consumption from an ecological point of view.

Carbon Sequestration:

The term "carbon sequestration" is used to describe both natural and deliberate processes through which CO_2 is either removed from the atmosphere or diverted from emission sources and stored in the ocean, terrestrial environments (vegetation, soils, and sediment), and geologic formations. This carbon is stored stable solid form by direct and indirect fixation of atmospheric CO_2. Direct soil carbon sequestration occurs by inorganic chemical reactions that convert CO_2 into soil inorganic carbon compounds such as **calcium and magnesium carbonates**. Direct plant carbon sequestration occurs as plants photosynthesize atmospheric CO_2 into plant biomass. Subsequently, some of this plant biomass is indirectly sequestered as **soil organic carbon** (SOC) during decomposition processes. The amount of carbon sequestered at a site reflects the long-term balance between carbon uptake and release mechanisms. Many agronomic, forestry, and conservation practices, including best management practices, leads to a beneficial net gain in fixation of carbon in soil.

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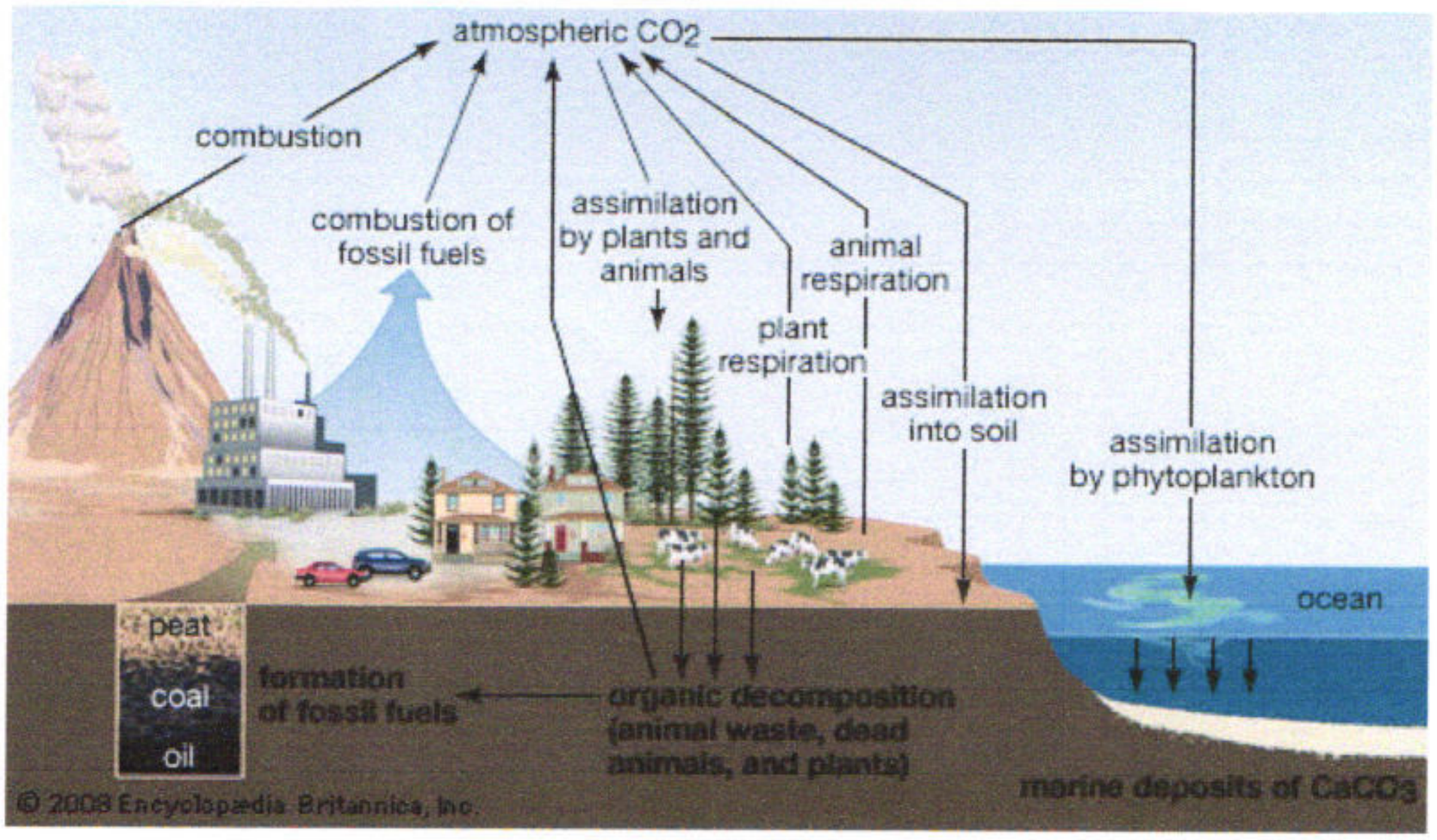


Fig. of Carbon sequestration cycle

Unlike many plants and most crops, which have short lives or release much of their carbon at the end of each season, forest biomass accumulates carbon over decades and centuries. Furthermore, carbon accumulation potential in forests is large enough that forests offer the possibility of sequestering significant amounts of additional carbon in relatively short periods – decades. Terrestrially, carbon is stored in vegetation and in the soil. Plants store carbon for as long as they live, in terms of live biomass. Once they die, the biomass becomes a part of the food chain and eventually enters the soil as soil carbon. If the biomass is incinerated, the carbon is re-emitted into the atmosphere and is free to move in the carbon cycle.

TYPES OF SEQUSTRATION

There are number of technologies under investigation for sequestering carbon from the atmosphere. These can be discussed under three main categories:

- **Ocean Sequestration:** Carbon stored in oceans through direct injection or fertilization.
- **Geologic Sequestration:** Natural pore spaces in geologic formations serve as reservoirs for long-term carbon dioxide storage.

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- **Terrestrial Sequestration:** A large amount of carbon is stored in soils and vegetation, which is natural carbon sinks. Increasing carbon fixation through photosynthesis, slowing down or reducing decomposition of organic matter, and changing land use practices can enhance carbon uptake in these natural sinks.

Benefits of Soil Carbon Sequestration:

Removing CO_2 from the atmosphere is only one significant benefit of enhanced carbon storage in soils. Improved soil and water quality, decreased nutrient loss, reduced soil erosion, increased water conservation, and greater crop production may result from increasing the amount of carbon stored in agricultural soils.

Important clauses of Kyoto Protocol related to carbon sequestration:

The Kyoto Protocol to the UN Framework Convention on Climate Change (UNFCCC, 1997) has provided a vehicle for considering the effects of carbon sinks and sources, as well as addressing issues related to fossil fuels emissions.

Soil Carbon Sequestration:

Soil carbon sequestration is the process of transferring carbon dioxide from the atmosphere into the soil through crop residues and other organic solids, and in a form that is not immediately remitted. This transfer or "sequestering" of carbon helps off-set emissions from fossil fuel combustion and other carbon-emitting activities while enhancing soil quality and long-term agronomic productivity.

AIM

This study is aimed at measuring carbon footprint and carbon sequestration in the campus area and to compare both the processes in the context of capacity building by the Jijamata college of Science & Arts Bhende Newasa Dist. Ahmednagar Maharashtra.



MAJOR OBJECTIVES OF STUDY CARBON EMISSION AND SEQUESTRATION:

1. To measure carbon emission from power (electrical) consumption
2. To measure carbon emitted from transportation and other activities
3. To estimate Soil organic matter
4. To estimate organic biomass of trees
5. Analysing results for determination of carbon footprint analysis and carbon sequestration

SCOPE

Removing CO_2 from atmosphere is significant benefit of enhanced carbon

Storage in soil. High level of fossil fuel combustion and deforestation have transformed large pools of fossil carbon (coal and oil) into atmospheric CO_2, strategies for reducing CO_2 in atmosphere include soil carbon sequestration, tree planting etc.

Scientists are doing work to understand impact of land use and land management on soil sequestration and ways to increase storage time of carbon in soil. Underline mechanisms controlling soil structure and storage of carbon these include various chemicals, physical, biological, mineralogical and ecological process. They are also doing work to find out relationship between biodiversity, atmospheric CO_2 level, and increase nitrogen deposition in carbon storage.

POSSIBLE OUTCOME OF THESE STUDY

It may be used for following purpose.

- Develop a quantitative analysis to understand carbon emission potential
- Estimation of carbon sequestration in college campus
- Formulation of strategies for plantation and other means for carbon sequestration
- Creation of awareness in the stakeholder regarding carbon emission and its capturing



METHODS FOR ASSESSMENT OF CARBON EMISSION AND CARBON SEQUESTRATION:

1. Carbon Emission

a) Power Consumption activity

The power consumption of individual has been studied by using secondary data of energy audit report done for college campus in 2019. Along with the same average electrical consumption per month was taken from last six months reading from college electricity bill. The energy/power generated through coal or diesel emits certain amount of carbon into atmosphere considering the fact carbon emission is calculated for present study.

The energy consumption at college is particularly for running light, fans and other instruments. Hence to measure the carbon emission from

Electrical consumption $C = \beta E$,

Where C is carbon dioxide emission, β is emission factor which is 0.81 ton/MWh and E is electrical consumption.

b) Consumption of fossil fuels

For the assessment of carbon emission the primary data was collected by survey in the college campus. Firstly for accounting of vehicular emission the no. of vehicles (two wheelers, four wheelers) measured which were visited to college campus every day. An average of six working days had been considered for the same. Parking areas and campus area had monitored from morning 7 am to evening 7 pm also number of students coming from ST buses are counted to determine indirect emission hence to calculate per capita emission.

- Emission factor Bus 0.023 kg CO_2 per passenger per Km
- Two wheeler 0.054 kg CO_2 per vehicle per Km
- Four wheeler 0.175 kg CO_2 per vehicle per Km
- Auto 0.13 kg CO2 per passenger per Km



(The emission factor is based on the percentage of carbon present in the fuel used for the vehicle whereas the present values given above are suitable at India Ref. Cerana Foundation)

2. Carbon Sequestration

a) Estimation of carbon sequestration from Soil Organic matter

- Selection of land use category or project activity strata, sampling method and location of sampling plots.
- Collection of soil samples at two depths (0 to 15 cm and 15 to 30 cm) from each stratum.
- Estimation of bulk density.
- Estimation of organic matter or carbon content in the soil sample in the laboratory using the Walkley and Black methods.
- Calculation of carbon stock in tonnes of carbon per hectare using organic matter content, bulk density and depth of soil.

b) Above ground biomass and carbon estimation of the trees

The biomass from the surrounding areas of college campus was estimated from the Diameter at Breast Height (DBH) and from the total height of the tree. A constant for wood density of about 690 kg/m^3 is taken in consideration for measuring total biomass of the tree. Hence the volume of dry and green biomass (calculated) from the constant values has been considered in estimating the carbon sequestration by the trees.

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ESTIMATION OF CARBON EMISSION

1. Carbon emission through power consumption activity
2. Carbon emission from transport activity

Number of vehicles visiting every day to college campus along with the mode of transport used by students, teacher, staff and visitors has been surveyed to understand this activity through which carbon is emitted into atmosphere. As per the weekly survey there are average **580** two wheelers and **25** four wheelers coming in college premises every day. About **3021 student/ staff/ teacher** are coming to college by using state transport bus service.

Hence for calculating the carbon emission we have considered average 5 Km of distance travelled by each of the person. The emission factor suitable for India terrain had been used in computing the carbon emission.

I. Emission from **3021** no. of individual

3021 X 0.023 X 5 = **347.41 Kg of CO_2 per day**

II. Emission from two wheelers

580 X 0.054 X 5 = **156.6 Kg of CO_2 per day**

III. Emission from four wheelers

25 X 0.175 X 11= **48.12 Kg of CO_2 per day**

a +b + c = **347.41 + 156.6 + 48.12 = 552.13**

Therefore total carbon dioxide emitted from transport activity within and outside college premises is **552.13 Kg of CO_2 per day or 16.54 tons/month**

Overall carbon emission from the college campus is A+B, it means both the activities from which carbon emitted in the surrounding of college campus.

Therefore total carbon emission =



Carbon Emission = 10.99 + 16.54

= 27.53 tons/month

= 329.28 tons/yea

ESTIMATION OF CARBON SEQUESTRATION

1) Carbon Sequestration by soil organic matter

The soil organic carbon is the major of soil organic matter present in the soil layer at the depth of 10 to 30 cm from ground level. The Soil Organic Matter (SOM) concentration differs among climate, soil type and land uses. Depletion of SOM, a widespread problem on croplands and grazing lands is exacerbated by soil degradation. Most soils have extremely low levels of soil organic carbon (SOC) contents, ranging from 8 to 10 g/kg. Depletion of SOC pool is caused by fertility- exploitative practices and soil degradation processes. Low external input of chemical fertilizers and organic amendment causes depletion of SOC pool because nutrients harvested in agricultural products are not replaced, and are made available through minerlization of SOM.

Every tonne of carbon lost from soil adds 3.67 tonnes of carbon dioxide (CO2) gas to the atmosphere. Conversely, every one tonne increase in soil organic carbon represents 3.67 tonnes of CO2 sequestered from the atmosphere and removed from the greenhouse equation

Many factors affect soil organic matter levels:

- **Soil depth** – the organic matter content generally decreases as you dig deeper
- **Soil type** – sandy soils generally have lower soil organic matter than heavier soils such as loams
- **Management practices** – excessive cultivation reduces organic matter levels
- **Temperature** – organic matter breaks down quicker in hot climates compared with cool climates

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- **Soil water content** – organic matter breaks down quicker in moist soil (though not permanently saturated) compared with dry soil

Carbon is a key ingredient in soil organic matter. Lands produce organic compounds by using sunlight energy and combining carbon dioxide from the atmosphere with water from the soil.

Well decomposed organic matter forms humus, a dark brown, porous, spongy material that provides a carbon source in soil. Plants assimilate carbon by the process of photosynthesis some of the carbon remains in plant tissue that is either consumed by animals or remain in soil as a litter. When plants die and decompose.

Table no .2 Carbon sequestration in college campus

Sr.no	Place of observation	Result	Carbon in Ton/He
1	Senior College ground	0.71	14.2
2	Botanical garden	0.75	15
3	Nursing college ground	0.73	14.6
4	Public School ground	0.72	14.4
5	ITI college Ground	0.74	14.8
Average carbon sequestration in college campus			**14.6**

Total area 38.10 acres = 15.24 hector

Therefore, total 222.56 ton CO_2 sequestered in college campus

Since the total area of college campus is about **38.10 acres i.e.** 15.24 hectares of land we must require the average carbon sequestered per hectare so that we can estimate the total carbon sequestered in



college campus. Therefore the total carbon sequestered is equal to **222.56 ton in college campus**.

The soil samples for measuring organic matter have been collected from the senior college ground, botanical garden, nursing college ground, public school ground ITI & college ground area of college campus. It was showing **0.71, 0.75, 0.73, 0.72, and 0.74 %** of organic carbon respectively. The carbon equivalent for this is equal to **14.6 ton/ha** in all campus of college. Thus the atmospheric carbon sequestered in college campus is equivalent to **51.38 and 55.05** ton/hectare CO_2.

Further if we treat total **222.56 ton/ha CO_2** then **3** times of atmospheric CO_2 is accounted to be **667.68** tons of carbon sequestration.

3. Above ground biomass and carbon estimation from trees

Sr. No.	Botanical Name	No.of plants in campus	Value of individual plant	Carbon as Biomass
1	*Delonix regia* (Box.ExHook)	15	11.54	173.1
2	*Pithcolombium dulce (Roxb)*	1	17.33	17.33
3	*Eucalyptus lanceolatus*	10	5.55	55.5
4	*Acacia nilotica*	7	6.73	47.11
5	*Milingtonia hortensis*	22	17.25	379.5
6	*Leucaena leucocephala*	16	3.05	48.8
7	*Ficus religiosa*	4	55.7	222.8
8	*Pongania pinnata*	152	5.53	840.56
9	*Azadirachta indica*	121	4.33	523.93
10	*Tectona grandis*	9	1.99	17.91
11	*Saraka Indica*	10	2.15	21.5
12	*Capparis zeylanica*	3	1.01	3.03
13	*Spathodia campanulata*	14	9.2	128.8
14	*Thespesia populnea*	2	8.78	17.56
15	*Mangifera indica*	53	4.06	215.18

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16	*Carica papaya*	9	2.03	18.27
17	*Livistona chinensis*	2	1.87	3.74
18	*Ficus benghalensis*	7	25.48	178.36
19	*Ziziphus jujuba*	13	2.03	26.39
20	*Ixora coccinea*	22	2.03	44.66
21	*Dalbergia sisso Roxb.*	59	9.1	536.9
22	*Cuscuta refelxa Roxb.*	2	1.23	2.46
23	*Ficus elastic Roxb ex Hornem*	2	7.62	15.24
24	*Musa paradisiaca L.*	6	2.12	12.72
25	*Mirabilis jalapa L.*	2	1.01	2.02
26	*Ficus benjamina L.*	27	10.45	282.15
27	*Tecoma stans L.*	38	1089	41382
28	*Bombax ceida*	2	5.25	10.5
29	*Plumeria obtuse*	5	2.16	10.8
30	*Artocarpus heterophyllus*	3	7.61	22.83
31	*Murraya koenigii*	5	3.26	16.3
32	*Nephrolepis exaltata L.*	26	1.05	27.3
33	*Cassia siamea Lam.*	75	4.81	360.75
34	*Ricinus communis*	1	1.08	1.08
35	*Adathoda vasica*	5	3.44	17.2
36	*Bauhinia racemosa*	12	3.23	38.76
37	*Tamarindus indica*	49	5.76	282.24
38	*Annona reticulata*	4	4.59	18.36
39	*Limonia acidissima L.*	2	12.84	25.68
40	*Dypsis l utescens H. Wendl*	10	8.15	81.5
41	*Bougainvillea spectabilis*	7	1.56	10.92
42	*Alstonia scolaris*	35	3.1	108.5
43	*Roystone aregia*	2	1.58	3.16
44	*Calotropis giaganthe*	1	2.16	2.16
45	*Cassia fistula*	40	12.14	485.6

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46	*Lantana Camera*	10	2.11	21.1
47	*Emblica officinalis*	7	6.52	45.64
48	*Madhuca longifolia*	2	27.26	54.52
49	*Bauhinia variegate*	17	1.66	28.22
50	*Catharanthus roseus L.*	30	1.05	31.5
51	*Araucaria columnarisJ.R.Forst Hook.*	2	1.91	3.82
52	*Cordia dichotomaG.Forst*	1	5.43	5.43
53	*Parkinosonia aculeate L.*	2	2.15	4.3
54	*Callistemon lanceollatus*	7	7.95	55.65
55	*Cassia marginata Roxb.*	2	10.28	20.56
56	*Syzygium cumini L.*	14	15.48	216.72
57	*Annona squmosa L.*	49	3.23	158.27
58	*Terminalia catappa L.*	8	14.56	116.48
59	*Nyctanthes arbor-tristis L.*	3	1.36	4.08
60	*Canna indica L.*	10	2.86	28.6
61	*Tabernaemontana divaricate R.Br.*	4	1.2	4.8
62	*Clitoria ternatea L.*	4	1.54	6.16
63	*Piper betle L.*	4	2.23	8.92
64	*Ficus racemosa*	3	12.74	38.22
65	*Thuja occidentalis*	40	2.56	102.4
66	*Aegle marmelos*	4	5.12	20.48
67	*Polyalthia longifolia*	108	4.59	495.72
68	*Santalum album*	6	13.62	81.72
69	*Cocus nucifera*	46	7.58	348.68
70	*Rauvolfia serpentine*	2	1.56	3.12
71	*Adansonia digitata*	3	2.11	6.33
72	*Neolamarckia cadamba*	3	1.69	5.07
73	*Swetenia mahugani*	4	3.01	12.04

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74	*Cycas revolute*	5	2.98	14.9
75	*Terminalia arjuna*	3	9.15	27.45
76	*Thevetia peruviana*	21	4.26	89.46
77	*Psidium guajava*	13	5.87	76.31
78	*Bambusa bamboo*	1	5.25	5.25
79	*Peltophorum pterocarpum*	367	26.81	9839.27
80	*Butea monosperma*	1	2.38	2.38
81	*Albizia julibrissin*	2	7.88	15.76
82	Samniea saman	7	25.75	180.25
	Total	**1727**		**58920.74**

Estimation of above-ground biomass (AGB) is an essential aspect of carbon stocks. Estimated C pools in different forest types can be used to in making decisions about C management within forests. Generally in estimation of biomass from tree the allometric equations are used. Allometric equations describe the relationship of one part of a plant to another part of a plant. Usually some parts of the plat are easier to measure than other parts. Usually it is easy to measure and predict the hard parts i.e. tree trunk or girth and height (e.g. Use diameter to predict tree height for a given species). In present study we had first measured the aboveground biomass for trees. It was calculated using the tree girth at breast height and total height of the tree, similarly the constant variables based on tree species is taken into account for estimating total biomass. This is further used for measuring carbon C stored in the tree species.

Tree survey conducted in college campus was showing more than **2000** nos. of trees present in college premises. We had taken **1726** nos. of trees from which total biomass had been estimated. As per the protocol the trees selected in present assessment need to have tree girth more than 15cm.

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Total carbon estimated as biomass from the tree species in present study is **58920.74** tons of carbon

The carbon sequestered can be calculated as soil organic matter plus the carbon estimated from tree biomass i.e. C + D

Carbon Sequestered in college campus is equal to

Carbon sequestered = C+ D

= 667.68 + 58920.74

= 59588.42 tons of CO2

Table 3: The carbon emission and sequestration balance as per study

Total Carbon emission from all measured activity in college campus	Total carbon sequestered from soil organic matter and tree biomass
329.28 tons/year	**59588.42 tons/Year**

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EVALUATION OF FINDINGS

The results based on our observations carried out during the survey clearly show that the college campus has much more capacity of carbon pool compared to yearly carbon footprint. In other words it may be stated that carbon sequestration capacity of the campus is so much so that the present rate of carbon emission persists for about

25.9 years to come. Thus, the college has proactively equipped itself by putting efforts continuously for a long period so as to build its capacity for carbon sequestration.

Mr.P.D. Ghare	Dr.KA. Lande	Dr.ME. Navgire	Dr. R. R. Saswade
Co-ordinator	Head Criteria VII	Co-Ordinator IQAC Jijamata College of Science & Art's,Bhende Bk.	PRINCIPAL Jijamata College of Science & Arts Bhende, Tal. Newasa, Dist. A'Nagar

Date: 17/02/2020

Place: Bhende Bk



ENVIRONMENT POLICY STATEMENT

2018-2023



ENVIRONMENT POLICY STATEMENT

I. Preamble

The Shri Marutrao Ghule Patil Shikshan Sanstha's (MGPSS) **JIJAMATA COLLEGE OF SCIENCE AND ARTS** (JCS&A) is very keen to protect environment and any of the activities practiced in the institution are not causing any harm to its stakeholders or to the society in general. Specific action would be taken to prevent that. The primary goal of environmental policy is to protect natural systems. It is, therefore, a core value of the institute to preserve and protect the environment. As we advance, scientific understanding regarding the fundamental interrelationship between human health and the environment, we will proactively demonstrate our commitment to environmental stewardship and sustainable development.

Through implementation of this policy, MGPSS's JCS&A College, will serve as a leader by advancing environmental conservation commitment within our own programs and facilities, and in the broader community.

II. Aims and Objectives of the Policy:

i. Develop and maintain environmental management programs with objectives and targets to minimize adverse environmental impacts.

ii. Comply with all applicable environmental, health, and safety laws, regulations, and other requirements.

iii. Implement effective pollution prevention and waste minimization programs to reduce, reuse, and recycle materials.

iv. Ensure that energy and water are used responsibly and conserved through innovative practices and procedures.

v. Provide all institute staff with the knowledge and tools needed to meet the goals of this policy and to actively participate in efforts to prevent negative environmental impacts.

vi. Measure progress toward our environmental goals.

III. The Policy

Accordingly, it is resolved that the MGPSS's JCS&A College will:

1. **Provide facilities for alternate sources of energy and energy conservation measures like:**
   - Solar energy

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

2. Create facilities for the management of the following types of degradable and non-degradable wastes:

- Solid waste management
- Liquid waste management
- E-waste management
- Waste recycling system
- Hazardous chemicals and radioactive waste management.

3. Provide Water Management and Water conservation facilities like:

- Rain water harvesting
- Bore well /Open well recharge
- Construction of tanks and bunds
- Waste water recycling
- Maintenance of water bodies and distribution system in the campus

4. **Take Green campus initiatives like:**

- Restricted entry of automobiles
- Use of Bicycles/ Battery powered vehicles
- Pedestrian Friendly pathways
- Ban on use of Plastic
- landscaping with trees and plants

5. Regularly conduct quality audits on environment and energy, which include:

- Green audit
- Energy audit
- Environment audit
- Clean and green campus recognitions/awards
- Beyond the campus environmental promotional activities

6. Implement Carbon Management Strategy, which include:

- To implement a carbon management strategy, including the efficient use of energy.
- To reduce greenhouse gas emissions in the college campus.
- To ensure the uptake of low carbon technologies in buildings and equipment.

7. Provide Awareness and Training:

- To communicate internally and externally, the college's environmental objectives and

performance.

- To raise awareness of staff and students about the college's environmental impact, activities and performance and good practices.
- To provide appropriate environmental educational programmes for staff and students.
- To encourage and facilitate feedback and suggestions on ensuring good practices.
- Evaluation of Environmental Policy.
- To undertake a regular review of environmental management procedures and activities to ensure suitability, adequacy and effectiveness.

IV. Responsibilities:

- The main responsibility for implementation of this policy lies with the Students, Teaching and non-teaching staff and Principal of College.
- The Heads of departments are responsible for ensuring compliance with Environment Policy within their area of control.
- The committee will actively monitor the performance of Colleges and Divisions in the implementation of the aims and objectives of this Policy in the activities under their control.
- Whilst the college accepts the main responsibility for implementation of this policy, individuals have a very important role in co-operating with those responsible for safeguarding the environment. Individuals are required to abide by rules and requirements made under the authority of this policy.

Waste Reduction and Recycling:

- To set and achieve targets for reducing resource use.
- To minimize the adverse environmental impacts of the decommissioning and disposal of college assets.
- To increase the rate of recycling of all appropriate materials, based on life-cycle principles.
- To implement sustainable resource management practices, based on reduce, reuse and recycle principles.

Photographs of Activities taken for Green campus






Plantation in Campus

ENVIRONMENT AND GREEN AUDIT REPORT
(YEAR 2020-2021)
OF
JIJAMATA COLLEGE OF SCIENCE AND ARTS,

DNYANESHWARNAGAR, BHENDE BK.

TAL; NEWASA, DIST; AHMEDNAGAR



PREPARED BY

UNIVERSE ENVIRONMENT CONSULTANCY, PUNE.

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Mobile: 860001776 Email; universeenviropune@gmail.com

CERTIFICATE

GREEN & ENVIRONMENT AUDIT

This is to certify that **Jijamata College of Science and Arts, Dnyneshwarnagar, Bhende (BK), Tal-Newasa, Dist -Ahmednagar** has successfully undergone **Green & Environment Audit** for year 2020-21

Date : 26th January 2021

Dr. Adhikrao Yewale
Universe Environment Consultancy, Pune

ACKNOWLEDGEMENT

Environment & Green Audit Assessment Team thanks to the Shri Anil Shewale, Secretory, Shir Marutirao Ghule Education society & Principal Dr. Saswade Ramkisan Raghunath for assigning this important work of Environment & Green Audit. We appreciate the cooperation extended to our team during the entire process.

Sr No	Name of the auditor	Area of Expertise	Designation
1	Dr. Saswade Ramkisan Raghunath	Botany	Principal
2	Dr Navgire Madhukar Eknath	Nodal Officer	Coordinator/ IQAC
3	Dr Lande Kakasaheb Abasaheb	Geography / Environment	Member
4	Prof. Naik Dhirsing wahrya	Energy Audit	Member
5	Prof. Ghare Pravin Devram	Water Harvesting /Solid and Liquid waste	Member
6	Dr. Gedam Ajit Kashinath	Vermicomposting project	Member
7	Prof Nawale Rohan Vijaykumar	Botany	Member
8	Shri. Gaikwad Dattatraya Bhausaheb	Administration	Member

Our special thanks to Green Audit Committee on behalf of Jijamata college.

We are also thankful to Department Heads and other staff members who were actively involved while collecting the data and supported us during field measurements.

Mr. Adhikrao Yewale

Universe Environment Consultancy, Pune

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1. INTRODUCTION

1.1 GREEN & ENVIRONMENT AUDIT

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of college. This 'Green Audit' aims to analyze environmental practices within and outside the college campus, which will have an impact on the environment.

Green Audit or Environment Audit focuses on the Green Campus, Waste Management, Water Management, Air Pollution &Energy Management etc. being implemented by the College Management.

The ICC defines Environmental Auditing as

"A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environment and natural resources in its operations/projects."

Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

Green audit is assigned to the criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India which declares the institutions as Grade A, B or C according to the scores assigned during the accreditation.

As a mandatory requirement of NACC, Green audit was planned for the academic year 2020-21 by management of college.

Management decided to conduct green audit yearly through internal as well as external audit team. As decided by management, Environment and green audit was carried out in month of December 2021 for the academic year 202-21.

Table No 1. Audit Team

Sr No	Name of the auditor	Area of Expertise	Designation
On behalf of Jijamata College			
1	Dr. Saswade Ramkisan Raghunath	Botany	Principal
2	Dr Navgire Madhukar Eknath	Nodal Officer	Coordinator/ IQAC
3	Dr Lande Kakasaheb Abasaheb	Geography / Environment	Member
4	Prof. Naik Dhirsing wahrya	Energy Audit	Member
5	Prof. Ghare Pravin Devram	Water Harvesting /Solid and Liquid waste	Member
6	Dr. Gedam Ajit Kashinath	Vermicomposting project	Member
7	Prof Nawale Rohan Vijaykumar	Botany	Member
8	Shri. Gaikwad Dattatraya Bhausaheb	Administration	Member
On behalf of Universe Environment Consultancy			
1	Dr. Adhikrao Yewale	Air Quality, Water quality and Ecology	Member
2	Shri Rahul Patil	Water quality & Soil quality	Member
3	Rupali Mohite	Water Management	Member
4	Shir Yogesh Raskar	Social	Member
5	Shri Dayand Jagdale	Energy	Member

1.2 OBJECTIVES OF ENVIRONMENT& GREEN AUDIT

The main objective of the Environment/Green audit is to promote the management and conservation of Environment in the College Campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

The main objectives of carrying out Green Audit are:

- *To document the floral and faunal diversity of the college*
- *To Document the water and waste management of the college*
- *To document the waste disposal system*

- *To estimate the Energy requirements of the college.*
- *To document the environmental condition of air, water, soil and noise of the college*
- *To introduce and aware students to real concerns of environment and its sustainability*

1.2.1 TARGET AREAS FOR ENVIORNMENT AND GREEN AUDIT

- **Biodiversity Conservation**: Green area, plantation, Florala diversity, faunal diversity local, endemic species, medicinal plants etc aspect was considered
- **Water and Waste Water:** Water requirement for various activities, source of water, water quality, waste water generation, treatment, recycle and reuse of treated waste water etc.
- **Solid Waste;** Biodegradable waste and non-Biodegradable waste generation, and its disposal.
- **Energy:** Source, Consumption, conservation and alternative energy sources
- **Environment Monitoring:** Ambient Air quality, Noise level, Water quality and Soil quality.

1.2.2 METHODOLOGY

In order to conduct the green audit, the methodology included different tools such as

- Preparation of questionnaire,
- Preparation of data collection formats
- Collection of data
- Physical checking of the campus,
- Observation and review of the documentation,
- Interview of key persons and data analysis, measurements and recommendations.

The study covered the following areas to summarize the present status of environment management in the campus:

- Green area management
- Water management
- Energy Conservation
- Waste management
- E-waste management

1.3 ABOUT THE COLLEGE

Jijamata college of Science and Arts Dnyneshwarnagar Bhende (BK), Tal-Newasa in Ahmednagar District Maharashtra state. This college is affiliated with Savitribai Phule University Pune. This college is established in June 1992 by Shri.Marutrao Ghule Patil Shikshan Santha' Dnyneshwarnagar Bhende (BK, premier educational institution founded By Hon. Late Shri.Marutrao Ghule Patil veteran social activist which has been imparting higher education KG to PG level in Science & Arts faculty.

Jijamata college of Science and Arts Dnyneshwarnagar Bhende (BK), campus consists of main buildings with ground, first and second floor. The administrative office, Library, Indoor stadium, various HOD cabins, staff rooms, classrooms, various laboratory like Physics, Chemistry, Botany, Zoology, Computer Sciences, etc. are the part of college campus. The college are functioning with basic motto to impart quality, employment, entrepreneur and higher education to mostly rural as well as marginal urban student. Besides this there are one boy's hostel and two ladies hostel buildings for facilitating student accommodation to many rural boys & girl students. Similarly in campus two building are available for residential purpose for teaching as well as non-teaching staff. This college also provides gymkhana facility indoor stadium to student undergoing through various type of physical education. There is also well-furnished library where student studying in various branches have facility to refer books. The college developed botanical garden & green campus.

Total campus Area is 31.65 acre. College is affiliated to Pune University, Pune

College is accredited with NAAC With B' Grade (CGPA 2.72) grade in year 2018by NAAC.

Table No. 2. Details of the College

Sr no	Particulars	Information
1	**Name of college**	Shri Marutrao Ghule Patil Shikshan Sanstha's Jijamata College of Science and Arts Bhende Tal Newasa Dist Ahmednagar.
2	**Address**	Dnyneshwarnagar Bhende (BK), Tal-Newasa in Ahmednagar District Maharashtra state.
3	**Latitude and Longitude**	latitudes – 19°27'14.59"N and longitude – 75° 1'25.75"E
4	**Area in acre**	31.65
5	**Faculty**	Arts, Science, Commerce , B.C.S

	(Arts/commerce/science)	
6	**Number Student year (2020-21)**	1484
	Boys	835
	Girls	649
7	**Principle of College**	Dr. Saswade Ramkisan Raghunath
8	**Administrative officer**	Shri.Ghodechor Bandu Ramchandra
9	**Contact Number**	02427-255304
10	**Email**	Principal.jijamatacollege@gmail.com
12	**Fax**	02427-255309
13	**Website**	http://jijamatacollege.ac.in

Table No 3 .Board of directors:

Sr.No.	Name	Designation
1	Dr. Narendra Marutrao Ghule Patil (Ex.M.La)	President
2	Shri Chandrashekhar Marutrao Ghule Patil (Exmla)	Vice President
3	Shri. Pandurang Gamaji Abhang (Ex.M.L.A.)	Trustee
4	Adv. Desai Bhausaheb Deshmukh	Trustee
5	Shri. Kakasaheb Narayanrao Narwade	Trustee
6	Shri. Vitthalrao Vakilrao Langhe	Trustee
7	Dr. Narayan Karbhari Mhaske	Trustee
8	Shri. Panditrao Rambhau Bhosale	Trustee
9	Shri. Babanrao Murlidhar Bhusari	Trustee
10	Shri. Kakasaheb Abasaheb Shinde	Trustee
11	Shri. Janardhan Rambhau Kadam	Trustee
12	Shri. Gorakshnath Dagdu Gandal	Trustee
13	Shri. Bhausaheb Sonyabapu Kangune	Trustee
14	Shri. Shivaji Rajdhar Kolte	Trustee

15	Shri. Machindra Suryabhan Mhaske	Trustee
16	Shri. Sakharam Digambar Lavhate	Trustee
17	Shri. Dipak Tulshiram Nannavare	Trustee
18	Sau. Shankarrao Laxman Pavse	Trustee
19	Sau. Latabai Ashok Misal	Trustee
20	Sau. Ratnamalatai Kashinath Navle Trustee	Trustee
21	Sau. Tarabai Hanuman Jagdale	Trustee
22	Dr. Kshitij Narendraji Ghule Patil	Trustee
23	Shri. Anil Pandit Shewale	Secretary

Table No 4: College offers the following programmes of graduation in Arts and Science faculty.

Sr No	Courses	Started from Year
A	**Arts**	**1994**
1	Marathi	
2	Hindi	
3	English	
4	Geography	
5	Political Science	
6	Economic s	
7	Physiology	
B	**Science**	**1992**
1	Physics	
2	Chemistry	
3	Botany	
4	Zoology	
5	Computer Science	

6	Statistics	
C	BSc Computer Science	2012-2013
D	B.Com	2013-2014
E	MSc Chemistry	2010-2011
F	MSc Botany	2016-2017
G	MA MARATHI	2009-2010
H	MA ECONOMICS	2010-2011

The college is a reputed educational institution, which has been known for producing outstanding students who take on different careers, as per their academic merit successfully in the society.

The college has rich tradition of co-curricular and extra-curricular activities such as NSS, NCC, Sports and Cultural Activities, which play an important role in the overall personality development of the students.

The students are also reciprocating by their high achievements in academic performance. A large number of students are getting excellent placements in different parts of the country & abroad also.

Table No 5: Details of the Teaching and non-teaching staff

Sr No	Position	Male	Female	Total
A Teaching				
1	Principal	01	0	01
2	Professor	03	0	03
3	Associate Professor	07	0	07
4	Assistant Professor	20	01	21
	Total			**32**
1	Non Grant	17	10	**27**
1	CHB	06	02	**8**

3	Ad-hoc	02	02	**04**
B. Non-Teaching				
1	Grant	09	0	09
2	Non Grant	15	02	17
	Total			**26**

Table No 6 : Number students last five years

Years	**Courses**								**Total**
	B. A	**B. Sc**	**BSc Comp Sci.**	**B. Com**	**MA Marathi**	**MA ECONOMICS**	**MSC CHEMISTY**	**MSC Botany**	
2020-21	381	502	142	275	20	31	89	44	**1484**
2019-20	448	517	91	258	27	27	62	46	**1476**
2018-19	348	584	81	232	36	29	48	44	**1402**
2017-18	391	617	87	213	17	37	8	48	**1418**
2016-17	345	563	83	172	17	44	38	23	**1285**
2015-16	384	557	79	117	23	54	38	0	**1252**

Table No. 7: Hostel strength :2 Buildings

Boys			**Girls**		
Sr. No	**Intake Capacity**	**Student 20-21**	**Sr. No**	**Intake Capacity**	**Student 20-21**
1	**100**	**50**	**1**	**120**	**60**

Table No 8: Staff Quarters 02 Building

Building No 01		**Building No 02**		**Gross Total**
Sr. No	**Total Rooms**	**Sr. No**	**Total Rooms**	
1	**08**	**1**	**08**	**16**

1.2 LOCATION OF THE COLLEGE

The college located at Bhende village, in Newasa Tehsil of Ahmednagar District. The college is located in the rural area. It is geographically located at latitudes – 19°27'14.59"N and longitude – 75° 1'25.75"E.

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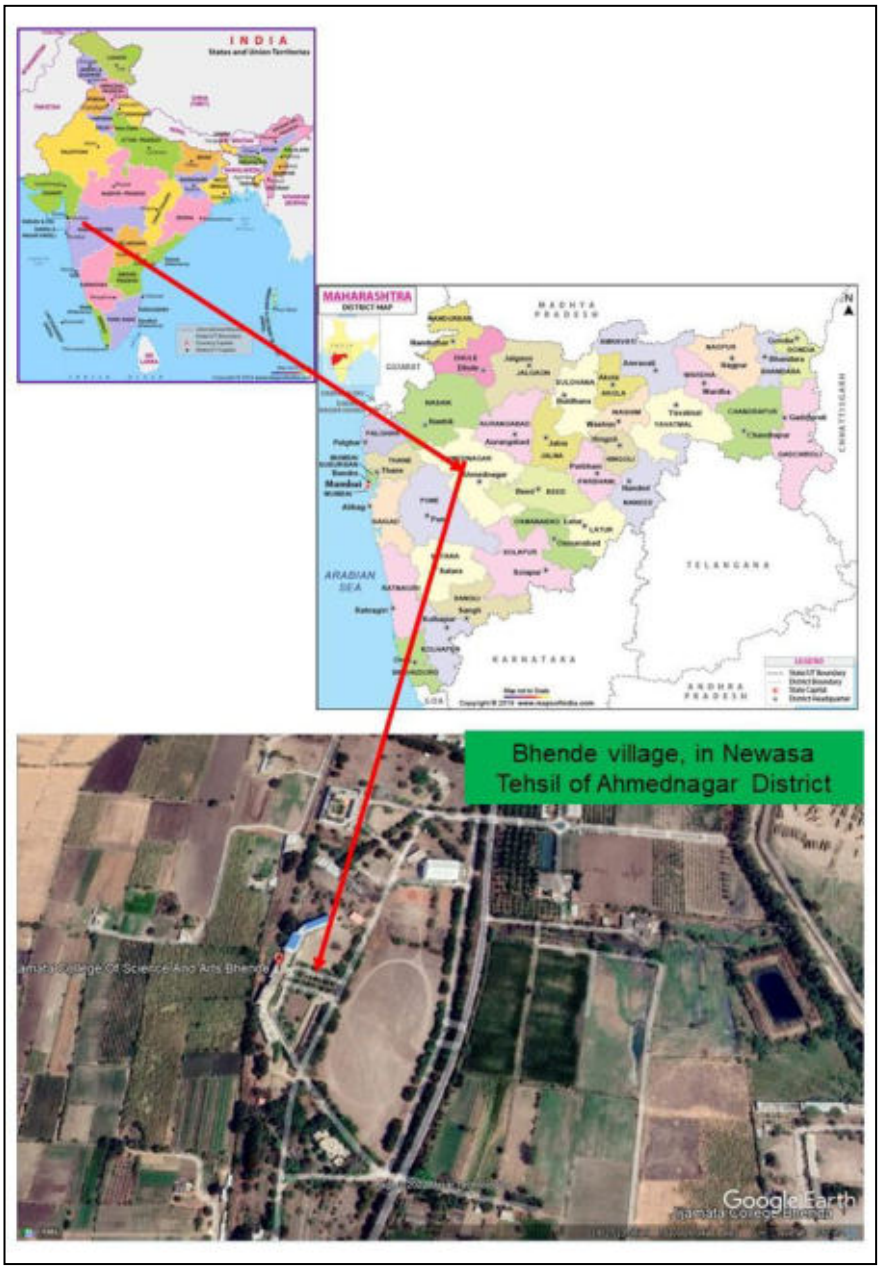


Figure No. 1 : College Location Map: Source Google Earth



Figure No. 2 : Google Image

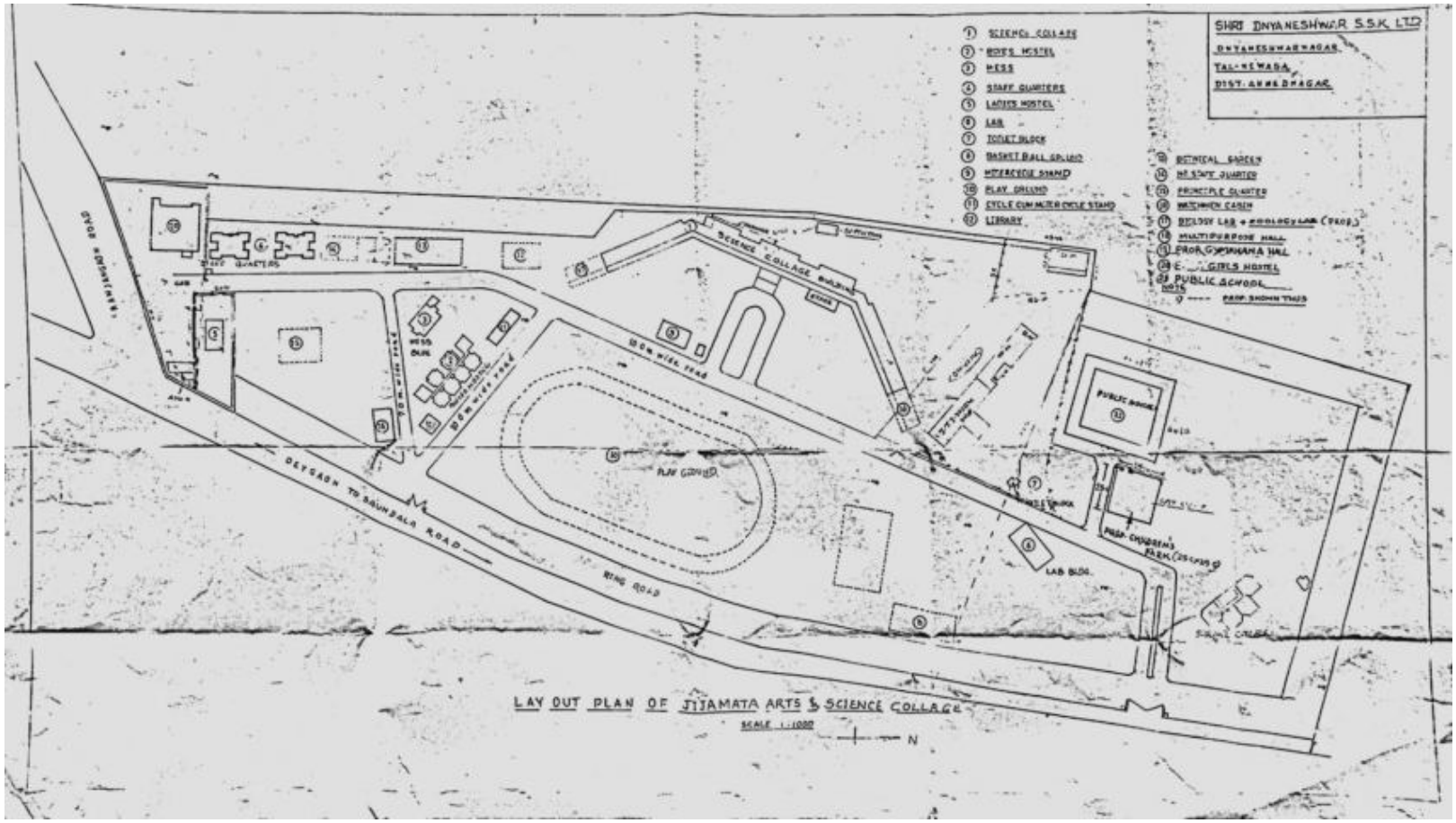


Figure No. 3 : Project Layout

1.4 COLLEGE INFRASTRUCTURE AND FACILITIES



Indoor Stadium



Playground with 400 meter running track



Parking to students



College Building



Staff Quatres and Hostels

1.5 REWARDS AND CERTIFICATE

- Extension activities are carried out in the neighborhood community, sensitizing students to social issues, for their holistic development, and impact thereof during the year 2020-21
- Number of extension and outreach programs conducted by the institution through NSS/NCC/Red cross/YRC etc., (including the programs such as Swachh Bharat, AIDS awareness, Gender issues etc. and/or those organized in collaboration with industry, community and NGOs) during the year and Number of students participating in extensionactivities during year
- Sensitization of students and employees of the Institution to the constitutional obligations: values, rights, duties and responsibilities of citizens
- Institution celebrates / organizes national and international commemorative days, events and festivals

The College takes pride in commemorating the national and international days that mark the important aspect of historical events to instil a sense of patriotism and to promote nationalism among the staff and students' community. Important cultural festivals which introduce the rich cultural heritage of our ancient traditions are celebrated with pomp quietly. During this academic year 2020-21 the following days were celebrated.

- International yoga day (21st June)
- Republic day (26 January) 72nd Republic Day was celebrated patriotic fervour tocommemorate the adoption of activities of our constitution,
- Savitribai Phule birth anniversary (3rd January)
- Mahatma Gandhi's birth anniversary (2 October)
- Birth Anniversary of Babasaheb Ambedkar (14th April)
- Maharashtra Day (1st May)
- Independence Day (15th August)
- Birth anniversary of Mahatma Jyotiba Phule.
- The birth anniversary of Marutrao Ghule Patil. (15 September)
- Environment Day (5 June) world Environment Day celebrate in college teacher andstudents, this day we planted 100 plants in our campus.

Sr. No.	**Title of the Activities**	**Date of Program**	**Organizing unit / agency**	**No of Teachers coordinated such activities**	**No of Students participated in such activities**
1	Mahatma Gandhi and Lal Bahadur Shastri Jayanti	02-10-2020	National Service Scheme	5	25
2	Dr. A.P.J. Abdul Kalam Jayanti and Readingday	15-10-2020	Library	25	150
3	Teachers Day	05-09-2020	Student Welfare	25	20
4	Loknete Marutrao Ghule Patil Jayanti	15-09-2020	MGPS Education Society	45	300
5	Campus Cleaning	27-08-2020	National Service Scheme	30	200
6	Womens Day	08-03-2021	Jijamata Vidyarthini Manch	10	81

7	Savitribai Phule Jayanti	03-01-2021	National Service Scheme	20	90
8	Yoga Day	21-06-2020	Physical Education	60	170
9	Plantation in College Campus	20-08-2020	National Service Scheme	35	40
10	Maharashtra Day	01-05-2021	Student Welfare	40	25
11	Republic Day	26-01-2021	Physical Education	60	500
12	Birth Anniversary of Mahatma Jyotiba Phule	11-04-2021	National Service Scheme	25	110
13	Sadbhavna Din	30-01-2021	National Service Scheme	3	47
14	Covid-19 RTPCR Testing camp	11-02-2021	Physical Education	4	52
15	Covid-19 Awareness Lecture	28-10-2020	Physical Education	15	35
16	Covid-19 Protection disinfection of collegecampus	04-08-2020	Physical Education	5	0
17	Plantation in College Campus	04-07-2020	National Service Scheme	4	62
18	Blood Donation Camp	31-12-2020	National Service Scheme	3	48

2.0 ANALYSIS

2.1 GREEN AREA/ PLANTATION

Green area or plantation includes the plant, greenery and landscaping of the campus to enhance the environment of the area This will help to increase the beauty of the campus. The college area is diverse with a variety of plant species performing a variety of functions. Most of the plant species are planted through various plantation programmes organized by the college.

The plantation in college have increased the quality of life, not only in college campus but also the surrounding area in term of temperature control, contributing to improving air quality, soil conservation, water conservation and habitat for birds and small animals etc.

Many spices of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favorite of birds and many insects. Leaf – covered branches keep many animals, such as birds and squirrels, out of reach of predators.

A thick belt of large shady trees in the periphery of the college have found to be bringing down noise and cut down dust. Thus, the college has been playing a significant role in maintaining the environment of the entire surrounding area of college.

2.1.1 FLORA DIVERSITY

Table 9. List of plant species observed in the campus during the field visit

Sr No	Botanical Name	Local Name	Family	No of Plants	Type
1	*Acacia nilotica*	Babul tree	Fabaceae	7	Tree
2	*Adansonia digitata*	Gorakchinch	Bombacaceae	3	Tree
3	*Adathoda vasica*	Adulsa	Acanthaceae	5	Shrub
4	*Aegle marmelos*	Bel	Rutaceae	4	Tree
5	*Albizia julibrissin*	Silk plant	Fabaceae	2	Tree
6	*Alstonia scolaris*	Saptaparni	Apocynaceae	35	Tree
7	*Annona reticulata*	Ramphal	Annonaceae	4	Tree
8	*Annona squmosa L.*	Shitaphal	Annonaceae	49	Tree
9	*Araucaria columnaris J. R. Forst Hook.*	X-Mas tree	Araucariaceae	2	Tree
10	*Artocarpus heterophyllus*	Jackfruit/fanas	Moraceae	3	Tree
11	*Azadirachta indica*	Neem	Meliaceae	121	Tree
12	*Bambusa bamboo*	Bamboo tree	Poaceae	1	Tree
13	*Bauhinia racemosa*	Apta	Caesalpiniaceae	12	Tree
14	*Bauhinia variegate*	Raktakanchan	Fabaceae	17	Tree
15	*Bombax ceida*	Silk cotton tree	Malvaceae	2	Tree
16	*Bougainvillea spectabilis*	Kagadigulab	Nyctaginaceae	7	Shrub
17	*Butea monosperma*	Palas	Fabaceae	1	Tree
18	*Callistemon lanceollatus*	Bottle brush	Myrtaceae	7	Tree
19	*Calotropis giaganthe*	Ruie	Asclepiadaceae	15	Shrub
20	*Canna indica L.*	Kardal	Cannaceae	10	Shrub
21	*Capparis zeylanica*	Ceylon caper	Capparaceae	3	Tree
22	*Carica papaya*	Papaya	Caricaceae	9	Tree
23	*Cassia fistula*	Golden rain tree	Caesalpiniaceae	40	Tree
24	*Cassia marginata Roxb.*	Red cassia	Caesalpiniaceae	2	Tree
25	*Cassia siamea Lam.*	Yellow Cassia	Caesalpiniaceae	75	Tree
26	*Catharanthus roseus L.*	Sadaphuli	Apocynaceae	50	Shrub
27	*Clitoria ternatea L.*	Gokharna	Fabaceae	4	Tree
28	*Cocus nucifera*	Coconut	Aracaceae	46	Tree
29	*Cordia dichotoma G. Forst*	Bhokar	Boraginaceae	1	Tree
30	*Cuscuta refelxa Roxb.*	Amar bel	Convolvalaceae	2	Tree
31	*Cycas revolute*	Cycas	Cycadaceae	5	Tree

32	*Dalbergia sisso Roxb.*	Shisham	Fabaceae	59	Tree
33	*Delonix regia* (Box *ExHook)*	Gulmohar	Fabaceae	15	Tree
34	*Dypsis l utescens H. Wendl*	Areca palm	Arecaceae	10	Shrub
35	*Emblica officinalis*	Amla	Phyllanthaceae	7	Tree
36	*Eucalyptus lanceolatus*	Nilgiri	Myrtaceae	10	Tree
37	*Ficus benghalensis*	Wad/Banyan	Moraceae	7	Tree
38	*Ficus benjamina L.*	Weeping fig	Moraceae	27	Shrub
39	*Ficus elastic Roxb ex*	Rubber tree	Moraceae	2	Tree
40	*Ficus racemosa*	Umbar	Moraceae	3	Tree
41	*Ficus religiosa*	Pimpel	Moraceae	4	Tree
42	*Ixora coccinea*	Ixora/Rugmini	Rubiaceae	22	Shrub
43	*Lantana Camera*	Ghaneri	Verbenaceae	20	Shrub
44	*Leucaena leucocephala*	Subhabul	Fabaceae	16	Tree
45	*Limonia acidissima L.*	Kauth	Rutaceae	2	Tree
46	*Livistona chinensis*	Fan palm	Arecaceae	2	Tree
47	*Madhuca longifolia*	Sontharad	Sapotaceae	2	Shrub
48	*Mangifera indica*	Mango/Amba	Anacardiaceae	53	Tree
49	*Milingtonia hortensis*	Jasmine plant/Buuch	Bignoniaceae	22	Tree
50	*Mirabilis jalapa L.*	4 O clock plant	Nyctaginaceae	2	Shrub
51	*Murraya koenigii*	Kadipatta	Rutaceae	5	Tree
52	*Musa paradisiaca L.*	Banana	Musaceae	6	Tree
53	*Neolamarckia cadamba*	Cadamba	Rubiaceae	3	Tree
54	*Nephrolepis exaltata L.*	Fish bone Fern	Nephrolepidaceae	26	Shrub
55	*Nyctanthes arbor-tristis L.*	Parijaat	Oleaceae	3	Tree
56	*Parkinosonia aculeate L.*	Jelly bean tree	Fabaceae	2	Tree
57	*Peltophorum pterocarpum*	Soanmohar	Fabaceae	367	Tree
58	*Piper betle L.*	Banaras wel	Piperaceae	4	climber
59	*Pithcolombium dulce (Roxb)*	Vilayati Chinch	Fabaceae	1	Tree
60	*Plumeria obtuse*	chapha	Apocynaceae	5	Tree
61	*Polyalthia longifolia*	Ashoka	Annonaceae	108	Tree
62	*Pongania pinnata*	Karanj	Fabaceae	152	Tree
63	*Psidium guajava*	Peru	Myrtaceae	13	Tree
64	*Rauvolfia serpentine*	Sarpagandha	Apocynaceae	2	Tree
65	*Ricinus communis*	Castor	Euphorbiaceae	1	Shrub
66	*Roystone aregia*	Cuban royalpalm	Arecaeae	2	Tree
67	Samniea saman	Shiris	Mimoceaceae	7	Tree
68	*Santalum album*	Chandan	Santalaceae	6	Tree
69	*Saraka Indica*	Sitecha Ashok	Fabaceae	10	Tree

70	*Spathodia campanulata*	Fountain tree	Bignoniaceae	14	Tree
71	*Swetenia mahugani*	Mahoguni	Meliaceae	4	Tree
72	*Syzygium cumini L.*	Jambhul	Myrtaceae	10	Tree
73	*Syzygium cumini L.*	Jambhul	Myrtaceae	4	Tree
74	*Tabernaemontana divaricate R. Br.*	Chandanipat	Apocynaceae	4	Shrub
75	*Tamarindus indica*	Chinch, Imli	Fabaceae	49	Tree
76	*Tecoma stans L.*	Yellow bells	Bignoniaceae	38	Tree
77	*Tectona grandis*	Burma/ Saag	Lamiaceae	9	Tree
78	*Terminalia arjuna*	Arjun tree	Combretaceae	3	Tree
79	*Terminalia catappa L.*	Badam	Combretaceae	8	Tree
80	*Thespesia populnea*	Indian Tulip tree/Ranbhendi	Malvaceae	2	Shrub
81	*Thevetia peruviana*	Yellow Oleander	Apocynacae	21	Tree
82	*Thuja occidentalis*	Morpankhi	Cupressaceae	20	Tree
83	*Ziziphus jujuba*	Bore	Rhamnaceae	13	Tree
		Total		**1751**	

Total 67 tree species, 15 shrubs species and 1 climber species are observed in the college campus area.

- 1544 numbers of trees, 203 shrubs and 4 number of Climber are planted in college campus area.
- Good vegetation was observed at boundary of college.
- College actively participated in tree plantation Programme
- College conducted and participated in various Planation activity programs are being organized at college campus and surrounding villages through various activities of college.
- The plantation program includes various types of indigenous species of ornamental and medicinal wild plant species.







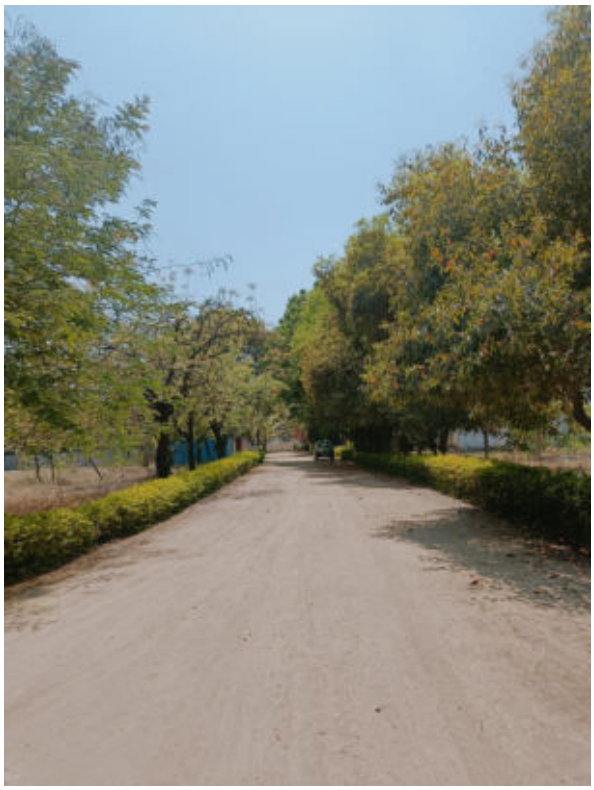












2.1.2 FAUNAL DIVERSITY

Birds;

Birds were studied by direct observation with the help of ‘‘Olympus 10 x 50 DPS I’’ binocular and were identified by adopting available literature (Grimmett et al. 1998). During the survey, 15 species of birds were noticed. The dominant birds were Indian myna, house crow, blue rock pigeon, etc. It has been observed that the majority of birds were insectivorous in habit preferring insects, worms and arachnids. None of these birds are endangered (Schedule I) as per Wildlife (Protection) Act 1972.

About 15 bird species was observed during the site visit.

Table 10. Avifauna in Campus area

SN	Common Name	Scientific Name	Conservation status as per Wildlife (Protection) Act 1972
1	Black kite	*Milvus migrans*	Sch – IV
2	Blue rock pigeon	*Columba livia*	Sch – IV
3	Cattle egret	*Bubulcus ibis*	Sch – IV
4	Common swallow	*Hirunds rustica*	Sch – IV
5	Crow pheasant	*Centropus sinensis*	Sch – IV
6	House crow	*Corvus splendens*	Sch – IV
7	House sparrow	*Passer domesticus*	Sch – IV
8	Indian black drongo	*Dicrurus adsimilis*	Sch – IV
9	Indian myna	*Acridotheres tristis*	Sch – IV
10	Koel	*Eudynamys scolopacea*	Sch – IV
11	Magpie robin	*Copsychus saularis*	Sch – IV
12	Purple sunbird	*Nactarinia asiatica*	Sch – IV
13	Red wattled lapwing	*Vanellus indicus*	Sch – IV
14	Redvented bulbul	*Pycronotus cafer*	Sch – IV
15	Small blue kingfisher	*Alcedo atthis*	Sch – IV

Butterflies

Study area comprises of 13 species of butterflies, dominated by Euploea core, Papilio demoleus, and Eurema hecabe Butterfly diversity and community composition are dependent on plants, as their caterpillars are highly specific to host plants on which they feed and metamorphose into the adults. Fairly good butterfly diversity in this area is conspicuous due to presence of wide varieties of flowering trees. Therefore, richness of host plant diversity contributes to butterfly diversity. None of these is endangered (Schedule I) as per Wildlife (Protection) Act 1972

Table 11.List of Butterflies in Campus area

SN	Common Name	Scientific Name	Conservation status as per Wildlife (Protection) Act 1972
1	Blue mormon	*Papilio polymnestor*	Not enlisted
2	Blue pansy	*Junonia orithya*	Not enlisted
3	Blue tiger	*Tirumala limniace*	Not enlisted
4	Chocolate pansy	*Junonia iphita*	Not enlisted
5	Ciliate blue	*Anthene emolus*	Not enlisted
6	Common evening brown	*Melanitis leda*	Not enlisted
7	Common grass yellow	*Eurema hecabe*	Not enlisted
8	Common Indian crow	*Euploea core*	Sch – IV
9	Common leopard	*Phalanta phalantha*	Not enlisted
10	Common mormon	*Papilio polytes*	Not enlisted
11	Gray pansy	*Junonia atlites*	Not enlisted
12	Lime butterfly	*Papilio demoleus*	Not enlisted
13	Plain tiger	*Danaus chrysippus*	Not enlisted

2.1.3 BOTANICAL GARDEN

Botanical garden is developed in 3000 sq.ft area in college campus. The garden has rich flora having approximately 63 Plant Species

The plants are of different ecological groups such as mesophytes, xerophytes, hydrophytes as well as it includes rock garden, pond ecosystem, oxy-park, medicinal plants, ornamental plants and various types of hedges and edges.

A botanical garden is an institution for botanical research, especially on the native flora of the region.



Botanical Garden

Functions of Botanical Gardens:

The botanical gardens are the natural source of science and culture. Functions of Botanical Gardens are as follows.

- Botanical gardens act as out-door laboratories.
- Initiate studies on the tropical and temperate ecosystems and their biota, before they are lost to science and preserve such systems.

- Serve as centres of gene pools or germplasm bank of wild relatives of economically important plants.
- Establish Nature centers and youth Museums to focus attention on destruction of tropical and temperate ecosystem, environmental degradation.





Table 12. List of plants in Botanical Garden

Plant No.	Botanical Name	Local Name	Family
1	*Eucalyptus lanceolatus*	Nilgiri	Myrtaceae
2	*Pongania pinnata*	Karanj	Fabaceae
3	*Azadirachta indica*	Neem	Meliaceae
4	*Spathodia campanulata*	Fountain tree	Bignoniaceae
5	*Mangifera indica*	Mango/Amba	Anacardiaceae
6	*Musa paradisiaca L.*	Banana	Musaceae
7	*Bombax ceida*	Silk cotton tree	Malvaceae
8	*Plumeria obtuse*	chapha	Apocynaceae
9	*Murrayakoenigii*	Kadipatta	Rutaceae
10	*Nephrolepis exaltata L.*	Fish bone Fern	Nephrolepidaceae
11	*Adathoda vasica*	Adulsa	Acanthaceae
12	*Cycas circianalis*	Cucus	Cycadaceae
13	*Asparagus racemosus*	Shatavari	Asparagaceae
14	*Vinca rosea*	Madagascar periwinkle,	Apocynaceae
15	*Origanum majorama*	Marjoram	Lamiaceae
16	*Bougainvillea spectabilis*	Kagadigulab	Nyctaginaceae
17	*Cassia fistula*	Golden rain tree	Caesalpiniaceae
18	*Lantana Camera*	Ghaneri	Verbenaceae
19	*Bauhinia variegate*	Raktakanchan	Fabaceae
20	*Catharanthus roseus L.*	Sadaphuli	Apocynaceae
21	*Araucaria columnaris J. R. Forest Hook.*	X-Mas tree	Araucariaceae
22	*Callistemon lanceollatus*	Bottle brush	Myrtaceae
23	*Terminalia catappa L.*	Badam	Combretaceae
24	*Canna indica L.*	Kardal	Cannaceae
25	*Tabernaemontana divaricate R. Br.*	Chandanipat	Apocynaceae
26	*Piper betle L.*	Banaras wel	Piperaceae
27	*Ficus racemosa*	Umbar	Moraceae
28	*Thuja occidentalis*	Morpankhi	Cupressaceae
29	*Aegle marmelos*	Bel	Rutaceae
30	*Santalum album*	Chandan	Santalaceae
31	*Cocus nucifera*	Coconut	Aracaceae
32	*Rauvolfia serpentine*	Sarpagandha	Apocynaceae
33	*Swetenia mahugani*	Mahoguni	Meliaceae
34	*Cycas revolute*	Cycas	Cycadaceae
35	*Manilkara zapota*	Chikoo	Sapotaceae
36	*Psidium guajava*	Peru	Myrtaceae
37	*Peltophorum pterocarpum*	Soanmohar	Fabaceae
38	*Butea monosperma*	Palas	Fabaceae

39	*Costus pictus*	costus	Coastaceae
40	*Ocimum sanctum*	Tulas	Lamiaceae
41	*Cymbopogon citrates*	Gavati Chaha	Poaceae
42	*Hibiscus rosa-sinesis*	Jaswand	Malvaceae
43	*Zamia pygmaea*	guayra,	Cyacadaceae
44	*Ficus panda*	Nandhrukha	Moraceae
45	*Nerium olender*	Kanher	Apocynaceae
46	*Jatropha integerrimo*	Jatropha	Eophorbiaceae
47	*Mentha spicata*	Pudina	Lamiaceae
48	*Thunbergia grandiflora*	Motha Pandhara	Acanthaceae
49	*Agave americana*	Ghaypat	Asparagaceae
50	*Putranjiva roxburghii*	Putrajivi	Putranjivaceae
51	*Sansevieria trifasciata*	snake plant	Asparagaceae
52	*Pedilanthus tithymaloides*	nival	Euphorbiaceae
53	*Terminalia chebula*	Hirda	Combretaceae
54	*Terminalia bellirica*	Behada	Combretaceae
55	*Commiphora wightii*	guggul	Burseraceae
56	*Opuntia elatior*	Phadya Nivadung	Cactaceae
57	*Ananas comosus*	Ananus	Bromeliaceae
58	*Ruta graveolenus*	Rue	Rutaceae
59	*Cupressus macrocarpa*	saru	Cupressaceae
60	*Ravenala madagascariensis*	Travellers Palm	Strelitziaceae
61	*Caryota mitis*;	Fish tail palm	Arecaceae
62	*Plumeria pudica*	Nag champa	Apocynaceae
63	*Casuarina equisetifolia;*	Suru	Casuarinaceae

Table No 13. List of Medicinal plants in Botanical Garden

Sr. No.	Name of the plant	Local name	Family	Plant part used
1	*Eucalyptus lanceolatus*	Nilgiri	Myrtaceae	Leaves, bark
2	*Aegle marmelos*	Bel	Rutaceae	fruits
3	*Rauvolfia serpentine*	Sarpgandha	Apocynaceae	Roots, Fruits,leaves
4	Asparagus racemosus	Shatavari	Asparagaceae	Roots
5	*Adathoda vasica*	Adulsa	Acanthceae	leaves
6	Vinca rosea	Sadaphuli	Apocynaceae	leaves
7	*Origanum majorana*	Marwa	Lamiaceae	Leaves
8	*Ocimum sanctum*	Tulas	Lamiaceae	Leaves

9	*Cymbopogon citrates*	Gavati chaha	Poaceae	leaves
10	Mentha spicata	Pudina	Lamiaceae	Leaves
11	*Azadirachta indica*	Neem	Meliaceae	Leaves,stem,fruit
12	Terminalia chebula	Hirda	Combretaceae	Fruits
13	*Terminalia bellirica*	Beheda	Combretaceae	fruits
14	C*ommiphora wightii*	Guggul	Burseraceae	friuts
15	*Aloe vera*	korphad	Asphodelaceae	Leaves
16	*Murraya koenigii*	Kadipatta	Rutaceae	Leaves
17	*Pelargonium citrosum*	Odomus plant	Geranaceae	Leaves
18	*Pelargonium hortorum*	Geranium plant	Geranaceae	Leaves
19	*Ruta grareolens*	Satapa	Rutaceae	Entire plant
20	*Pandanus odorifer*	Kewda	*Panadanaceae*	fruit
21	*Chlorophytum borivilianum;*	Safed Musli	Asperagaceae	Roots
22	*Acorus calamus;*	vekhand	*Acoraceae*	fruit

2.2.4 RECOMMENDATIONS

- Review yearly the list of trees planted in the college campus, and allots numbers to the trees along with scientific /botanical and local/common name to the trees.
- Select endemic or local species for the planation.
- Considerations for selection of plant species:
    - Plant species which shows higher adaptability to local climatic and edaphic conditions
    - Plants that show vigorous growth, and higher forage value
    - Plants having ability of fixing nitrogen
    - Preferably indigenous, endemic and rare species
    - Plant that serves as nesting, feeding and breeding site for fauna
    - Plants species having high fodder and fuel value
    - Plant that enhances the aesthetics of the surrounding areas
    - Plants species having importance in soil binding
    - Plant species with different height, growth habits and bole shapes
    - Species tolerant to specific conditions or capacity to endure water stress and climatic extremes after initial establishment
    - Economically important plant species.
- Avoid plantation of exotic plant species in college campus.
- Promote environmental awareness as a part of course work in various curricular areas, independent research projects, and community service.
- Conduct small workshop or training programme for the students on medicinal plants
- Establish a College Environmental cell that will take responsibility for the whole environment of the college campus.
- Establish Environment Policy for the environment conservation nd protection of college.
- The Environmental cell shall be the source of advice and guidance to staff and students on how to implement this Policy.
- Conduct six monthly internal audit to ensure that implementation of activities for the environment planned for the year, action is taken on the basis of audit report, recommendation and findings.

- Celebrate every year 5th June as ‘Environment Day’, wildlife week and plant trees on this day to make the campus more Green.
- Establish Green library for the students.
- Prepare five-year planation Programme /Plan in consultation with management and students.
- Establish nature club
- Organize exhibitions like plant painting, flower painting, flowers, posters etc.
- Develop seed bank under botanical garden programme

2.2 WATER & WASTE WATER MANAGEMENT

Water is a natural resource all living things are depend on water. We need to use water wisely to ensure that drinkable water is available for all, now and in the future. Water auditing is conducted for the evaluation of facilities of water requirement,

SOURCES AND FACILITIES FOR WATER TREATMENT AND ITS REUSE.

2.2.1 WATER REQUIREMENT

In college campus following main uses of water

Main water uses in the campus

- Drinking
- Lab
- Cleaning
- Toilets
- Washing
- Office uses
- Garden

Water source: Mula right bank canal & Grampanchayat Bhenda.

Water tank having capacity of 1 lakh litr is constructed by college



Water requirement for year 2020-21 is calculated based on the number of students, staff & garden area etc. due to covid 19 50% Students and staff was present.

Sr No	Details	Number	Water Requirement per head lit/day as per NBC Norms 2016			Total Lit/day
			Domestics	Flushing	Total	
1	**Students**	742	25	20	45	33390
2	**Staff**	50	25	20	45	2250
3	**Hostel for Girls & Boys**	220	90	45	135	14850
4	**Staff Quarter**	50	90	45	135	6750
						54990

*Estimation of water requirement for drinking and domestic use as per NBC 2016, BIS

1	**Domestic water**	54990lit/day
2	**Department/ Laboratory Use Chemistry, Botany & Zoology**	2000 lit /day
3	**Garden & Lawn**	6000 lit /day
	Total Water	6299 l0 it/day (62.99 M3/day)

- The total quantity of water required for drinking, flushing and laboratory use and gardening purposes is assessed is assessed as 63 liters per day.
- Area under plantation is about 30 % of total area of institute (31.65 acre) but most of the plants are more than 10-15 years old so that no need of daily water for those plants. Only garden, lawn and botanical garden required daily water.
- For hygienic drinking water, Water is treated at water treatment plant by Sugar Factory and provided to college.

2.2.2 WASTE WATER GENERATION & TREATMENT

- Total 85 m3/day sewage is generated. Generated sewage is treated through Septic tank. Over flow of septic tank is used for the gardening.
- Septic tanks are provided to treat the generated sewage.
- No treatment is provided to waste water generated from laboratories

2.2.3 WATER CONSERVATION

- Roof top Rain water harvesting system is installed and water collected at natural tank behind the Main Building of college. Collected water will be used for gardening after rainy season in month of October to December.



Natural Pond for Rain Water Storage

- Rain water is collected at 2000 lit capacity tank and are using for the chemistry department laboratory.



Rain water harvested at Tank

Rainwater Harvesting Calculations

- Area for Rainwater Harvesting = 2870 SQ. M
- Average Seasonal Rainfall in Newasa Taluka from last five year = 531 MM OR 0.531 M
- Run-Off Co-Efficient = 0.9
- Rain water harvesting potentional = 0.531 x 2870 x 0.9 = 1371 CU. M

2.3.4 RECOMMENDATION

- Installed sewage treatment plant having capacity of 90CMD and recycle the treated water for flushing and gardening.
- Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.
- In order to use the treated waste water for flushing a separate plumbing system should be provided.
- Drip irrigation system should be provided to Gardens to minimize water use.
- Liquid waste generated from laboratory should not be disposed off without any treatment.
- Fixture for toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor-based control.
- Prepare Detailed rain water harvesting plan and implement in next five year to reduce the raw water requirement.
- Water quality analysis should be carried through NABL or MOEF accredited laboratory for monthly or quarterly basis.

2.3 SOLID WASTE MANAGEMENT

To reduce waste in the college campus, recycling efforts are taken. Waste is collected and segregated properly. Students, faculty, and staff are aware and educated on proper waste management practices such as waste source and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste is divided into two categories: dry waste and wet waste

- Wet waste: biodegradable waste
- Dry waste: no Biodegradable waste

2.3.1 WASTE GENERATION IN COLLEGE CAMPUS

Category	Quantity kg/day	Disposal
Paper Waste	5	Sale to Vendor for recycling
Plastic waste	4	Sale to Vendor for recycling
Glass waste	0.50	Sale to Vendor for recycling
Metal waste	2.0	Sale to Vendor for recycling
Canteen waste (Food waste)	20	Vermi composting and used as manure for garden
Garden waste	120	Vermi composting and used as manure for garden

2.3.2 OBSERVATIONS

- The waste generated in the campus includes glass, metals, wrappers, paper, plastics, etc. Old newspapers, used papers and journal files, workshop scrap etc. are given for recycling to external agencies.
- Glass, metals, plastic and other non-biodegradable wastes are given to external agencies where they are segregated and disposed/ recycled according to the nature of the waste.

- Biodegradable waste: Leaf litter& food waste is decomposed in composting unit of College.
- Plastic waste sends to the recycling vendor. Apart from dry solid waste, the campus generates an average of 120kgs of organic waste per day and 20 kgs of processed food waste per day from canteen.
- In garden a unit of Vermicompost also established which is essential for production of vermicompost and vermiwash as an organic manure which is used as fertilizer for various plants in the garden. Vermi composting plant is in operation in the campus. Food Waste from collage and canteen is mix with leaf litter and use for the Vermi composting. Vermi compost is used for plants as manure.
- Clean and neat College campus was observed during the visit.



2.3.3 RECOMMENDATIONS

- Segregate dry and wet waste separately

- Reduce the waste generation from students, college staff, departments and offices.
- Display the awareness board of solid waste
- Send all recycling waste glass, cans, white, coloured and brown paper, plastic bottles, batteries, print cartridges, cardboard and furniture to recycling facility or authorized vendor.

2.4 E –WASTE

E- waste is becoming major thread to the whole world. Its toxic emissions mixed with virgin soil and air and causing harmful effects to the entire biota either directly or indirectly. Direct impacts include release of acids, toxic compounds including heavy metals, carcinogenic chemicals and indirect effects such as bio magnification of heavy metals

2.6.1 OBSERVATIONS;

E-waste generated in the college campus is very less in quantity. The E-waste and defective item from computer laboratory is being stored properly. The college management has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner.

2.6.2 RECOMMENDATIONS:

- Recycle or safely dispose of computers and electrical equipment's.
- Use reusable resources and containers and avoid unnecessary packaging where possible.
- Always purchase recycled resources where these are both suitable and available.

2.5 ENVIRONMENT MONITORING

2.5.1 AMBIENT AIR QUALITY

Ambient air quality monitoring was carried out in the college campus to understand the air quality of the campus.

Ambient air quality monitored at one location (i.e at infront of college) in the campus. The concentrations of PM10, PM2.5 , SO2 and NOX samp les were collected as 24 hourly average by drawing air at the rate of 1.0 -1.5 m3/min through glass fibre filter paper and analyzing by the gravimetric method. Concentrations of SO2 and NOX were analyzed by absorption & colorimetric method. Pre-calibrated fine dust particulate samplers were used for monitoring of PM10 & PM2.5.

The results are given below Table

Sr No	Parameters	Results	Units	NAAQS 24hrs
1	Dry Bulb Temperature	32	^{0}C	
2	Relative Humidity	64	%	
3	Sulphur Dioxide (SO2)	13.5	µg/m3	≤80
4	Oxide of Nitrogen (NOx)	18	µg/m3	≤80
5	Particulate Matter PM10	55.0	µg/m3	≤100
6	Particulate Matter PM2.5	17.8	µg/m3	≤60
7	Carbon Dioxide	0.5	mg/M3	≤4

Analysis report is enclosed as annexure I

The above results show the concentrations of PM_{10} $PM_{2.5}$, SO_2 NO_x and CO were found within the National Ambient Air Quality Standards (NAAQ).

Analysis result report is enclosed as annexure I

2.5.2 WATER QUALITY

Result of Drinking Water quality:

Sr No.	Parameter	Units	Results	Limits as per IS 10500:2012
1	Color	Hazen	Clear	≤5
2	Odor	-	Agreeable	Agreeable
3	Turbidity	NTU	<1	≤1
4	TDS	Ppm	66.0	≤500
5	pH	-	7.3	6.5-8.5
6	Total hardness as Caco3	mg/lit	33.2	≤200
7	Iron as Fe	mg/lit	<0.13	≤0.3
8	Chlorides as Cl	mg/lit	10.8	≤250
9	Residual Chlorine	mg/lit	<0.1	≤0.20
10	Calcium (as Ca)	mg/lit	9.8	≤75
11	Magnesium (as Mg)	mg/lit	6.0	≤30
12	Sulphate	mg/lit	4.0	≤200
13	Nitrate	mg/lit	<0.2	≤45
14	Total Coliform	MPN/100ml	Absent	Absent
15	E.Coli	Per /100 ml	Absent	Absen

Analysis result report is enclosed as annexure I

2.5.3 NOISE LEVEL

Ambient noise standards are prescribed for residential, commercial and industrial areas and silence zone vide 'The Noise Pollution (Regulation and control) Rules, 2000, notified by the MoEF&CC on 14th February, 2000 and amended thereof. The ambient noise standards have been stipulated during day time (6 am to 9 pm) and night time (9 pm to 6 am) keeping in the view the different sensitive and the resultant impacts at community level during these periods.

The ambient noise levels were monitored at 2 selected locations within the campus during day and night time. Educational Institute come under silence zones. But the college area is located adjacent to Village Road

Equivalent noise levels during day and night, The Noise quality monitoring Station presented in Table below

Sr No	Location	DAY Leq	NIGHT Leq
ANQ 1	College –Main Building	**52.4**	**40.9**
ANQ 2	College gate	**51.6**	**41.4**

Analysis result report is enclosed as annexure I

Noise level observed at two locations in day time and night time were found to be well within the limit.

2.5.4 Soil Quality Report:

Sr no	Parameters	Results	Units
1	Percentage of different Components		
	Sand	36	%
	Silt	22	%
	Clay	42	%
2	Soil Moisture	15.0	%
3	Bulk Density	2.0	
4	Water Holding capacity	54.2	%
5	pH	7.8	
6	Conductivity	265	µs/cm

7	Organic Carbon	3.0	%
8	Calcium (as Ca)	35.0	mg/kg
9	Magnesium (as Mg)	24.2	mg/kg
10	Total Kjeldhal Nitrogen	0.65	%
11	Phosphorous (as P)	17.5	Kg/ka
12	Potassium (as K)	47.1	Kg/ha
13	Iron as fe	4.6	mg/kg

Analysis reports are attached as I

3.0 CONCLUSION

Green and environment audit is the powerful tool to identify the strength and weakness of college in environment area.

This audit is one kind of scientific and professional approach towards accountability in utilization of resources. Green audit is helpful to the college for the identifying, evaluating and managing environmental risks and improvement in waste management, energy, water management etc.

Output of the green audit report in each area will be serve as a guide for educating the college community on the environment related practices and resource usage at the college as well as spawn new activities and innovative practices.

Important Suggestions

- Adopt an environmental policy for the college
- Establish Environment management Committee of the college.
- Establish a purchase policy for Eco friendly materials
- Conduct seminars and group discussions on environmental education and environment protection
- Conduct Regular Green and Environment audit
- Involve Students and staff in local environmental problems to solve along with local body and people.
- Establish sewage Treatment system.

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TEST REPORT

Report No:	**EHSM/2021/Dec/R-414**	**Issue Date**	**11/12/2021**
Name and Address of Customer	**Jijamata college of Science and Arts DnyneshwarnagarBhende (BK), Tal-Newasa in Ahmednagar District Maharashtra**		
Sample Name	Air	**Sample Description**	Ambient Air
Date of Sampling	07/12/2021	**Sampling duration**	1440 Min
Sampling Location	Near Main Gate	**Sampling Procedure**	CPCB Guideline for measurement of Ambient Air pollutants Volume I
Dry bulb temperature	32°C	**Wet bulb temperature**	28°C
Relative Humidity	64 %	**Sampling done by**	EHS Matrix Pvt Ltd, Pune
Start Date of Analysis	08/12/2021	**End Date of Analysis**	11/12/2021

Results

Sr. No.	Parameters	Results	Unit(s)	Specifications (NAAQ Standards)	Methods
1	Sulphur Dioxide(SO_2)	13.5	µg/m³	≤ 80	IS 5182 (Part 2)
2	Oxides of Nitrogen(NO_2)	18.0	µg/m³	≤ 80	IS 5182 (Part 6)
3	Particulate Matter PM_{10}	55.0	µg/m³	≤ 100	CPCB Guideline for measurement of Ambient Air pollutants Volume I
4	Particulate Matter $PM_{2.5}$	17.8	µg/m³	≤ 60	
5	Carbon Monoxide (CO)	0.5	mg/m³	≤ 04	
6	Ozone(O_3)	21.0	µg/m³	≤ 180	
7	Lead (Pb)	BDL	µg/m³	≤ 01	
8	Arsenic(As)	BDL	ng/m³	≤ 06	
9	Nickel(Ni)	BDL	ng/m³	≤ 20	
10	Ammonia(NH_3)	BDL	µg/ m³	≤ 400	
11	Benzo(a)Pyrene(BaP)	BDL	ng/ m³	≤ 1.0	
12	Benzene(C_6H_6)	BDL	µg/ m³	≤ 05	IS 5182 (Part 11)

Remark- All above results are within National Ambient Air Quality standards.
BDL – Below Detectable Limit.

Checked by
Miss. Aishwarya Shetty
(Technical Manager)

EHS Matrix Pvt. Ltd. PUNE

Authorized Signatory
Mr Rahul Patil
(Director)

Laboratory Recognized by Ministry of Environment, Forest (MoEF) & Climate Change (CC) Govt. of India.
S.O. 3511 (E), Dated 24th August 2021 valid till 9th September 2023.

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CERTIFICATIONS :
ISO 9001 : 2015
ISO 14001 : 2015
ISO 45001 : 2018

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TEST REPORT

Report No:	**EHSM/2021/Dec/R-415**	**Issue Date**	**11/12/2021**
Name and Address of Customer	**Jijamata college of Science and Arts DnyneshwarnagarBhende (BK), Tal-Newasa in Ahmednagar District Maharashtra**		
Sample Name	Noise	**Sample Description**	Ambient Noise
Date of Sampling	07/12/2021	**Sampling duration**	Spot Time
Sampling done by	EHS Matrix Pvt Ltd, Pune		

Results

Sr. No.	Locations	Results dB(A) Day	Results dB(A) Night	Specifications (CPCB Standards dB(A)	Methods
1.	Near Main Gate	52.4	40.9	55/45	CPCB Guideline
2.	College Main Building	51.6	41.4		

Remark-

- All above Noise level results are within Central Pollution Control Board Standards limit.
- Day/Night -55/45dB.

Checked by
Miss. Aishwarya Shetty
(Technical Manager)

EHS Matrix Pvt. Ltd. PUNE

Authorized Signatory
Mr. Rahul Patil
(Director)

Page 01 of 01

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TEST REPORT

Report No:	**EHSM/2021/Dec/R-416**	**Issue Date**	**11/12/2021**
Name and Address of Customer	**Jijamata college of Science and Arts DnyneshwarnagarBhende (BK), Tal-Newasa in Ahmednagar District Maharashtra**		
Sample Name	Water	Sample Description	Drinking Water
Date of Sampling	07/12/2021	**Sampling Time**	11.10 AM
Sampling Location	College Building	**Sampling Procedure**	APHA 1060
Sampling done by	EHS Matrix Pvt Ltd, Pune	**Sample Quantity**	02 lit
Start Date of Analysis	08/12/2021	**End Date of Analysis**	11/12/2021

Results

Sr. No.	Parameters	Results	Limits as per Is 10500:2012	Unit(s)	Methods
1	Colour	Clear	<5	Hazen	IS : 3025 (Part 4):1983
2	Turbidity	<1	<1	NTU	IS : 3025 (Part 10):1984
3	pH at 25^{0}C	7.3	6.5 to 8.5	--	APHA 4500 H+ A, 23rd Ed.2017
4	Total Dissolved Solids TDS	66.0	<500	mg/lit	APHA 2540 C, 23rd Ed.2017
5	Total Hardness	33.2	<200	mg/lit	IS 3025 (Part 21):2009
6	Total Alkalinity	21.0	<200	mg/lit	IS 3025 (Part 23):1986
7	Sulphate (as SO_4)	5.3	<200	mg/lit	IS 3025 (Part 24):1986
8	Chloride(as Cl)	10.8	<250	mg/lit	APHA 4500 Cl 23rd Ed.2017
9	Nitrate (as NO_3)	<2.0	<45	mg/lit	IS : 3025 (Part 34):1988
10	Fluoride (as F)	<0.1	<0.1	mg/lit	IS : 3025 (Part 23):1983
11	Residual Chlorine	<0.1	<0.2	mg/lit	IS : 3025 (Part 26):1986
12	Calcium (as Ca)	9.8	<75	mg/lit	IS 3025 (Part 40) 1991
13	Magnesium (as Mg)	6.0	<30	mg/lit	IS 3025 (Part 46) 1994
14	Iron (as F)	<0.13	<0.3	mg/lit	AAS Method
15	Total Coliform	Absent	Absent	MPN/100ml	IS 1622:1981
16	E.coli.	Absent	Absent	MPN/100ml	IS 1622:1981

- **Remark-The above water sample is Comply with required limit as per 10500:2012.**
- **For Total Coliform &*E.coli*. <2 can be consider as Zero [Refer IS: 1622 (R.A.1996), Table No.-4].**

Checked by
Miss. Aishwarya Shetty
(Technical Manager)

EHS Matrix Pvt. Ltd. PUNE

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Mr Rahul Patil
(Director)

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TEST REPORT

Report No:	**EHSM/2021/Dec/R-417**	**Issue Date**	**11/12/2021**
Name and Address of Customer	**Jijamata college of Science and Arts DnyneshwarnagarBhende (BK), Tal-Newasa in Ahmednagar District Maharashtra**		
Sample Name	Soil	**Sample Description**	Soil
Date of Sampling	07/12/2021	**Sampling Time**	12.00 PM
Sampling Location	Project Site	**Sampling Procedure**	--
Sampling done by	EHS Matrix Pvt Ltd, Pune	**Sample Quantity**	01 kg
Start Date of Analysis	08/12/2021	**End Date of Analysis**	11/12/2021

Results

Sr. No.	Parameters	Results	Unit(s)	Methods
1	Soil Texture			Manual Of Soil Testing
	a)Sand	36	%	
	b) Slit	22	%	
	c)Clay	42	%	
2	pH at 25^{0}C	7.8	--	IS 2720(Part 26) 1987
3	EC at 25^{0}C	265.0	µS/cm	IS 14767 : 2000
4	Moisture Content	15.0	%	Manual Of Soil Testing
5	Organic Carbon	3.0	%	IS 2720(Part 22) 1972
6	Bulk Density	2.0	gm/cm^2	Manual Of Soil Testing
7	Phosphorus as (P)	17.5	kg/ha	Manual Of Soil Testing
8	Total Kjeldhal Nitrogen	0.65	%	Manual Of Soil Testing
9	Water Holding Capacity	54.2	%	Manual Of Soil Testing
10	Calcium as (Ca)	35.0	mg/kg	Manual Of Soil Testing
11	Magnesium as (Mg)	24.2	mg/kg	Manual Of Soil Testing
12	Lead (as Pb)	<0.4	mg/kg	Manual Of Soil Testing
13	Iron (as Fe)	4.6	mg/kg	Manual Of Soil Testing
14	Manganese (as Mg)	24.0	mg/kg	Manual Of Soil Testing
15	Potassium (as K)	47.1	kg/ha	Manual Of Soil Testing

Checked by
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TEST CERTIFICATE

Report No: EHSM/2021/Dec/R-418	**Date of Report**	11/12/2021
Client Name and Address: Jijamata college of Science and Arts DnyneshwarnagarBhende (BK), Tal-Newasa in Ahmednagar District Maharashtra	**Date of Sampling**	07/12/2021
	Start Date of Analysis	08/12/2021
	End Date of Analysis	11/12/2021
	Sample Details	Manure
	Nature of sample	Solid
Sample Collected By	EHS Matrix Pvt Ltd, Pune	

Compost Analysis Report

Sr. No.	Parameter	Result	Limit As per FCO	Unit(s)
1.	PH	7.6	6.5-7.5	--
2.	Moisture	20.9	≤ 25	%
3.	Colour	Blackish Brown	Dark Brown to Black	--
4.	Odour	Absence of foul smell	Absence of foul smell	--
5.	Bulk Density	0.89	≤ 1.0	gm/cm^3
6.	Total Organic Carbon	21.0	≥ 14	%
7.	Total Nitrogen as N	1.30	≥ 0.8	%
8.	Total Phosphate as P_2O_5	0.59	≥ 0.4	%
9.	Potash, as K_2O	0.60	≥ 0.4	%
10.	C:N Ratio	19.4	≤ 20:1	--
11.	Particle Size	87 % pass through 4.0mm Sieve	Min 90% material pass through 4.0 mm IS sieve	%

Checked by
Miss. Aishwarya Shetty
(Technical Manager)

EHS Matrix Pvt. Ltd. PUNE

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CERTIFICATIONS :
ISO 9001 : 2015
ISO 14001 : 2015

CERTIFICATE

GREEN & ENVIRONMENT AUDIT

This is to certify that **Jijamata College of Science and Arts, Dnyneshwarnagar, Bhende (BK), Tal-Newasa, Dist -Ahmednagar** has successfully undergone **Green & Environment Audit** for year 2020-21



Date : 26th January 2021

Dr. Adhikrao Yewale
Universe Environment Consultancy, Pune

DETAILED ENERGY AUDIT REPORT

Year 2020-21

Prepared for

Shri.Marutrao Ghule Patil Shikshan Santha'

Jijamata College of Science and Arts,

Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar



Prepared by

HITECH ENERGY SERVICES

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Abbreviations

Abbreviations	Full Form
°C	Degree Centigrade
A	Ampere
AC	Alternating Current
Avg.	Average
CFM	Cubic Feet per Minute
CMH	Cubic Meter per Hour
DB	Distribution Board
DG	Diesel Generator
Dia.	Diameter
hr.	Hour
I	Current
kCal	Kilo Calories
Kg.	Kilogram
kVA	Kilo Volt Ampere
kVAr	Kilo Volt Ampere Reactive
kW	Kilo Watts
kWh	Kilo Watt Hour
M or m	Meter
Max.	Maximum
M/c	Machine
MD	Maximum Demand
Min.	Minimum
SES	SES Energy Services Ltd.
Mm	Millimetre
MTs	Metric Tons
No.	Number
p.a.	Per Annum
PF	Power Factor
Sec.	Second
SEC	Specific Energy Consumption
THD	Total Harmonics Distortion
TPA	Tons per Annum
TPD	Tons per day
Temp.	Temperature
V	Voltage
VFD	Variable Frequency Drive
JCSA	Jijamata College Of Science And Arts
PEA	Pioneer Energy Auditor
yr.	Year

HIGHLIGHTS OF THE REPORT

A. JIJAMATA COLLEGE OF SCIENCE AND ARTS

- Year of Energy Audit : 2020-21
- Location : Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar

B. Energy Scene

- Energy source : MSEDCL
- Total annual electricity bill : RS. 13.90 lakh (Jun 20 - May 21)
- Major connected load : Computers, Lighting, Fan,

C. Key Result Areas for Energy Savings & Estimated Potential along with Broad Cost Benefit:

Sr. No.	Energy Saving Areas	Estimated Investment (Rs. Lakhs)	Estimated Energy Saving Potential (Rs.)	Simple Payback Period (Months)	Remark
1	Electricity Bill Analysis	0.027	0.311	1.0	Short term
2	Replacement of 20 Watt FTL with New 15 Watt Led Tube Light	1.35	0.451	36.0	Long term
3	Solar PV System for Fan and Computer	22.5	9.89	27.3	Long Term
4	Replacement of Old AC with New Inverter Air Conditioner AC	0.35	0.423	9.9	Short Term
5	Replacement of Fan with New Energy Efficient Fan	4.56	2.91	18.8	Mid Term
	Total	**28.78**	**13.98**	**24.0**	--

Payback period =Investment /revenues x 12 Months

ACKNOWLEDGEMENTS

An energy audit study is a joint venture exercise of consultant and industry to account & contain energy usage without sacrificing the purpose of energy use. The contribution of industry team is equally important in this venture. Team of technical experts of M/s. Hitech Energy Services, Pune appreciates the keen interest shown by the management of M/s.Jijamata College of Science and Arts. for their kind co-operation, furnishing required data, analysis reports and hospitality offered during our visits.

Dr. Saswade Ramkisan Raghunath	:	Hon.Principle
Dr. Navgire Madhukar Eknath	:	Coordinator/ IQAC
Dr. Lande Kakasaheb Abasaheb	:	Member
Prof. Naik Dhirsing wahrya	:	Member
Prof. Ghare Pravin Devram	:	Member
Dr. Gedam Ajit Kashinath	:	Member
Prof. Nawale Rohan Vijaykumar	:	Member
Shri. Gaikwad Dattatraya Bhausaheb	:	Member

We are also thankful to the other staff members who were actively involved while collecting operating data and conducting the field studies.

Chapter 1

INTRODUCTION

1.1 Preamble

- M/s.Jijamata College of Science and Arts., Bhende having 58 KVA Contract demand and 53 KVA is maximum peak in the Jun 2020.
- This energy audit report for JCSA presents the analysis of the data collected, observations made and field trials undertaken. It is governed by the objectives, scope of work, and methodology discussed in ensuing paragraphs.

1.2 Objectives

- To undertake an energy audit at JCSA so as to identify areas for energy saving, both without and with investment.

- To prioritize distinct areas identified for energy savings depending upon saving potential, skills, and time frame for execution, investment cost, paybacks etc.

1.3 Methodology

- Pioneer Energy Auditor deputed following team of experts for conducting the study and worked in close association with JCSA personnel.

➢ Mr. Pradeep Thakur (Certified Energy Auditor)

➢ Hitech Energy Services submitted an execution work plan for the assignment for which client provided relevant data support.

- Client nominated specific persons from engineering / maintenance sections along with a co-ordinator of senior managerial level for this audit.

- HES undertook an "Orientation Meeting" with management / engineering / maintenance personnel prior to start of the audit.

- HES's team conducted all necessary field trials and measurements.

- HES provided all the instruments necessary for conducting the field trials.

- HES's team used following instruments;

Table 1: Instruments Used by Energy Audit Team

Sr. No.	Instrument Name	Specification
1.	Power Analyzer	Suitable for 1φ, 3φ. 156 electrical parameters like voltage, current, frequency, harmonics, active & reactive power, power factor etc.
2.	Clamp-on Power Meter	0 - 1200 kW 0 - 600 Voltage, AC 0 - 800 Voltage, DC 0 - 2000 A, Current, AC / DC
3.	Lux Meter	0 - 50,000 lux level Non Contact Type
4.	Digital Thermo Anemometer	0 - 45 m / sec. ± 3%
5.	Relative Humidity and Temperature Indicator	RH – 10% to 95% Temp. – 0 – 100 °C Handheld unit
7.	Infrared Thermometers	40 ^{0}C to 500 ^{0}C
8.	Portable Temperature Indicator	50 ^{0}C to 1200 ^{0}C

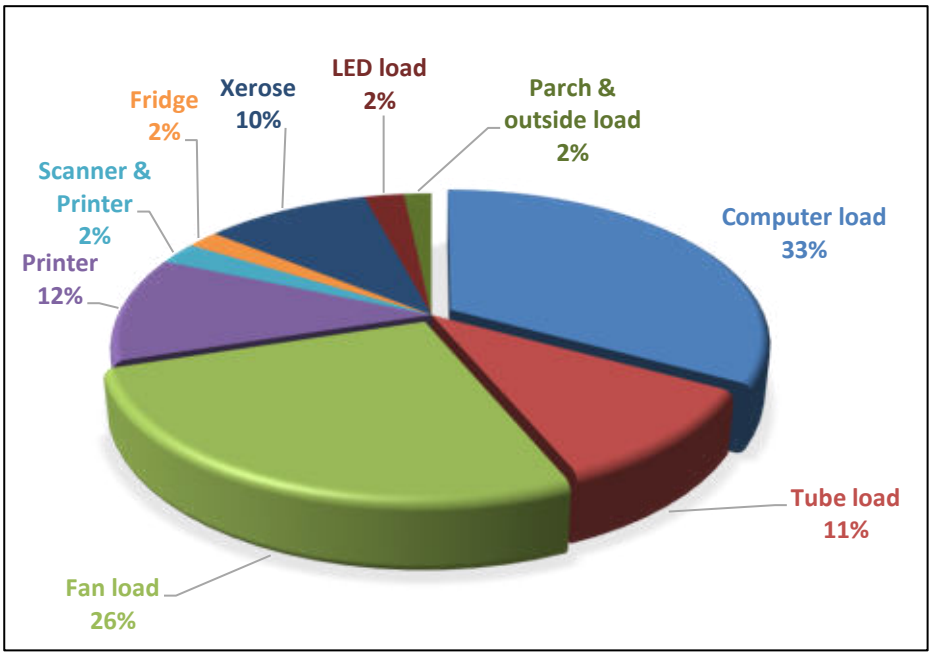
Chapter 2

BACK DROP ON ENERGY SCENE

2 Electrical Energy Share

- The primary source of electrical power for the bank is from the MSEDCL Grid with contract demand of 58 KVA.
- Major electrical energy consumers at the bank have been shown in below figure. As can be noted the water heaters, air conditioners, celling fan, Lighting The study involved analysis the actual major consumers followed by energy saving opportunities at these sections.

Figure 1:Various Loads Contribution in %



- Average Grid contract demand is 58 kVA.
- Average registered actual demand is 41 KVA with a maximum peak of 53 KVA.
- The below table indicates average consumption for the reference period.

Table 2 : Electricity consumption Details

Months	RS/Months	kWH	KVA
Jun-20	180703	12853	53
Jul-20	91601	6230	40
Aug-20	93073	6348	40
Sep-20	102321	7094	40
Oct-20	116803	8443	40
Nov-20	92178	6276	40
Dec-20	97597	6686	40
Jan-21	109326	7624	40
Feb-21	114603	8084	40
Mar-21	127412	9026	40
Apr-21	129172.18	9536	40
May-21	135439.28	10145	40
AVG	**115852.37**	**8195**	**41**
Total	**1390228.46**	**98345**	**--**

2.1 Energy Metering, Monitoring & Control System - Existing Status

2.2 Electricity

- Electrical energy consumption at the facility is measured on the main meter on daily basis.
- Adequate instrumentation is observed for power, voltage & current.

2.3 Level of Awareness

- The level of awareness for energy conservation in top & middle management is excellent. It has however felt necessary to make serious efforts to percolate the same up to the individual operating personnel level.

2.3.1 Power Measurement Survey

Table 3: Power Survey

Mode	Phase	V	A	KW	P.F
1 Phase	R-N	235	25	4.8	0.82
	Y-N	237	30	6.3	0.88
	B-N	237	19	3.8	0.84
3 Phase	RY	419	22	14.0	0.88
	YB	422	24	14.4	0.82
	BR	421	23	14.3	0.85

Observation:

Table 3: Voltage observations at MSEDCL Incomer

Voltage	Avg.	Max	Min	% Unbalance	Remark
V1	419	435	415	0.97	☑ Pass
V2	422	434	420	0.98	☑ Pass
V3	421	439	425	0.98	☑ Pass

Suggestion:

- Voltage % Unbalance are found within the specified limit
- Specified Limit is 1% as per the NEC 2019

Observation:

Table 4: Current Observations at Main incomer

Current	Avg.	Max	Min	% Unbalance	Remark
I1	22	23	21	0.89	☑ Pass
I2	24	25	23	0.89	☑ Pass
I3	23	25	20	0.91	☑ Pass

Observations:

- Current % Unbalance are found within the specified limit of 10%

- **2.3.4 Exisisting Connected Load in kW**

Table 5 – Exisisting Connected Load 2020-21

Types of Load	Qty	Watt per unit	Watt	KW	Load %
Computer load	95	180	17100	17.1	33%
Tube load	270	20	5400	5.5	11%
Fan load	228	60	13680	13.68	26%
Printer	27	220	5940	5.94	11%
Scanner & Printer	5	250	1250	1.25	2%
Fridge	5	200	1000	1	2%
Xerose	5	1040	5200	5.2	10%
LED load	120	10	1200	1.24	2%
Parch & outside load	36	24	864	0.864	2%
Total	**791**	**2004**	**51634**	**51.774**	**100%**

Chapter 3

ENERGY CONSERVATION OPPORTUNITIES

3.0 Electricity Bill Analysis

Sr. No.	Month	Contract Demand (KVA)	Actual Demand (KVA)	Units Consumed (KVAH/kWh	Power Factor	Total Bill (Rs.)	Charges for Excess Demand (Rs.)	Billing \ MSEB load factor (%)	Plant load factor (%)	Rs/kWh
1	Jun-20	58	53	12853	0.85	180703	0	36.2	39.6	14.06
2	Jul-20	58	40	6230	0.89	91601	0	16.8	24.3	14.70
3	Aug-20	58	40	6348	0.88	93073	0	17.3	25.0	14.66
4	Sep-20	58	40	7094	0.83	102321	0	20.5	29.7	14.42
5	Oct-20	58	40	8443	0.86	116803	0	23.5	34.1	13.83
6	Nov-20	58	40	6276	0.89	92178	0	16.9	24.5	14.69
7	Dec-20	58	40	6686	0.86	97597	0	18.6	27.0	14.60
8	Jan-21	58	40	7624	0.88	109326	0	20.7	30.1	14.34
9	Feb-21	58	40	8084	0.82	114603	0	23.6	34.2	14.18
10	Mar-21	58	40	9026	0.959	127412	0	22.5	32.7	14.12
11	Apr-21	58	40	9536	0.839	129172.18	0	27.2	39.5	13.55
12	May-21	58	40	10145	0.823	135439.28	0	29.5	42.8	13.35
		58	**41**	**8195**	**0.865**	**115852.37**	**--**	**22.78**	**31.96**	**14.21**
		--	**--**	**98345**		**1390228.46**	**0**	**--**	**--**	**--**

Electricity Bill Analysis Calculations

Average P.F: 0.86

Desired P.F: 0.99

Kw Drawn = 41 KVA x0.86 = 35.26

KVAr required = 35.26 (Tanø1-Tanø2)

= 35.26 (0.593 - 0.142)

= 35.26 x (0.451)

= 15.90 ~ 15 kVAr

Reduction in Demand = 41 – 35 = 6 KVA/Month

Reduction in Demand charges: 6 KVA *12 Months*RS 432 /KVA = Rs 31104 / Year

Total Revenue possible in RS = 31104

Investment in RS = 2700

Payback Period = 32 Days

3.1 Replacement of 20 Watt Tube Light With 15 W LED Tube Light

Table 6 : Saving Potential with 15 Watt LED

Sr. No.	Lighting Description	Actual Consumption	Estimated Saving Potential with 15 W LED Tuble Light
1	FTL Light 270 Qty ------ 20 W each	5.4 kW	4.0 kW
	Total kWh Saving	---	1.4 kWh
	Electricity cost per Rs/kWh	9.21	Rs/kWh
	Annual operating Hr	3500 hr	
	Saving potential per year = 1.4 x 3500 x 9.21 = Rs 45129 per Year Imvestment Cost For 270 Fittings = 1.35 Lakh Simple Payback period is = 3 Year		

Specifications: 15 LED Tube Light:

Power	15 W
Input Voltage	90-280V AC
LED	Philips/Cree/Osram
Color	Warm White/ Pure White
C.C.T.	2700-3300K(WW)/5500-6500K(PW)
Efficiency	>85%
Power factor	>0.90
Lumens"	100 lumen per watt
Life Span	>50000 hours
CRI	>80%
Replacement for	20 w FTL
Length	T5 1200 MM

3.2 Installation of Solar Photo Voltic Project for Fan & Computers

Table 7: Installation of Rooftop solar Photovoltaic system

Sr. No.	Description	Actual Consumption	Estimated Saving Potential with Solar P. V
1	Computer Load	17.1 kW	17.1 kW
2	Celling Fan	13.6 KW	13.6 kW
	Total kWh Saving	30.7	30.7 kWh
	Electricity cost per Rs/kWh	9.21	Rs/kWh
	Annual operating Hr	3500	Hr
	Saving potential per year = 30.7 x 3500 x 9.21 = 9.89 Lakh Capital Investment for Solar PV Projects : 22.5 Lakh (Proposed 50 KW Solar projects) Simple payback Period is = 2.27 Year		



Figure 2 : Rooftop Solar Photovoltaic system

3.3 Installation of Inverter AC instead of Normal AC

Figure 3:Advantages of Inverter Air Conditioner

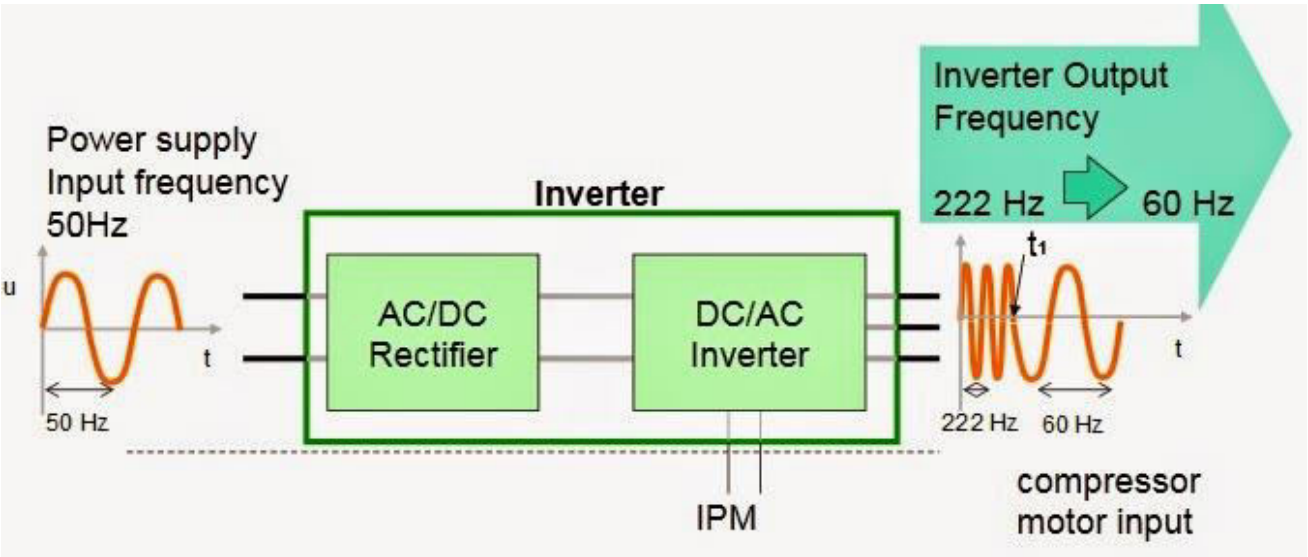


Table 8: Saving potential with Inverter AC

Sr. No.	Air Conditioner	Actual Consumption	Estimated Saving Potential with Inverter AC
1	1 X 1 TR AC – Daily 8 Hr. Operation 1 TR = 3.5 kW	3.5 kW	2.45 kW
	Total kWh Saving	-	1.05 kWh
	Electricity cost per Rs/kWh	9.21	Rs/kWh
	Annual operating Hr	4380	Hr
	Saving potential per year = 1.05 x 4380 x 9.21 = Rs 42356 Capital Investement for New Inverter AC = Rs 35000 Simple payback period is = 301 days		

3.4 Installation of Energy Efficient Fan with Existing Fan

Table 9: Saving Potential with Celling Fan

Sr. No.	Description	Actual Consumption	Estimated Saving Potential with 5 Star Energy Efficient Celling Fan (30 Watt)
1	Celling Fan 228 Qty ------ 60 W each	13.6 kW	6.8 kW
	Total kWh Saving	---	6.8 kWh
	Electricity cost per Rs/kWh	9.21	Rs/kWh
	Annual operating Hr	3500 hr	Hr
	Saving potential per year = 6.8 x 3500 x 9.21 = 2.91 Investement for energy efficient Fan = 4.56 Lakh Simple Payback period is = 1.56 Year		

Chapter - 4

ENERGY CONSERVATION: GENERAL ENERGY CONSERVATION TIPS

General Energy Conservation Tips

- Apart from the above-mentioned areas, there are certain tips that plant should examine in future to increase energy efficiency and hence to cut down on energy costs.

Checklist & Tips For Energy Efficiency In Electrical Utilities

1.1.1 Electricity

- Optimise the tariff structure with utility supplier
- Schedule your operations to maintain a high load factor
- Minimise maximum demand by tripping loads through a demand controller
- Stagger star-up times for equipment with large starting currents to minimise load peaking.
- Use standby electric generation equipment for on-peak high load periods.
- Correct power factor to at least 0.95 under rated load conditions.
- Relocate transformers close to main loads.
- Set transformer taps to optimum settings.
- Disconnect primary power to transformers that do not serve any active loads
- Consider on-site electric generation or cogeneration.
- Export power to grid if you have any surplus in your captive generation.
- Check utility electric meter with your own meter.
- Shut off unnecessary computers, printers and copiers at night

1.1.2 Motors

- Properly size to the load for optimum efficiency.(High efficiency motors offer of 4 – 5% & higher efficiency than standard motors)
- Use energy-efficient motors where economical.
- Use synchronous motors to improve power factor.
- Check alignment.
- Provide proper ventilation (For every 10^0C increase in motor operating temperature over recommended peak, the motor life is estimated to be halved)
- Check for under-voltage and over-voltage conditions.
- Balance the three-phase power supply. (An Imbalanced voltage can reduce 3 – 5% in motor input power)
- Demand efficiency restoration after motor rewinding. (If rewinding is not done properly, the efficiency can be reduced by 5 – 8%)

1.1.3 Drives

- Use variable-speed drives for large variable loads.
- Use high-efficiency gear sets.
- Use precision alignment.
- Check belt tension regularly.
- Eliminate variable-pitch pulleys.
- Use flat belts as alternatives to v-belts.
- Use synthetic lubricants for large gearboxes.
- Eliminate eddy current couplings.
- Shut them off when not needed.

1.1.4 Fans

- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimise fan inlet and outlet obstructions.
- Clean screens, filters and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimise fan speed.
- Use low-slip or flat belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.
- Minimise bends in ductwork.
- Turn fans off when not needed

1.1.5 Blowers

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimise blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimise blower speed.
- Use low-slip or no-slip belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable blower loads.
- Use energy-efficient motors for continuous or near-continuous operation.
- Eliminate ductwork leaks.
- Turn blowers off when they are not needed

1.1.6 Pumps

- Operate pumping near best efficiency point.
- Modify pumping to minimise throttling.
- Adapt to side load variation with variable speed drives or sequenced control of smaller units.
- Stop running both pumps – add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small load as requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimise water waste.
- Balance the system to minimise flows and reduce pump power requirements.
- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

1.1.7 Compressors

- Consider variable speed drive for variable load on positive displacement compressors.
- Use a synthetic lubricant if the compressor manufacturer permits it.
- Be sure lubricating oil temperature is not too high (oil degradation and lowered viscosity) and not too low (condensation contamination).
- Change the oil filter regularly.
- Periodically inspect compressor intercoolers for proper functioning.

- Use water heat from a very large compressor to power an absorption chiller or preheat process or utility feeds.
- Establish a compressor efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressor efficiency-maintenance program a part of your continuous energy management program.

1.1.8 Compressed Air

- Install a control system to co-ordinate multiple air compressors.
- Study part-load characteristic and cycling costs to determine the most-efficient mode for operating multiple air compressors.
- Avoid over sizing – match the connected load.
- Load up modulation-controlled air compressors. (They use almost as much power at partial load as at full load.)
- Turn off the back-up air compressor until it is needed.
- Reduce air compressor discharge pressure to the lowest acceptable setting. *(Reduction of 1 kg/cm² air pressure (8kg/cm² to 7 kg/cm²) would result in 9% input power savings. This will also reduce compressed air leakage rates by 10%)*
- Use the highest reasonable dryer dew point settings.
- Turn off refrigerated and heated air dryers when the air compressors are off.
- Use a control system to minimise heatless desiccant dryer purging.
- Minimise purges, leaks, excessive pressure drops and condensation accumulation. *(Compressed air leak from 1 mm hole size at 7 kg/cm² pressure would mean power loss equivalent to 0.5 KW)*
- Use drain controls instead of continuous air bleeds through the drains.
- Consider engine-driven or steam-driven air compression to reduce electrical demand charges.
- Replace standard V-belts with high-efficiency flat belts as the old V-belts wear out.
- Use a small air compressor when major production load is off.
- Take air compressor intake air from the coolest (but not air conditioned) location. *(Every 5ºC reduction in intake air temperature would result in 1% reduction in compressor power consumption)*
- Use an air-cooled after cooler to heat building makeup air in winter.
- Be sure that heat exchangers are not fouled (eg. – with oil)
- Be sure that air / oil separators are not fouled.
- Monitor pressure drops across suction and discharge filters and clean or replace filters promptly upon alarm.
- Use a properly sized compressed air storage receiver.
- Minimise disposal costs by using lubricant that is fully demulsible and an effective oil-water separator.
- Consider alternatives to compressed air such as blowers for cooling, hydraulic rather than air cylinders, electric rather than air actuators and electronic rather than pneumatic controls.
- Use nozzles or venturi - type devices instead of blowing with open compressed air lines.
- Check for leaking drain valves on compressed air filter / regular sets. Certain rubber-type valves may leak continuously after they age and crack.
- In dusty environments, control packaging lines with high-intensity photocell units instead of standard units with continuous air purging of lenses and reflectors.
- Establish a compressed air efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressed air efficiency-maintenance program a part of your continuous energy management program.

1.1.9 Chiller

- Increase the chilled water temperature set point if possible.

- Use the lowest temperature condenser water available that the chiller can handle. *(Reducing condensing temperature by 5.5ºC, results in a 20 – 25% decrease in compressor power consumption)*
- Increase the evaporator temperature *(5.5ºC increase in evaporator temperature reduces compressor power consumption by 20 – 25%)*
- Clean heat exchangers when fouled. *(1 mm scale build-up on condenser tubes can increase energy consumption by 40%)*
- Replace old chillers or compressors with new higher efficiency models.
- Use water-cooled rather than air-cooled chiller condensers.
- Use energy-efficient motors for continuous or near continuous operation.
- Specify appropriate fouling factors for condensers.
- Do not overcharge oil.
- Install a control system to co-ordinate multiple chillers.
- Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple chillers.
- Run the chillers with the lowest operating costs to near base load.
- Avoid oversizing – match the connected load.
- Isolate off-line chillers and cooling towers.
- Establish a chiller efficiency-maintenance program. Start with an energy audit and follow-up, then make a chiller efficiency-maintenance program a part of your continuous energy management program.

1.1.10 HVAC (Heating / Ventilation / Air Conditioning)

- Tune up the HVAC control system.
- Consider installing a building automation system (BAS) or energy management system (EMS) or restoring an out-of-service one.
- Balance the system to minimise flows and reduce blower / fan / pump power requirements.
- Eliminate or reduce reheat whenever possible.
- Use appropriate HVAC thermostat setback.
- Use morning pre-cooling in summer and pre-heating in winter (i.e. – before electrical peak hours).
- Use building thermal lag to minimise HVAC equipment operating time.
- In winter during unoccupied periods, allow temperature to fall as low as possible without damaging stored materials.
- Improve control and utilisation of outside air.
- Use air-to-air heat exchangers to reduce energy requirements for heating and cooling of outside air.
- Reduce HVAC system operating hours (e.g. – night, weekend).
- Optimise ventilation.
- Ventilate only when necessary. To allow some areas to be shut down when unoccupied, install dedicated HVAC systems on continuous loads (e.g. – computer rooms).
- Provide dedicated outside air supply to cleaning rooms, combustion equipment, etc. to avoid excessive exhausting of conditioned air.
- Use evaporative cooling in dry climates.
- Reduce humidification or dehumidification during unoccupied periods.
- Use atomisation rather than steam for humidification where possible.
- Clean HVAC unit coils periodically and comb mashed fins.
- Upgrade filter banks to reduce pressure drop and thus lower fan power requirements.
- Check HVAC filters on a schedule (at least monthly) and clean / change if appropriate.
- Check pneumatic controls air compressors for proper operation, cycling, and maintenance.

- Isolate air conditioned loading dock areas and cool storage areas using high-speed doors or clear PVC strip curtains.
- Install ceiling fans to minimise thermal stratification in high-bay areas.
- Relocate air diffusers to optimum heights in areas with high ceilings.
- Consider reducing ceiling heights.
- Eliminate obstructions in front of radiators, baseboard heaters, etc.
- Check reflectors on infrared heaters for cleanliness and proper beam direction.
- Use professionally-designed industrial ventilation hoods for dust and vapour control.
- Use local infrared heat for personnel rather than heating the entire area.
- Use spot cooling and heating (e.g. – use ceiling fans for personnel rather than cooling the entire area).
- Purchase only high-efficiency models for HVAC window units.
- Put HVAC window units on timer control.
- Do not oversize cooling unit. (Oversized units will "short cycle" which results in poor humidity control.)
- Install multi-fuelling capability and run with the cheapest fuel available at the time.
- Consider dedicated make-up air for exhaust hoods. (Why exhaust the air conditioning or heat if you do not need to?)
- Minimise HVAC fan speeds.
- Consider desiccant drying of outside air to reduce cooling requirements in humid climates.
- Consider ground source heat pumps.
- Seal leaky HVAC ductwork.
- Seal all leaks around coils.
- Repair loose or damaged flexible connections (including those under air handling units).
- Eliminate simultaneous heating and cooling during yearal transition periods.
- Zone HVAC air and water systems to minimise energy use.
- Inspect, clean, lubricate and adjust damper blades and linkages.
- Establish and HVAC efficiency-maintenance program. Start with an energy audit and follow-up, then make an HVAC efficiency-maintenance program a part of your continuous energy management program.

1.1.11 Refrigeration

- Use water-cooled condensers rather than air-cooled condensers.
- Challenge the need for refrigeration, particularly for old batch processes.
- Avoid oversizing – match the connected load.
- Consider gas-powered refrigeration equipment to minimise electrical demand charges.
- Use "free cooling" to allow chiller shutdown in cold weather.
- Use refrigerated water loads in series if possible.
- Convert firewater or other tanks to thermal storage.
- Do not assume that the old way is still the best – particularly for energy-intensive low temperature systems.
- Correct inappropriate brine or glycol concentration that adversely affects heat transfer and / or pumping energy. If it sweats, insulate it, but if it is corroding, replace it first.
- Make adjustments to minimise hot gas bypass operation.
- Inspect moisture / liquid indicators.
- Consider change of refrigerant type if it will improve efficiency.
- Check for correct refrigerant charge level.
- Inspect the purge for air and water leaks.
- Establish a refrigeration efficiency-maintenance program. Start with an energy audit and follow-up, then make a refrigeration efficiency-maintenance program part of your continuous energy management program.

1.1.12 Cooling Tower

- Control cooling tower fans based on leaving water temperatures.
- Control to the optimum water temperature as determined from cooling tower and chiller performance data.
- Use two-speed or variable-speed drives for cooling tower fan control if the fans are few. Stage the cooling tower fans with on-off control if there are many.
- Turn off unnecessary cooling tower fans when loads are reduced.
- Cover hot water basins (to minimise algae growth that contributes to fouling).
- Balance flow to cooling tower hot water basins.
- Periodically clean plugged cooling tower water distribution nozzles.
- Install new nozzles to obtain a more-uniform water pattern.
- Replace splash bars with self-extinguishing PVC cellular-film fill.
- An old counter flow cooling towers, replace old spray-type nozzles with new square-spray ABS practically-non-clogging nozzles.
- Replace slat-type drift eliminators with high-efficiency, low-pressure-drop, self-extinguishing, PVC cellular units.
- If possible, follow manufacturer's recommended clearances around cooling towers and relocate or modify structures, signs, fences, dumpsters, etc. that interfere with air intake or exhaust.
- Optimise cooling tower fan blade angle on a yearal and / or load basis.
- Correct excessive and / or uneven fan blade tip clearance and poor fan balance.
- Use a velocity pressure recovery fan ring.
- Divert clean air-conditioned building exhaust to the cooling tower during hot weather.
- Re-line leaking cooling tower cold water basins.
- Check water overflow pipes for proper operating level.
- Optimise chemical use.
- Consider side stream water treatment.
- Restrict flows through large loads to design values.
- Shut off loads that are not in service.
- Take blowdown water from the return water header.
- Optimise blowdown water from the return water header.
- Automate blowdown to minimise it.
- Send blowdown to other uses (Remembers, the blowdown does not have to be removed at the cooling tower. It can be removed anywhere in the piping system.)
- Implement a cooling tower winterisation plan to minimise ice build-up.
- Install interlocks to prevent fan operation when there is no water flow.
- Establish a cooling tower efficiency-maintenance program. Start with an energy audit and follow-up, then make a cooling tower efficiency-maintenance program a part of your continuous energy management program.

1.1.13 Lighting

- Reduce excessive illumination levels to standard levels using switching, delamping, etc. (Know the electrical effects before doing delamping.)
- Aggressively control lighting with clock timers, delay timers, photocells, and / or occupancy sensors.
- Install efficient alternatives to incandescent lighting, mercury vapour lighting, etc. as follows: low pressure sodium, high pressure sodium, metal halide, fluorescent, mercury vapour, incandescent.
- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.
- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts.
- Consider lowering the fixtures to enable using less of them.

- Consider day lighting, skylights, etc.
- Consider painting the walls a lighter colour and using less lighting fixtures or lower wattages.
- Use task lighting and reduce background illumination.
- Re-evaluate exterior lighting strategy, type and control. Control it aggressively.
- Change exit signs from incandescent to LED.

1.1.14 DG Set

- Optimise loading
- Use waste heat to generate steam / hot water / power an absorption chiller or preheat process or utility feeds.
- Use jacket and head cooling water for process needs.
- Clean air filters regularly.
- Insulate exhaust pipes to reduce DG set room temperatures.
- Use cheaper heavy fuel oil for capacities more than 1MW.

1.1.15 Building

- Seal exterior cracks / openings / gaps with caulk, gasketing, weather-stripping etc.
- Consider new thermal doors, thermal window, roofing insulation, etc.
- Install windbreaks near exterior doors.
- Replace single-pane glass with insulating glass.
- Consider covering some window and skylight areas with insulated wall panels inside the building.
- If visibility is not required but light is required, consider replacing exterior windows with insulated glass block.
- Consider tinted glass, reflective glass, coatings, awnings, overhangs, draperies, blinds and shades for sunlit exterior windows.
- Use landscaping to advantage.
- Add vestibules or revolving doors to primary exterior personnel doors.
- Consider automatic doors, air curtains, strip doors, etc. at high-traffic passages between conditioned and non-conditioned spaces. Use self-closing doors if possible.
- Use intermediate doors in stairways and vertical passages to minimise building stack effect.
- Use dock seals at shipping and receiving doors.
- Bring cleaning personnel in during the working day or as soon after as possible to minimise lighting and HVAC costs.

1.1.16 Waste & Waste Water

- Recycle water, particularly for uses with less-critical quality requirements.
- Recycle water, especially if sewer costs are based on water consumption.
- Balance closed systems to minimise flows and reduce pump power requirements.
- Eliminate once-through cooling with water.
- Use the least expensive type of water that will satisfy the requirement.
- Fix water leaks.
- Test for underground water leaks. (It is easy to do over a holiday shutdown.)
- Check water overflow pipes for proper operating level.
- Automate blow down to minimise it.
- Provide proper tools for wash down – especially self-closing nozzles.
- Install efficient irrigation.
- Reduce flows at water sampling stations.

- Eliminate continuous overflow at water tanks.
- Promptly repair leaking toilets and faucets.
- Use water restrictors on faucets, showers, etc.
- Use self-closing type faucets in restrooms.
- Use the lowest possible hot water temperature.
- Do not use a heating system hot water boiler to provide service hot water during the cooling year – install a smaller, more-efficient system for the cooling year service hot water.
- If water must be heated electrically, consider accumulation in a large insulated storage tank to minimise heating at on-peak electric rates.
- Use multiple, distributed, small water heaters to minimise thermal losses in large piping systems.
- Use freeze protection valves rather than manual bleeding of lines.
- Consider leased and mobile water treatment systems, especially for deionised water.
- Seal sumps to prevent seepage inward from necessitating extra sump pump operation.
- Install pre-treatment to reduce TOC and BOD surcharges.
- Verify the water meter readings.

1.1.17 Miscellaneous

- Meter any unmetered utilities. Know what is normal efficient use.Track down causes of deviations.
- Shut down spare, idling or unneeded equipment.
- Make sure that all of the utilities to redundant areas are turned off – including utilities like compressed air and cooling water.
- Install automatic control to efficiently co-ordinate multiple air compressors, chillers, cooling tower cells, boilers, etc.
- Renegotiate utilities contracts to reflect current loads and variations.
- Consider buying utilities from neighbours, particularly to handle peaks.
- Leased space often has low-bid inefficient equipment. Consider upgrades if your lease will continue for several more years.
- Adjust fluid temperature within acceptable limits to minimise undesirable heat transfer in long pipelines.
- Minimise use of flow bypasses and minimise bypass flow rates.
- Provide restriction orifices in purges (nitrogen, steam, etc.).
- Eliminate unnecessary flow measurement orifices.
- Consider alternatives to high pressure drops across valves.
- Turn off winter heat tracing that is on in summer.

1.2 Checklist & Tips For Energy Efficiency In Thermal Utilities

1.2.1 Insulation

- Repair damaged insulation
- Insulate any hot or cold metal or insulation
- Replace wet insulation
- Use an infrared gun to check for cold wall areas during cold weather or hot wall areas during hot weather
- Ensure that all insulated surfaces are cladded with aluminium.
- Insulate all flanges, valves and couplings.
- Insulate open tanks.

1.2.2 Waste Heat Recovery

- Recover heat from flue gas, engine cooling water, engine exhaust, low pressure waste steam, drying oven exhaust, boiler blowdown, etc.
- Recover heat from incinerator off-gas.
- Use waste heat for fuel oil heating, boiler feed water heating, outside air heating etc.
- Use chiller waste heat to preheat hot water.
- Use heat pumps.
- Use absorption refrigeration.
- Use thermal wheels, run-around systems, heat pipe systems and air-to-air exchangers.

SITE IMAGE GALLERY







CERTIFICATE OF ENERGY AUDIT

Education Instituties

Certificate No : 202021-EA 4401

This is to Certify that

JIJAMATA COLLEGE OF SCIENCE AND ARTS,

Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar

has successfully Completed the Statutory requirement of Energy Audit for Year 2020-21

issued this 26th day of Jan 2021

Valid until: March 2021

Hitech Energy Services

ENVIRONMENT AND GREEN AUDIT REPORT

(YEAR 2021-2022)

OF

JIJAMATA COLLEGE OF SCIENCE AND ARTS,

DNYANESHWARNAGAR, BHENDE BK.

TAL; NEWASA, DIST; AHMEDNAGAR



PREPARED BY

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CERTIFICATE

GREEN & ENVIRONMENT AUDIT

This is to certify that **Jijamata College of Science and Arts, Dnyneshwarnagar, Bhende (BK), Tal-Newasa, Dist -Ahmednagar** has successfully undergone **Green & Environment Audit** for year 2021-22

Date : 25TH MARCH 2022

Dr. Adhikrao Yewale
Universe Environment Consultancy, Pune

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ENVIRONMENT AND GREEN AUDIT REPORT

Compliance of Observations and Recommendation in Audit year 2020-21.

Sr No	Particulars	Observation	Recommendation	Compliance
1	Green Area /Plantation	• Total 67 tree species, 15 shrubs species and 1 climber species are observed in the college campus area. • 1544 numbers of trees, 203 shrubs and 4 number of Climber are planted in college campus area. • Good vegetation was observed at boundary of college. • College actively participated in tree plantation Programme • College conducted and participated in various Planation activity programs are being organized at college campus and surrounding villages through various activities of college. • The plantation program includes various types of indigenous species of ornamental and medicinal wild plant species.	Review yearly the list of trees planted in the college campus, and allots numbers to the trees along with scientific /botanical and local/common name to the trees.	College reviewed list of trees and updated with new plantation
			•Select endemic or local species for the planation.	Local species selected for the plantation. List tree is given in section 2.1 of report
			Promote environmental awareness as a part of course work in various curricular areas, independent research projects, and community service.	Conducted environmental awareness as a part of course work in various curricular areas, independent research projects, and community service.
			Establish a College Environmental cell that will take responsibility for the whole environment of the college campus.	College established College Environmental cell that will take responsibility for the whole environment of the college campus.
			Establish Environment Policy for the environment conservation nd protection of college.	Established Environment Policy for the environment conservation and protection of college.
			Celebrate every year 5th June as 'Environment Day', wildlife week and plant trees on this day to make the campus more Green.	Celebrated environment day, wild life day
			Establish Green library for the students.	Established green library

			Prepare five-year planation Programme /Plan in consultation with management and students.	Prepared five year plantation program
			Establish nature club	Established nature club
2	Water Environment Waste water	• The total quantity of water required for drinking, flushing and laboratory use and gardening purposes is assessed is assessed as 99.84KL per day. • Area under plantation is about 30 % of total area of institute (31.65 acre) but most of the plants are more than 10-15 years old so that no need of daily water for those plants. Only garden, lawn and botanical garden required daily water. For hygienic drinking water, Water is treated at water treatment plant by Sugar Factory and provided to college. ➢ Total 85 m3/day sewage is generated. Generated sewage is treated through Septic tank. Over flow of septic tank is used for the gardening. ➢ Septic tanks are provided to treat the generated sewage. ➢ No treatment is provided to waste water generated from laboratories	• Installed sewage treatment plant having capacity of 90CMD and recycle the treated water for flushing and gardening	No sewage treatment plant installed
			• In order to use the treated waste water for flushing a separate plumbing system should be provided.	Not executed
			• Drip irrigation system should be provided to Gardens to minimize water use	Drip system installed for plantation area
			• Liquid waste generated from laboratory should not be disposed off without any treatment	Liquid waste generated from laboratory is neutralized at small tank and disposed off.
			• Fixture for toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor-based control	Not executed
			• Prepare Detailed rain water harvesting plan and implement in next five year to reduce the raw water requirement.	Rain water harvesting system is installed. All roof top water is collected in earthen tank

			Water quality analysis should be carried through NABL or MOEF accredited laboratory for monthly or quarterly basis	Water quality analysis was accrued out report is enclosed in section 2.5
3	SOLID WASTE MANAGEMENT	The waste generated in the campus includes glass, metals, wrappers, paper, plastics, etc. Old newspapers, used papers and journal files, workshop scrap etc. are given for recycling to external agencies. Glass, metals, plastic and other non-biodegradable wastes are given to external agencies where they are segregated and disposed/ recycled according to the nature of the waste. Biodegradable waste: Leaf litter& food waste is decomposed in composting unit of College. Plastic waste sends to the recycling vendor. Apart from dry solid waste, the campus generates an average of 120kgs of organic waste per day and 20 kgs of processed food waste per day from canteen. In garden a unit of Vermicompost also established which is essential for production of vermicompost and vermiwash as an organic manure which is used as fertilizer for various plants in the garden. Vermi composting plant is in operation in the campus. Food Waste from collage and canteen is mix with leaf litter and use for the Vermi composting. Vermi compost is used	• Segregate dry and wet waste separately	Dry and wet waste segregated
			Display the awareness board of solid waste	Displayed boards for solid waste awareness in college campus
			Send all recycling waste glass, cans, white, coloured and brown paper, plastic bottles, batteries, print cartridges, cardboard and furniture to recycling facility or authorized vendor	Complied

		for plants as manure.		
4	E- Waste	E-waste generated in the college campus is very less in quantity. The E-waste and defective item from computer laboratory is being stored properly. The college management has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner	Recycle or safely dispose of computers and electrical equipment's. Use reusable resources and containers and avoid unnecessary packaging where possible. Always purchase recycled resources where these are both suitable and available.	College agreed and committed to comply

1. INTRODUCTION

1.1 GREEN & ENVIRONMENT AUDIT

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of college. This 'Green Audit' aims to analyze environmental practices within and outside the college campus, which will have an impact on the environment.

Green Audit or Environment Audit focuses on the Green Campus, Waste Management, Water Management, Air Pollution &Energy Management etc. being implemented by the College Management.

The ICC defines Environmental Auditing as

"A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environment and natural resources in its operations/projects."

Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

Green audit is assigned to the criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India which declares the institutions as Grade A, B or C according to the scores assigned during the accreditation.

As a mandatory requirement of NACC, Green audit was planned for the academic year 021-22 by management of college.

Management decided to conduct green audit yearly through internal as well as external audit team. College was carried out Environment and green audit for the year 2020-21 and also decided by management, Environment and green audit will be carried out in month of March 2022 for the academic year 2021-22.

Table No 1. Audit Team

Sr No	Name of the auditor	Area of Expertise	Designation
On behalf of Jijamata College			
1	Dr. Saswade Ramkisan Raghunath	Botany	Principal
2	Dr Navgire Madhukar Eknath	Nodal Officer	Coordinator/ IQAC
3	Dr Lande Kakasaheb Abasaheb	Geography / Environment	Member
4	Prof. Naik Dhirsing wahrya	Energy Audit	Member
5	Prof. Ghare Pravin Devram	Water Harvesting /Solid and Liquid waste	Member
6	Dr. Gedam Ajit Kashinath	Vermicomposting project	Member
7	Prof Nawale Rohan Vijaykumar	Botany	Member
8	Shri. Gaikwad Dattatraya Bhausaheb	Administration	Member
On behalf of Universe Environment Consultancy			
1	Dr. Adhikrao Yewale	Air Quality, Water quality and Ecology	Member
2	Shri Rahul Patil	Water quality & Soil quality	Member
3	Rupali Mohite	Water Management	Member
4	Shir Yogesh Raskar	Social	Member
5	Shri Dayand Jagdale	Energy	Member

1.2 OBJECTIVES OF ENVIRONMENT& GREEN AUDIT

The main objective of the Environment/Green audit is to promote the management and conservation of Environment in the College Campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

The main objectives of carrying out Green Audit are:

- *To document the floral and faunal diversity of the college*
- *To Document the water and waste management of the college*
- *To document the waste disposal system*

- *To estimate the Energy requirements of the college.*
- *To document the environmental condition of air, water, soil and noise of the college*
- *To introduce and aware students to real concerns of environment and its sustainability*

1.2.1 TARGET AREAS FOR ENVIORNMENT AND GREEN AUDIT

- **Biodiversity Conservation**: Green area, plantation, Florala diversity, faunal diversity local, endemic species, medicinal plants etc aspect was considered
- **Water and Waste Water:** Water requirement for various activities, source of water, water quality, waste water generation, treatment, recycle and reuse of treated waste water etc.
- **Solid Waste;** Biodegradable waste and non-Biodegradable waste generation, and its disposal.
- **Energy:** Source, Consumption, conservation and alternative energy sources
- **Environment Monitoring:** Ambient Air quality, Noise level, Water quality and Soil quality.

1.2.2 METHODOLOGY

In order to conduct the green audit, the methodology included different tools such as

- Preparation of questionnaire,
- Preparation of data collection formats
- Collection of data
- Physical checking of the campus,
- Observation and review of the documentation,
- Interview of key persons and data analysis, measurements and recommendations.

The study covered the following areas to summarize the present status of environment management in the campus:

- Green area management
- Water management
- Energy Conservation
- Waste management
- E-waste management

1.3 ABOUT THE COLLEGE

Jijamata college of Science and Arts Dnyneshwarnagar Bhende (BK), Tal-Newasa in Ahmednagar District Maharashtra state. This college is affiliated with Savitribai Phule University Pune. This college is established in June 1992 by Shri.Marutrao Ghule Patil Shikshan Santha' Dnyneshwarnagar Bhende (BK, premier educational institution founded By Hon. Late Shri.Marutrao Ghule Patil veteran social activist which has been imparting higher education KG to PG level in Science & Arts faculty.

Jijamata college of Science and Arts Dnyneshwarnagar Bhende (BK), campus consists of main buildings with ground, first and second floor. The administrative office, Library, Indoor stadium, various HOD cabins, staff rooms, classrooms, various laboratory like Physics, Chemistry, Botany, Zoology, Computer Sciences, etc. are the part of college campus. The college are functioning with basic motto to impart quality, employment, entrepreneur and higher education to mostly rural as well as marginal urban student. Besides this there are one boy's hostel and two ladies hostel buildings for facilitating student accommodation to many rural boys & girl students. Similarly in campus two building are available for residential purpose for teaching as well as non-teaching staff. This college also provides gymkhana facility indoor stadium to student undergoing through various type of physical education. There is also well-furnished library where student studying in various branches have facility to refer books. The college developed botanical garden & green campus.

Total campus Area is 31.65 acre. College is affiliated to Pune University, Pune

College is accredited with NAAC With B' Grade (CGPA 2.72) grade in year 2018by NAAC.

Table No. 2. Details of the College

Sr no	Particulars	Information
1	**Name of college**	Shri Marutrao Ghule Patil Shikshan Sanstha's Jijamata College of Science and Arts Bhende Tal Newasa Dist Ahmednagar.
2	**Address**	Dnyneshwarnagar Bhende (BK), Tal-Newasa in Ahmednagar District Maharashtra state.
3	**Latitude and Longitude**	latitudes – 19°27'14.59"N and longitude – 75° 1'25.75"E
4	**Area in acre**	31.65
5	**Faculty (Arts/commerce/science)**	Arts, Science, Commerce

6	**Number Student year (2021- 22)**	1375
	Boys	801
	Girls	574
7	**Principle of College**	Dr. Saswade Ramkisan Raghunath
8	**Administrative officer**	Shri.Ghodechor Bandu Ramchandra
9	**Contact Number**	02427-255304
10	**Email**	Principal.jijamatacollege@gmail.com
12	**Fax**	02427-255309
13	**Website**	http://jijamatacollege.ac.in

Table No 3 .Board of directors:

Sr.No.	Name	Designation
1	Dr. Narendra Marutrao Ghule Patil (Ex.M.La)	President
2	Shri Chandrashekhar Marutrao Ghule Patil (Exmla)	Vice President
3	Shri. Pandurang Gamaji Abhang (Ex.M.L.A.)	Trustee
4	Adv. Desai Bhausaheb Deshmukh	Trustee
5	Shri. Kakasaheb Narayanrao Narwade	Trustee
6	Shri. Vitthalrao Vakilrao Langhe	Trustee
7	Dr. Narayan Karbhari Mhaske	Trustee
8	Shri. Panditrao Rambhau Bhosale	Trustee
9	Shri. Babanrao Murlidhar Bhusari	Trustee
10	Shri. Kakasaheb Abasaheb Shinde	Trustee
11	Shri. Janardhan Rambhau Kadam	Trustee
12	Shri. Gorakshnath Dagdu Gandal	Trustee
13	Shri. Bhausaheb Sonyabapu Kangune	Trustee
14	Shri. Shivaji Rajdhar Kolte	Trustee
15	Shri. Machindra Suryabhan Mhaske	Trustee

16	Shri. Sakharam Digambar Lavhate	Trustee
17	Shri. Dipak Tulshiram Nannavare	Trustee
18	Sau. Shankarrao Laxman Pavse	Trustee
19	Sau. Latabai Ashok Misal	Trustee
20	Sau. Ratnamalatai Kashinath Navle Trustee	Trustee
21	Sau. Tarabai Hanuman Jagdale	Trustee
22	Dr. Kshitij Narendraji Ghule Patil	Trustee
23	Shri. Anil Pandit Shewale	Secretary

Table No 4: College offers the following programmes of graduation in Arts and Science faculty.

Sr No	Courses	Started from Year
A	**Arts**	**1994**
1	Marathi	
2	Hindi	
3	English	
4	Geography	
5	Political Science	
6	Economic s	
7	Physiology	
B	**Science**	**1992**
1	Physics	
2	Chemistry	
3	Botany	
4	Zoology	
5	Computer Science	
6	Statistics	

C	BSc Computer Science	2012-2013
D	B.Com	2013-2014
E	MSc Chemistry	2010-2011
F	MSc Botany	2016-2017
G	MA MARATHI	2009-2010
H	MA ECONOMICS	2010-2011

The college is a reputed educational institution, which has been known for producing outstanding students who take on different careers, as per their academic merit successfully in the society.

The college has rich tradition of co-curricular and extra-curricular activities such as NSS, NCC, Sports and Cultural Activities, which play an important role in the overall personality development of the students.

The students are also reciprocating by their high achievements in academic performance. A large number of students are getting excellent placements in different parts of the country & abroad also.

Table No 5: Details of the Teaching and non-teaching staff

Sr No	Position	Male	Female	Total
A Teaching				
1	Principal	01	0	01
2	Professor	03	0	03
3	Associate Professor	07	0	07
4	Assistant Professor	20	01	21
	Total			**32**
1	Non Grant	17	10	**27**
1	CHB	06	02	**8**
3	Ad-hoc	02	02	**04**

B. Non-Teaching				
1	Grant	09	0	09
2	Non Grant	15	02	17
	Total			**26**

Table No 6 : Number students last five years

Years	Courses								Total
	B. A	B. Sc	BSc Comp Sci.	B. Com	MA Marathi	MA ECONOMICS	MSC CHEMISTY	MSC Botany	
2021-22	327	400	187	235	35	45	100	47	**1376**
2020-21	381	502	142	275	20	11	89	44	**1464**
2019-20	448	517	91	258	27	27	62	46	**1476**
2018-19	348	584	81	232	36	29	48	44	**1402**
2017-18	391	617	87	213	17	37	8	48	**1418**
2016-17	345	563	83	172	17	44	38	23	**1285**
2015-16	384	557	79	117	23	54	38	0	**1252**

Table No. 7: Hostel strength :2 Buildings

Boys			Girls		
Sr. No	Intake Capacity	Student 21-22	Sr. No	Intake Capacity	Student 21-22
1	**100**	**47**	**1**	**120**	**65**

Table No 8: Staff Quarters 02 Building

Building No 01		Building No 02		Gross Total
Sr. No	Total Rooms	Sr. No	Total Rooms	
1	**08**	**1**	**08**	**16**

THE GREEN CAMPUS, ENERGY AND ENVIRONMENT POLICY

The policy Jijamata College of Science and Arts is conserve, protect & save the environment , minimize use of energy and natural resources with following objectives

- **To build awareness among the students about importance and conservation of natural resources.**
- **To develop and adopt environment friendly approach in the students.**
- **Ensure that energy and water are used responsibly and conserved through innovative practices and procedures.**
- **Provide all institute staff with the knowledge and tools needed to meet the goals of this policy and to actively participate in efforts to prevent negative environmental impacts.**
- **Measure progress toward our environmental goals. The Office of Management, Health and Back Safety Branch, in coordination with the Top.**

1.2 LOCATION OF THE COLLEGE

The college located at Bhende village, in Newasa Tehsil of Ahmednagar District. The college is located in the rural area. It is geographically located at latitudes – 19°27'14.59"N and longitude – 75° 1'25.75"E.

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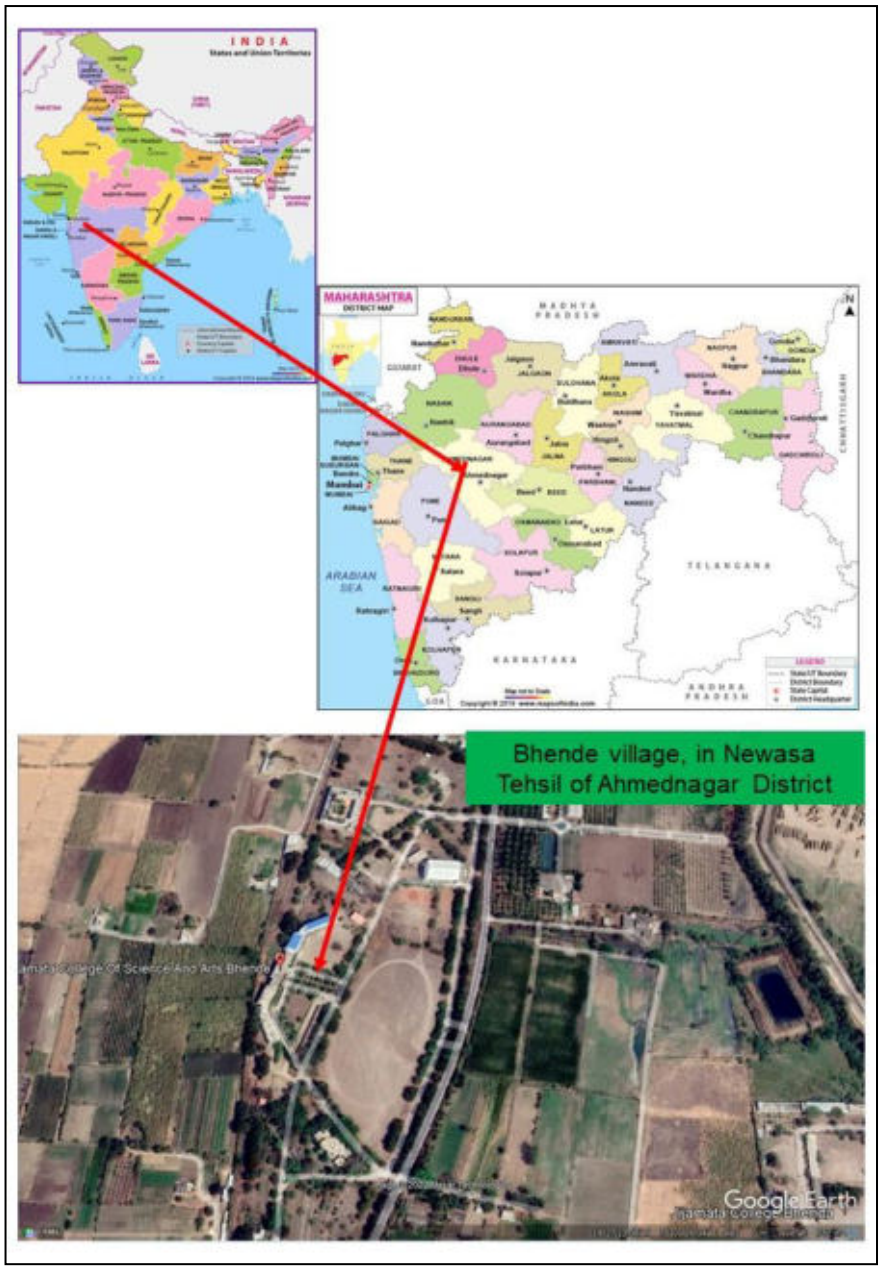


Figure No. 1 : College Location Map: Source Google Earth



Figure No. 2 : Google Image

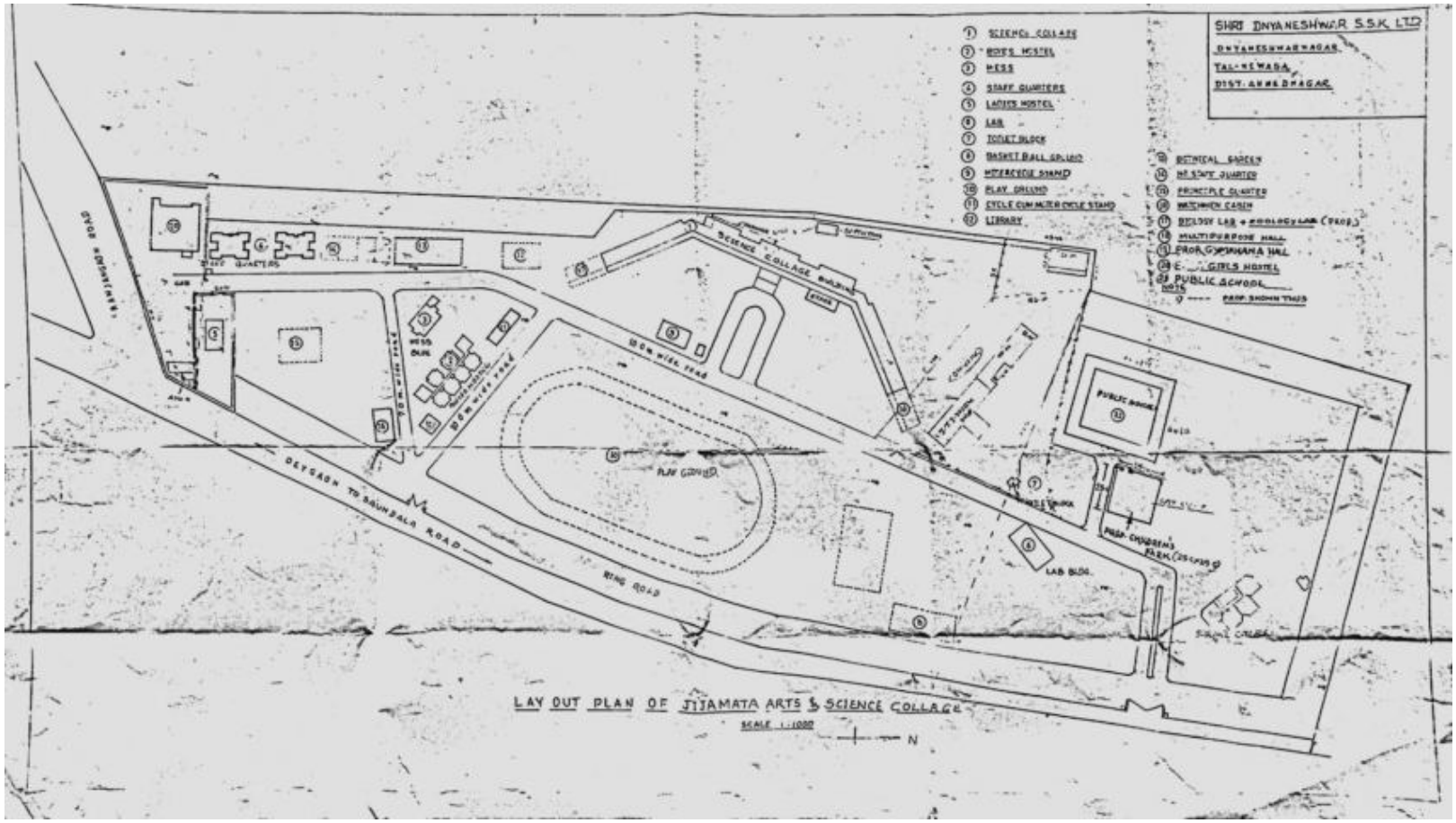


Figure No. 3 : Project Layout

1.4 COLLEGE INFRASTRUCTURE AND FACILITIES



Indoor Stadium



Playground with 400 meter running track



Parking to students



College Building



Staff Quatres and Hostels

1.5 REWARDS AND CERTIFICATE

- Extension activities are carried out in the neighborhood community, sensitizing students to social issues, for their holistic development, and impact thereof during the year 2020-21
- Number of extension and outreach programs conducted by the institution through NSS/NCC/Red cross/YRC etc., (including the programs such as Swachh Bharat, AIDS awareness, Gender issues etc. and/or those organized in collaboration with industry, community and NGOs) during the year and Number of students participating in extensionactivities during year
- Sensitization of students and employees of the Institution to the constitutional obligations:values, rights, duties and responsibilities of citizens
- Institution celebrates / organizes national and international commemorative days, events and festivals

The College takes pride in commemorating the national and international days that mark the important aspect of historical events to instil a sense of patriotism and to promote nationalism among the staff and students' community. Important cultural festivals which introduce the rich cultural heritage of our ancient traditions are celebrated with pomp quietly. During this academic year 2020-21 the following days were celebrated.

- International yoga day (21st June)
- Republic day (26 January) 72nd Republic Day was celebrated patriotic fervour tocommemorate the adoption of activities of our constitution,
- Savitribai Phule birth anniversary (3rd January)
- Mahatma Gandhi's birth anniversary (2 October)
- Birth Anniversary of Babasaheb Ambedkar (14th April)
- Maharashtra Day (1st May)
- Independence Day (15th August)
- Birth anniversary of Mahatma Jyotiba Phule.
- The birth anniversary of Marutrao Ghule Patil. (15 September)
- Environment Day (5 June) world Environment Day celebrate in college teacher andstudents, this day we planted 100 plants in our campus.

Sr. No.	**Title of the Activities**	**Date of Program**	**Organizing unit / agency**	**No of Teachers coordinated such activities**	**No of Students participated in such activities**
1	Mahatma Gandhi and Lal Bahadur ShastriJayanti	02-10-2020	National Service Scheme	5	25
2	Dr. A.P.J. Abdul Kalam Jayanti and Readingday	15-10-2020	Library	25	150
3	Teachers Day	05-09-2020	Student Welfare	25	20
4	Loknete Marutrao Ghule Patil Jayanti	15-09-2020	MGPS Education Society	45	300
5	Campus Cleaning	27-08-2020	National Service Scheme	30	200
6	Womens Day	08-03-2021	Jijamata Vidyarthini Manch	10	81
7	Savitribai Phule Jayanti	03-01-2021	National Service Scheme	20	90
8	Yoga Day	21-06-2020	Physical Education	60	170
9	Plantation in College Campus	20-08-2020	National Service Scheme	35	40
10	Maharashtra Day	01-05-2021	Student Welfare	40	25
11	Republic Day	26-01-2021	Physical	60	500

			Education		
12	Birth Anniversary of Mahatma Jyotiba Phule	11-04-2021	National Service Scheme	25	110
13	Sadbhavna Din	30-01-2021	National Service Scheme	3	47
14	Covid-19 RTPCR Testing camp	11-02-2021	Physical Education	4	52
15	Covid-19 Awareness Lecture	28-10-2020	Physical Education	15	35
16	Covid-19 Protection disinfection of collegecampus	04-08-2020	Physical Education	5	0
17	Plantation in College Campus	04-07-2020	National Service Scheme	4	62
18	Blood Donation Camp	31-12-2020	National Service Scheme	3	48

ENVIRONMENT MANAGEMENT CELL

Sr No	Name of the auditor	Area of Expertise	Designation
1	Dr. Saswade Ramkisan Raghunath	Botany	Principal
2	Dr Navgire Madhukar Eknath	Nodal Officer	Coordinator/ IQAC
3	Dr Lande Kakasaheb Abasaheb	Geography / Environment	Member
4	Prof. Naik Dhirsing wahrya	Energy Audit	Member
5	Prof. Ghare Pravin Devram	Water Harvesting /Solid and Liquid waste	Member
6	Dr. Gedam Ajit Kashinath	Vermicomposting project	Member
7	Prof Nawale Rohan Vijaykumar	Botany	Member
8	Shri. Gaikwad Dattatraya Bhausaheb	Administration	Member

2.0 ANALYSIS

2.1 GREEN AREA/ PLANTATION

Green area or plantation includes the plant, greenery and landscaping of the campus to enhance the environment of the area This will help to increase the beauty of the campus. The college area is diverse with a variety of plant species performing a variety of functions. Most of the plant species are planted through various plantation programmes organized by the college.

The plantation in college have increased the quality of life, not only in college campus but also the surrounding area in term of temperature control, contributing to improving air quality, soil conservation, water conservation and habitat for birds and small animals etc.

Many species of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favorite of birds and many insects. Leaf – covered branches keep many animals, such as birds and squirrels, out of reach of predators.

A thick belt of large shady trees in the periphery of the college have found to be bringing down noise and cut down dust. Thus, the college has been playing a significant role in maintaining the environment of the entire surrounding area of college.

2.1.1 FLORA DIVERSITY

Table 1. List of plant species

Sr No	Botanical Name	Local Name	Family	No of Plants	Type
1	*Acacia nilotica*	Babul tree	Fabaceae	7	Tree
2	*Adansonia digitata*	Gorakchinch	Bombacaceae	3	Tree
3	*Adathoda vasica*	Adulsa	Acanthaceae	5	Shrub
4	*Aegle marmelos*	Bel	Rutaceae	4	Tree
5	*Albizia julibrissin*	Silk plant	Fabaceae	2	Tree
6	*Alstonia scolaris*	Saptaparni	Apocynaceae	35	Tree
7	*Annona reticulata*	Ramphal	Annonaceae	4	Tree
8	*Annona squmosa L.*	Shitaphal	Annonaceae	49	Tree
9	*Araucaria columnaris J. R. Forst Hook.*	X-Mas tree	Araucariaceae	2	Tree
10	*Artocarpus heterophyllus*	Jackfruit/fanas	Moraceae	3	Tree
11	*Azadirachta indica*	Neem	Meliaceae	121	Tree
12	*Bambusa bamboo*	Bamboo tree	Poaceae	1	Tree
13	*Bauhinia racemosa*	Apta	Caesalpiniaceae	12	Tree
14	*Bauhinia variegate*	Raktakanchan	Fabaceae	17	Tree
15	*Bombax ceida*	Silk cotton tree	Malvaceae	2	Tree
16	*Bougainvillea spectabilis*	Kagadigulab	Nyctaginaceae	7	Shrub
17	*Butea monosperma*	Palas	Fabaceae	1	Tree
18	*Callistemon lanceollatus*	Bottle brush	Myrtaceae	7	Tree
19	*Calotropis giaganthe*	Ruie	Asclepiadaceae	15	Shrub
20	*Canna indica L.*	Kardal	Cannaceae	10	Shrub
21	*Capparis zeylanica*	Ceylon caper	Capparaceae	3	Tree
22	*Carica papaya*	Papaya	Caricaceae	9	Tree
23	*Cassia fistula*	Golden rain tree	Caesalpiniaceae	40	Tree
24	*Cassia marginata Roxb.*	Red cassia	Caesalpiniaceae	2	Tree
25	*Cassia siamea Lam.*	Yellow Cassia	Caesalpiniaceae	75	Tree
26	*Catharanthus roseus L.*	Sadaphuli	Apocynaceae	50	Shrub
27	*Clitoria ternatea L.*	Gokharna	Fabaceae	4	Tree
28	*Cocus nucifera*	Coconut	Aracaceae	46	Tree
29	*Cordia dichotoma G. Forst*	Bhokar	Boraginaceae	1	Tree
30	*Cuscuta refelxa Roxb.*	Amar bel	Convolvalaceae	2	Tree
31	*Cycas revolute*	Cycas	Cycadaceae	5	Tree

32	*Dalbergia sisso Roxb.*	Shisham	Fabaceae	59	Tree
33	*Delonix regia* (Box *ExHook)*	Gulmohar	Fabaceae	15	Tree
34	*Dypsis l utescens H. Wendl*	Areca palm	Arecaceae	10	Shrub
35	*Emblica officinalis*	Amla	Phyllanthaceae	7	Tree
36	*Eucalyptus lanceolatus*	Nilgiri	Myrtaceae	10	Tree
37	*Ficus benghalensis*	Wad/Banyan	Moraceae	7	Tree
38	*Ficus benjamina L.*	Weeping fig	Moraceae	27	Shrub
39	*Ficus elastic Roxb ex*	Rubber tree	Moraceae	2	Tree
40	*Ficus racemosa*	Umbar	Moraceae	3	Tree
41	*Ficus religiosa*	Pimpel	Moraceae	4	Tree
42	*Ixora coccinea*	Ixora/Rugmini	Rubiaceae	22	Shrub
43	*Lantana Camera*	Ghaneri	Verbenaceae	20	Shrub
44	*Leucaena leucocephala*	Subhabul	Fabaceae	16	Tree
45	*Limonia acidissima L.*	Kauth	Rutaceae	2	Tree
46	*Livistona chinensis*	Fan palm	Arecaceae	2	Tree
47	*Madhuca longifolia*	Sontharad	Sapotaceae	2	Shrub
48	*Mangifera indica*	Mango/Amba	Anacardiaceae	53	Tree
49	*Milingtonia hortensis*	Jasmine plant/Buuch	Bignoniaceae	22	Tree
50	*Mirabilis jalapa L.*	4 O clock plant	Nyctaginaceae	2	Shrub
51	*Murraya koenigii*	Kadipatta	Rutaceae	5	Tree
52	*Musa paradisiaca L.*	Banana	Musaceae	6	Tree
53	*Neolamarckia cadamba*	Cadamba	Rubiaceae	3	Tree
54	*Nephrolepis exaltata L.*	Fish bone Fern	Nephrolepidaceae	26	Shrub
55	*Nyctanthes arbor-tristis L.*	Parijaat	Oleaceae	3	Tree
56	*Parkinosonia aculeate L.*	Jelly bean tree	Fabaceae	2	Tree
57	*Peltophorum pterocarpum*	Soanmohar	Fabaceae	367	Tree
58	*Piper betle L.*	Banaras wel	Piperaceae	4	climber
59	*Pithcolombium dulce (Roxb)*	Vilayati Chinch	Fabaceae	1	Tree
60	*Plumeria obtuse*	chapha	Apocynaceae	5	Tree
61	*Polyalthia longifolia*	Ashoka	Annonaceae	108	Tree
62	*Pongania pinnata*	Karanj	Fabaceae	152	Tree
63	*Psidium guajava*	Peru	Myrtaceae	13	Tree
64	*Rauvolfia serpentine*	Sarpagandha	Apocynaceae	2	Tree
65	*Ricinus communis*	Castor	Euphorbiaceae	1	Shrub
66	*Roystone aregia*	Cuban royalpalm	Arecaeae	2	Tree
67	Samniea saman	Shiris	Mimoceaceae	7	Tree
68	*Santalum album*	Chandan	Santalaceae	6	Tree
69	*Saraka Indica*	Sitecha Ashok	Fabaceae	10	Tree

70	*Spathodia campanulata*	Fountain tree	Bignoniaceae	14	Tree
71	*Swetenia mahugani*	Mahoguni	Meliaceae	4	Tree
72	*Syzygium cumini L.*	Jambhul	Myrtaceae	10	Tree
73	*Syzygium cumini L.*	Jambhul	Myrtaceae	4	Tree
74	*Tabernaemontana divaricate R. Br.*	Chandanipat	Apocynaceae	4	Shrub
75	*Tamarindus indica*	Chinch, Imli	Fabaceae	49	Tree
76	*Tecoma stans L.*	Yellow bells	Bignoniaceae	38	Tree
77	*Tectona grandis*	Burma/ Saag	Lamiaceae	9	Tree
78	*Terminalia arjuna*	Arjun tree	Combretaceae	3	Tree
79	*Terminalia catappa L.*	Badam	Combretaceae	8	Tree
80	*Thespesia populnea*	Indian Tulip tree/Ranbhendi	Malvaceae	2	Shrub
81	*Thevetia peruviana*	Yellow Oleander	Apocynacae	21	Tree
82	*Thuja occidentalis*	Morpankhi	Cupressaceae	20	Tree
83	*Ziziphus jujuba*	Bore	Rhamnaceae	13	Tree
		Total		**1751**	

Total 67 tree species, 15 shrubs species and 1 climber species are observed in the college campus area.

- 1544 numbers of trees, 203 shrubs and 4 number of Climber are planted in college campus area.
- Good vegetation was observed at boundary of college.
- College actively participated in tree plantation Programme
- College conducted and participated in various Planation activity programs are being organized at college campus and surrounding villages through various activities of college.
- The plantation program includes various types of indigenous species of ornamental and medicinal wild plant species.

Plantation of in year 2021-22

Plant No.	**Botanical Name**	**Local Name**	**Family**	**No.of plants in campus**
1	*Delonixregia*(Box.ExHook)	Gulmohar	Fabaceae	15
2	*Emblica officinalis*	Amla	Phyllanthacea	6

			e	
3	*Madhuca longifolia*	Sontharad	Sapotaceae	3
4	*Bauhinia variegate*	Raktakanchan	Fabaceae	18
5	*Catharanthus roseus L.*	Sadaphuli	Apocynaceae	4
6	*Araucaria columnarisJ.R.Forst Hook.*	X-Mas tree	Araucariaceae	3
7	*Cordia dichotomaG.Forst*	Bhokar	Boraginaceae	2
8	*Parkinosonia aculeate L.*	Jelly bean tree	Fabaceae	3
9	*Callistemon lanceollatus*	Bottle brush	Myrtaceae	6
10	*Cassia marginata Roxb.*	Red cassia	Caesalpiniaceae	3
11	*Syzygium cumini L.*	Jambhul	Myrtaceae	12
12	*Annona squmosa L.*	Shitaphal	Annonaceae	45
13	*Terminalia catappa L.*	Badam	Combretaceae	9
14	*Nyctanthes arbor-tristis L.*	Parijaat	Oleaceae	4
15	*Canna indica L.*	Kardal	Cannaceae	9
16	*Tabernaemontana divaricate R.Br.*	Chandanipat	Apocynaceae	5
17	*Clitoriaternatea L.*	Gokharna	Fabaceae	5
18	*Piper betle L.*	Banaras wel	Piperaceae	5
19	*Ficus racemosa*	Umbar	Moraceae	2
	Total			159







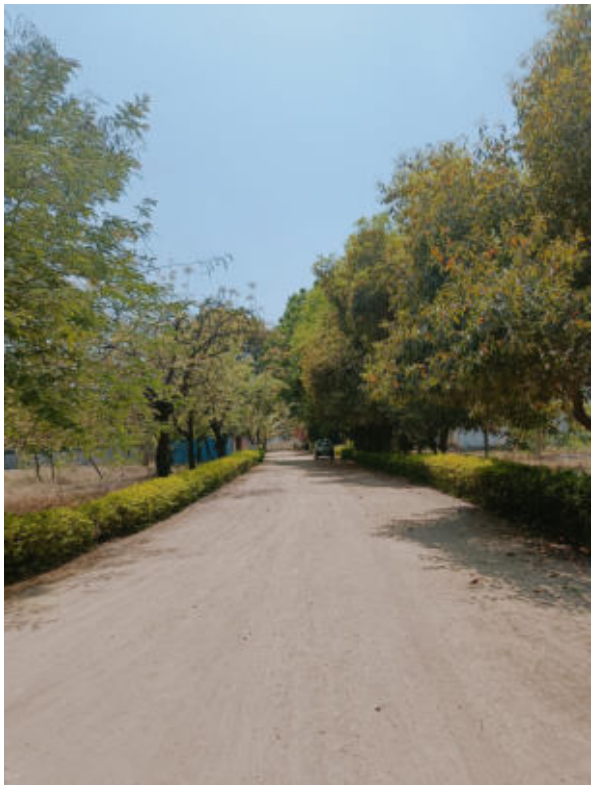












2.1.2 FAUNAL DIVERSITY

2.1.3 BOTANICAL GARDEN

Botanical garden is developed in 3000 sq.ft area in college campus. The garden has rich flora having approximately 63 Plant Species

The plants are of different ecological groups such as mesophytes, xerophytes, hydrophytes as well as it includes rock garden, pond ecosystem, oxy-park, medicinal plants, ornamental plants and various types of hedges and edges.

A botanical garden is an institution for botanical research, especially on the native flora of the region.



Botanical Garden

Functions of Botanical Gardens:

The botanical gardens are the natural source of science and culture. Functions of Botanical Gardens are as follows.

- Botanical gardens act as out-door laboratories.
- Initiate studies on the tropical and temperate ecosystems and their biota, before they are lost to science and preserve such systems.

- Serve as centres of gene pools or germplasm bank of wild relatives of economically important plants.
- Establish Nature centers and youth Museums to focus attention on destruction of tropical and temperate ecosystem, environmental degradation.





List of plants in Botanical Garden

Plant No.	Botanical Name	Local Name	Family
1	*Eucalyptus lanceolatus*	Nilgiri	Myrtaceae
2	*Pongania pinnata*	Karanj	Fabaceae

3	*Azadirachta indica*	Neem	Meliaceae
4	*Spathodia campanulata*	Fountain tree	Bignoniaceae
5	*Mangifera indica*	Mango/Amba	Anacardiaceae
6	*Musa paradisiaca L.*	Banana	Musaceae
7	*Bombax ceida*	Silk cotton tree	Malvaceae
8	*Plumeria obtuse*	chapha	Apocynaceae
9	*Murrayakoenigii*	Kadipatta	Rutaceae
10	*Nephrolepis exaltata L.*	Fish bone Fern	Nephrolepidaceae
11	*Adathoda vasica*	Adulsa	Acanthaceae
12	*Cycas circianalis*	Cucus	Cycadaceae
13	*Asparagus racemosus*	Shatavari	Asparagaceae
14	*Vinca rosea*	Madagascar periwinkle,	Apocynaceae
15	*Origanum majorama*	Marjoram	Lamiaceae
16	*Bougainvillea spectabilis*	Kagadigulab	Nyctaginaceae
17	*Cassia fistula*	Golden rain tree	Caesalpiniaceae
18	*Lantana Camera*	Ghaneri	Verbenaceae
19	*Bauhinia variegate*	Raktakanchan	Fabaceae
20	*Catharanthus roseus L.*	Sadaphuli	Apocynaceae
21	*Araucaria columnaris J. R. Forest Hook.*	X-Mas tree	Araucariaceae
22	*Callistemon lanceollatus*	Bottle brush	Myrtaceae
23	*Terminalia catappa L.*	Badam	Combretaceae
24	*Canna indica L.*	Kardal	Cannaceae
25	*Tabernaemontana divaricate R. Br.*	Chandanipat	Apocynaceae
26	*Piper betle L.*	Banaras wel	Piperaceae
27	*Ficus racemosa*	Umbar	Moraceae
28	*Thuja occidentalis*	Morpankhi	Cupressaceae
29	*Aegle marmelos*	Bel	Rutaceae
30	*Santalum album*	Chandan	Santalaceae
31	*Cocus nucifera*	Coconut	Aracaceae
32	*Rauvolfia serpentine*	Sarpagandha	Apocynaceae
33	*Swetenia mahugani*	Mahoguni	Meliaceae
34	*Cycas revolute*	Cycas	Cycadaceae
35	*Manilkara zapota*	Chikoo	Sapotaceae
36	*Psidium guajava*	Peru	Myrtaceae
37	*Peltophorum pterocarpum*	Soanmohar	Fabaceae
38	*Butea monosperma*	Palas	Fabaceae
39	*Costus pictus*	costus	Coastaceae
40	*Ocimum sanctum*	Tulas	Lamiaceae
41	*Cymbopogon citrates*	Gavati Chaha	Poaceae
42	*Hibiscus rosa-sinesis*	Jaswand	Malvaceae
43	*Zamia pygmaea*	guayra,	Cyacadaceae
44	*Ficus panda*	Nandhrukha	Moraceae

45	*Nerium olender*	Kanher	Apocynaceae
46	*Jatropha integerrimo*	Jatropha	Eophorbiaceae
47	*Mentha spicata*	Pudina	Lamiaceae
48	*Thunbergia grandiflora*	Motha Pandhara	Acanthaceae
49	*Agave americana*	Ghaypat	Asparagaceae
50	*Putranjiva roxburghii*	Putrajivi	Putranjivaceae
51	*Sansevieria trifasciata*	snake plant	Asparagaceae
52	*Pedilanthus tithymaloides*	nival	Euphorbiaceae
53	*Terminalia chebula*	Hirda	Combretaceae
54	*Terminalia bellirica*	Behada	Combretaceae
55	*Commiphora wightii*	guggul	Burseraceae
56	*Opuntia elatior*	Phadya Nivadung	Cactaceae
57	*Ananas comosus*	Ananus	Bromeliaceae
58	*Ruta graveolenus*	Rue	Rutaceae
59	*Cupressus macrocarpa*	saru	Cupressaceae
60	*Ravenala madagascariensis*	Travellers Palm	Strelitziaceae
61	*Caryota mitis*;	Fish tail palm	Arecaceae
62	*Plumeria pudica*	Nag champa	Apocynaceae
63	*Casuarina equisetifolia;*	Suru	Casuarinaceae

List of Medicinal plants in Botanical Garden

Sr. No.	Name of the plant	Local name	Family	Plant part used
1	*Eucalyptus lanceolatus*	Nilgiri	Myrtaceae	Leaves, bark
2	*Aegle marmelos*	Bel	Rutaceae	fruits
3	*Rauvolfia serpentine*	Sarpgandha	Apocynaceae	Roots, Fruits,leaves
4	Asparagus racemosus	Shatavari	Asparagaceae	Roots
5	*Adathoda vasica*	Adulsa	Acanthceae	leaves
6	Vinca rosea	Sadaphuli	Apocynaceae	leaves
7	*Origanum majorana*	Marwa	Lamiaceae	Leaves
8	*Ocimum sanctum*	Tulas	Lamiaceae	Leaves
9	*Cymbopogon citrates*	Gavati chaha	Poaceae	leaves
10	Mentha spicata	Pudina	Lamiaceae	Leaves
11	*Azadirachta indica*	Neem	Meliaceae	Leaves,stem,fruit
12	Terminalia chebula	Hirda	Combretaceae	Fruits
13	*Terminalia bellirica*	Beheda	Combretaceae	fruits

14	*Commiphora wightii*	Guggul	Burseraceae	friuts
15	*Aloe vera*	korphad	Asphodelaceae	Leaves
16	*Murraya koenigii*	Kadipatta	Rutaceae	Leaves
17	*Pelargonium citrosum*	Odomus plant	Geranaceae	Leaves
18	*Pelargonium hortorum*	Geranium plant	Geranaceae	Leaves
19	*Ruta grareolens*	Satapa	Rutaceae	Entire plant
20	*Pandanus odorifer*	Kewda	*Panadanaceae*	fruit
21	*Chlorophytum borivilianum;*	Safed Musli	Asperagaceae	Roots
22	*Acorus calamus;*	vekhand	*Acoraceae*	fruit

2.2 WATER & WASTE WATER MANAGEMENT

Water is a natural resource all living things are depend on water. We need to use water wisely to ensure that drinkable water is available for all, now and in the future. Water auditing is conducted for the evaluation of facilities of water requirement,

SOURCES AND FACILITIES FOR WATER TREATMENT AND ITS REUSE.

2.2.1 WATER REQUIREMENT

In college campus following main uses of water

Main water uses in the campus

- Drinking
- Lab
- Cleaning
- Toilets
- Washing
- Office uses
- Garden

Water source: Mula right bank canal & Grampanchayat Bhenda.

Water tank having capacity of 1 lakh litr is constructed by college



Water requirement for year 2020-21 is calculated based on the number of students, staff & garden area etc.

Sr No	Details	Number	Water Requirement per head lit/day as per NBC Norms 2016			Total Lit/day
			Domestics	Flushing	Total	
1	**Students**	1464	25	20	45	65880
2	**Staff**	97	25	20	45	4365
3	**Hostel for Girls & Boys**	220	90	45	135	14850
4	**Staff Quarter**	50	90	45	135	6750
						91845

*Estimation of water requirement for drinking and domestic use as per NBC 2016, BIS

1	**Domestic water**	91845lit/day
2	**Department/ Laboratory Use Chemistry, Botany & Zoology**	2000 lit /day
3	**Garden & Lawn**	6000 lit /day
	Total Water	99845 lit/day (99.84 M3/day)

- The total quantity of water required for drinking, flushing and laboratory use and gardening purposes is assessed is assessed as 99.84 liters per day.
- Area under plantation is about 30 % of total area of institute (31.65 acre) but most of the plants are more than 10-15 years old so that no need of daily water for those plants. Only garden, lawn and botanical garden required daily water.
- For hygienic drinking water, Water is treated at water treatment plant by Sugar Factory and provided to college.

2.2.2 WASTE WATER GENERATION & TREATMENT

- Total 85 m3/day sewage is generated. Generated sewage is treated through Septic tank. Over flow of septic tank is used for the gardening.
- Septic tanks are provided to treat the generated sewage.
- No treatment is provided to waste water generated from laboratories

2.2.3 WATER CONSERVATION

- Roof top Rain water harvesting system is installed and water collected at natural tank behind the Main Building of college. Collected water will be used for gardening after rainy season in month of October to December.



Natural Pond for Rain Water Storage

- Rain water is collected at 2000 lit capacity tank and are using for the chemistry department laboratory.



Rain water harvested at Tank

Rainwater Harvesting Calculations

- Area for Rainwater Harvesting = 2870 SQ. M
- Average Seasonal Rainfall in Newasa Taluka from last five year = 531 MM OR 0.531 M
- Run-Off Co-Efficient = 0.9
- Rain water harvesting potentional = 0.531 x 2870 x 0.9 = 1371 CU. M

2.3 SOLID WASTE MANAGEMENT

To reduce waste in the college campus, recycling efforts are taken. Waste is collected and segregated properly. Students, faculty, and staff are aware and educated on proper waste management practices such as waste source and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste is divided into two categories: dry waste and wet waste

- Wet waste: biodegradable waste
- Dry waste: no Biodegradable waste

2.3.1 WASTE GENERATION IN COLLEGE CAMPUS

Category	Quantity kg/day	Disposal
Paper Waste	5	Sale to Vendor for recycling
Plastic waste	4	Sale to Vendor for recycling
Glass waste	0.50	Sale to Vendor for recycling
Metal waste	2.0	Sale to Vendor for recycling
Canteen waste (Food waste)	20	Vermi composting and used as manure for garden
Garden waste	120	Vermi composting and used as manure for garden

2.3.2 OBSERVATIONS

- The waste generated in the campus includes glass, metals, wrappers, paper, plastics, etc. Old newspapers, used papers and journal files, workshop scrap etc. are given for recycling to external agencies.
- Glass, metals, plastic and other non-biodegradable wastes are given to external agencies where they are segregated and disposed/ recycled according to the nature of the waste.
- Biodegradable waste: Leaf litter& food waste is decomposed in composting unit of College.

- Plastic waste sends to the recycling vendor. Apart from dry solid waste, the campus generates an average of 120kgs of organic waste per day and 20 kgs of processed food waste per day from canteen.
- In garden a unit of Vermicompost also established which is essential for production of vermicompost and vermiwash as an organic manure which is used as fertilizer for various plants in the garden. Vermi composting plant is in operation in the campus. Food Waste from collage and canteen is mix with leaf litter and use for the Vermi composting. Vermi compost is used for plants as manure.
- Clean and neat College campus was observed during the visit.

2.4 E –WASTE

E- waste is becoming major thread to the whole world. Its toxic emissions mixed with virgin soil and air and causing harmful effects to the entire biota either directly or indirectly. Direct impacts include release of acids, toxic compounds including heavy metals, carcinogenic chemicals and indirect effects such as bio magnification of heavy metals

2.6.1 OBSERVATIONS;

E-waste generated in the college campus is very less in quantity. The E-waste and defective item from computer laboratory is being stored properly. The college management has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner.

3.0 CONCLUSION

Green and environment audit is the powerful tool to identify the strength and weakness of college in environment area.

This audit is one kind of scientific and professional approach towards accountability in utilization of resources. Green audit is helpful to the college for the identifying, evaluating and managing environmental risks and improvement in waste management, energy, water management etc.

Output of the green audit report in each area will be serve as a guide for educating the college community on the environment related practices and resource usage at the college as well as new activities and innovative practices.

CERTIFICATE

GREEN & ENVIRONMENT AUDIT

This is to certify that **Jijamata College of Science and Arts, Dnyneshwarnagar, Bhende (BK), Tal-Newasa, Dist -Ahmednagar** has successfully undergone **Green & Environment Audit** for year 2021-22

Date : 25TH MARCH 2022

Dr. Adhikrao Yewale
Universe Environment Consultancy, Pune

DETAILED ENERGY AUDIT REPORT

Year 2021-22

Prepared for

Shri.Marutrao Ghule Patil Shikshan Santha'

Jijamata College of Science and Arts,

Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar



Prepared by

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Abbreviations

Abbreviations	Full Form
°C	Degree Centigrade
A	Ampere
AC	Alternating Current
Avg.	Average
CFM	Cubic Feet per Minute
CMH	Cubic Meter per Hour
DB	Distribution Board
DG	Diesel Generator
Dia.	Diameter
hr.	Hour
I	Current
kCal	Kilo Calories
Kg.	Kilogram
kVA	Kilo Volt Ampere
kVAr	Kilo Volt Ampere Reactive
kW	Kilo Watts
kWh	Kilo Watt Hour
M or m	Meter
Max.	Maximum
M/c	Machine
MD	Maximum Demand
Min.	Minimum
SES	SES Energy Services Ltd.
Mm	Millimetre
MTs	Metric Tons
No.	Number
p.a.	Per Annum
PF	Power Factor
Sec.	Second
SEC	Specific Energy Consumption
THD	Total Harmonics Distortion
TPA	Tons per Annum
TPD	Tons per day
Temp.	Temperature
V	Voltage
VFD	Variable Frequency Drive
JCSA	Jijamata College Of Science And Arts
PEA	Pioneer Energy Auditor
yr.	Year

HIGHLIGHTS OF THE REPORT

A. JIJAMATA COLLEGE OF SCIENCE AND ARTS

- Year of Energy Audit : 2021-22
- Location : Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar

B. Energy Scene

- Energy source : MSEDCL
- Total annual electricity bill : RS. 19.87 lakh (Nov 21 - Oct 22)
- Major connected load : Computers, Lighting, Fan,

C. Key Result Areas for Energy Savings & Estimated Potential along with Broad Cost Benefit:

Sr.no	Energy Saving Areas	Estimated Investment (Rs. Lakhs)	Estimated Energy Saving Potential (Rs. Lakh)	Simple Payback Period (Months)	Remark
1	Power Factor Improvement at Main Incomer	3.0	0.67	54	Long Term
2	Replacement of 24 Watt Tube Light With 15 W LED Tube Light at Hostels	0.18	0.07	31	Mid Term
3	Replacement of 36 Watt Tube Light With 15 W LED Tube Light at Hostels	0.33	0.298	13	Short Term
4	Installation of Solar Water Heating System for Hostels	6.0	1.37	53	Long Term
5	Installation of Energy Efficient Fan with Existing Fan	1.5	0.43	42	Long Term
	Total	**11.0**	**2.8**	**46.5**	

Payback period =Investment /revenues x 12 Months

ACKNOWLEDGEMENTS

An energy audit study is a joint venture exercise of consultant and industry to account & contain energy usage without sacrificing the purpose of energy use. The contribution of industry team is equally important in this venture. Team of technical experts of M/s. Hitech Energy Services, Pune appreciates the keen interest shown by the management of M/s.Jijamata College of Science and Arts. for their kind co-operation, furnishing required data, analysis reports and hospitality offered during our visits.

Dr. Saswade Ramkisan Raghunath	:	Hon.Principle
Dr. Navgire Madhukar Eknath	:	Coordinator/ IQAC
Dr. Lande Kakasaheb Abasaheb	:	Member
Prof. Naik Dhirsing wahrya	:	Member
Prof. Ghare Pravin Devram	:	Member
Dr. Gedam Ajit Kashinath	:	Member
Prof. Nawale Rohan Vijaykumar	:	Member
Shri. Gaikwad Dattatraya Bhausaheb	:	Member

We are also thankful to the other staff members who were actively involved while collecting operating data and conducting the field studies.

Chapter 1

INTRODUCTION

1.1 Preamble

- M/s.Jijamata College of Science and Arts., Bhende having 58 KVA Contract demand and 60 KVA is maximum peak in the May 2022.
- This energy audit report for JCSA presents the analysis of the data collected, observations made and field trials undertaken. It is governed by the objectives, scope of work, and methodology discussed in ensuing paragraphs.

1.2 Objectives

- To undertake an energy audit at JCSA so as to identify areas for energy saving, both without and with investment.

- To prioritize distinct areas identified for energy savings depending upon saving potential, skills, and time frame for execution, investment cost, paybacks etc.

1.3 Methodology

- Pioneer Energy Auditor deputed following team of experts for conducting the study and worked in close association with JCSA personnel.

➢ Mr. Pradeep Thakur (Certified Energy Auditor)

➢ Hitech Energy Services submitted an execution work plan for the assignment for which client provided relevant data support.

- Client nominated specific persons from engineering / maintenance sections along with a co-ordinator of senior managerial level for this audit.

- HES undertook an "Orientation Meeting" with management / engineering / maintenance personnel prior to start of the audit.

- HES's team conducted all necessary field trials and measurements.

- HES provided all the instruments necessary for conducting the field trials.

- HES's team used following instruments;

Table 1: Instruments Used by Energy Audit Team

Sr. No.	Instrument Name	Specification
1.	Power Analyzer	Suitable for 1φ, 3φ. 156 electrical parameters like voltage, current, frequency, harmonics, active & reactive power, power factor etc.
2.	Clamp-on Power Meter	0 - 1200 kW 0 - 600 Voltage, AC 0 - 800 Voltage, DC 0 - 2000 A, Current, AC / DC
3.	Lux Meter	0 - 50,000 lux level Non Contact Type
4.	Digital Thermo Anemometer	0 - 45 m / sec. ± 3%
5.	Relative Humidity and Temperature Indicator	RH – 10% to 95% Temp. – 0 – 100 °C Handheld unit
7.	Infrared Thermometers	40 ^{0}C to 500 ^{0}C
8.	Portable Temperature Indicator	50 ^{0}C to 1200 ^{0}C

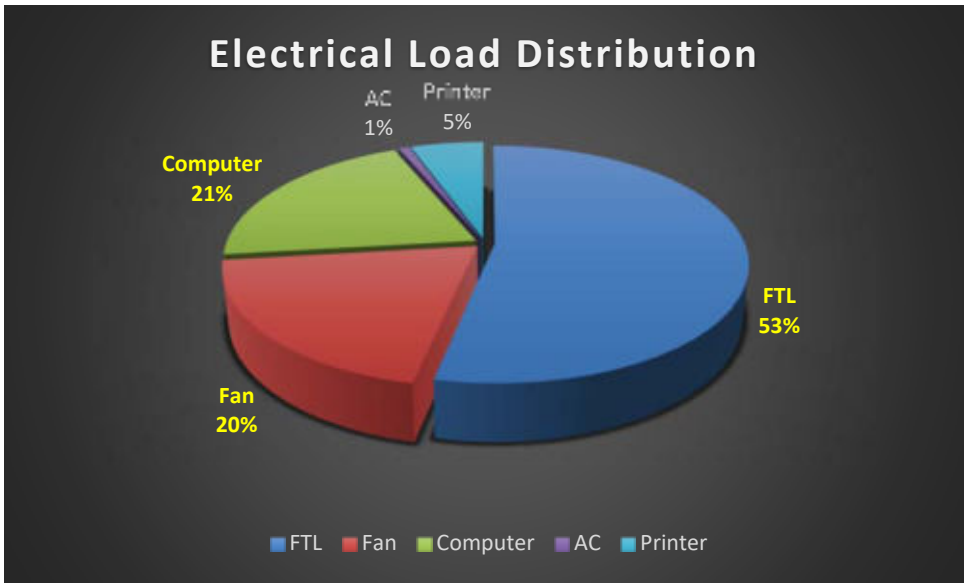
Chapter 2

BACK DROP ON ENERGY SCENE

2 Electrical Energy Share

- The primary source of electrical power for the bank is from the MSEDCL Grid with contract demand of 58 KVA.
- Major electrical energy consumers at the bank have been shown in below figure. As can be noted the water heaters, air conditioners, celling fan, Lighting The study involved analysis the actual major consumers followed by energy saving opportunities at these sections.

Figure 1:Various Loads Contribution in %



- Average Grid contract demand is 58 kVA.
- Average registered actual demand is 47.4 KVA with a maximum peak of 60 KVA.
- The below table indicates average consumption for the reference period.

Table 2 : Electricity consumption Details

Bill Months	Units	Bill Demand KVA	Bill Amount
22-Oct	10121.0	45.0	158108.0
22-Sep	11662.0	45.0	177170.0
22-Aug	11210.0	45.0	172214.0
22-Jul	10666.0	45.0	165612.0
22-Jun	11684.0	49.0	180150.0
22-May	17194.0	60.0	231337.0
22-Apr	14447.0	50.0	194133.0
22-Mar	13736.0	44.0	184225.0
22-Feb	10108.0	44.0	138295.0
22-Jan	9186.0	44.0	128571.0
21-Dec	9683.0	44.0	133469.0
21-Nov	8569.0	54.0	124534.0
Total	138266.00	--	1987818
Average	11522.2	47.4	165651.5
Min	8569.0	44.0	124534.0
Max	17194.0	60.0	231337.0

2.1 Energy Metering, Monitoring & Control System - Existing Status

2.2 Electricity

- Electrical energy consumption at the facility is measured on the main meter on daily basis.
- Adequate instrumentation is observed for power, voltage & current.

2.3 Level of Awareness

- The level of awareness for energy conservation in top & middle management is excellent. It has however felt necessary to make serious efforts to percolate the same up to the individual operating personnel level.

2.3.1 Power Measurement Survey

Table 3: Power Survey

Mode	Phase	V	A	KW	P. F
1 Phase	R-N	237	48	11.03	0.97
	Y-N	234	52	11.68	0.96
	B-N	239	51	11.70	0.96
3 Phase	RY	415	48	33.5	0.97
	YB	418	52	36.5	0.97
	BR	420	51	36.0	0.97

Observation:

Table 3: Voltage observations at MSEDCL Incomer

Voltage	Line V	Phaser V	Current
VL1	431	227	48
VL2	427	224	52
VL3	425	225	51
Avg L-L V	427.7	225.3	50.3
Max Deviation Vavg	3.3	1.7	1.7
Voltage Unbal %	0.8%	0.7%	3.3%
Remark	☑	☑	☑

Suggestion:

- Voltage & Current % Unbalance are found within the specified limit
- Specified Limit is 1% as per the NEC 2019

- **2.3.4 Exisisting Connected Load in kW**

Table 4 – Exisisting Connected Load 2021-22

Types of Loads	Qty	Watt per unit	Watt	KW	Load %
Computer load	104	180	18720	18.7	40.9%
Tube load	270	20	5400	5.4	11.8%
Fan load	100	60	6000	6.0	13.1%
Printer	28	220	6160	6.2	13.5%
Scanner & Printer	5	250	1250	1.3	2.7%
Fridge	5	200	1000	1.0	2.2%
Xerose	5	1040	5200	5.2	11.4%
LED load	120	10	1200	1.2	2.6%
Parch & outside load	36	24	864	0.9	1.9%
Total	**673**	**2004**	**45794**	**45.8**	**100%**

Chapter 3

ENERGY CONSERVATION OPPORTUNITIES

3.0 Power Factor Improvement at Main Incomer

Electricity Bill Analysis Calculations							
Average P.F:			0.93		Cos Inv	0.376	
Desired P.F:			0.99		Cos Inv	0.142	
Average Billed KVA			47.4				
Demand Charges/KVA in RS			454				
Kw Drawn			44.08				
KVAr required =	44.1	X	Tanø1	-	Tanø2		
KVAr required =	44.1	X	0.39523	-	0.14249		
KVAr required =	11.1						
Reduction in Demand KVA/Month	3.3	=	47.4	-	44.1		
Reduction in Demand charges:	18076.5	=	3.318	X	12	X	454
Total Revenue Possible in RS			18076.46				
Cost of Capacitor in RS			4000.0				
Payback period in Months			3				

3.1 Replacement of 24-Watt Tube Light With 15 W LED Tube Light at Poarch Area

Table 5 : Saving Potential with 15 Watt LED

Replacement of 24-Watt Tube Light With 15 W LED Tube Light at Poarch and Outside Area							
Sr. No.	**Lighting Description**	**Qty**	**Wattage**	**Actual Consumption in Kw**	**Proposed FTL Wattage**	**Power Consumption in KW with 15 Watt LED FTL**	**Unit**
1	FTL Light at Hostels	36	24	0.864	15	0.54	Kw
2	Total kWh Saving	---				0.324	Kwh
3	Electricity cost per Rs/kWh	8.96					Rs/kWh
4	Annual operating Hr	2400					Hr./Year
	Saving potential per year	0.324	x	8.96	x	2400	
	Total Saving Potential in RS	**6967.296/-**					
	Imvestment Cost of New 15-Watt Fittings in RS	**18000.00/-**					
	Simple Payback Period in Months	**31.00**	=	18000.00	/	6967.3	

3.2 Replacement of 36-Watt Tube Light With 15 W LED Tube Light at Hostels

Table 6 : Saving Potential with LED Tube light

Replacement of 36-Watt Tube Light With 15 W LED Tube Light at Hostels							
Sr. No.	**Lighting Description**	**Qty**	**Wattage**	**Actual Consumption in Kw**	**Proposed FTL Wattage**	**Power Consumption in KW with 15 Watt LED FTL**	**Unit**
1	FTL Light at Hostels	66	36	2.376	15	0.99	Kw
2	Total kWh Saving	---				1.386	Kwh
3	Electricity cost per	8.96					Rs/kWh
4	Annual operating Hr	2400					Hr./Year
	Saving potential per year	1.386	x	8.96	x	2400	
	Total Saving Potential in RS	**29804.544/-**					
	Imvestment Cost of New 15-Watt Fittings in RS	**33000.00/-**					
	Simple Payback Period in Months	**13.29**	=	33000.00	/	29804.5	

Specifications: 15 LED Tube Light:

Power	15 W
Input Voltage	90-280V AC
LED	Philips/Cree/Osram
Color	Warm White/ Pure White
C.C.T.	2700-3300K(WW)/5500-6500K(PW)
Efficiency	>85%
Power factor	>0.90
Lumens"	100 lumen per watt
Life Span	>50000 hours
CRI	>80%
Replacement for	20 w FTL

Length	T5 1200 MM

3.3 Installation of Solar water Heating System for Hostel

Table 7: Installation of Solar Hot Water System

Solar Water Heating System for Hostels							
Sr. No.	**Lighting Description**	**Qty**	**Water Required/day per Student in Ltrs.**		**Total Capacity in Ltrs.**	**Safety Factor 10%**	**Unit**
1	No. of Students in Hostels Approx.	100	50		5000	5500	Ltrs
2	Actual Kwh Consumption per day for Water Heating per day /1hr Operation	51					Kwh/day
3	Energy Saving after installation of Solar Water Heating System	51					Kwh/day
4	Electricity cost per Rs/kWh	8.96					Rs/kWh
5	Annual operating Hr	2400					Hr./Year
6	Electricity Cost per year for 300 days in lakh	300	X	51	X	8.96	
	Electricity Cost per year for 300 days in lakh	**1.37**					
	Imvestment Cost for Solar Water Heating System in Lakh	6.00					
	Simple Payback Period in Months	**52.52**	=	6.00	/	1.37	

3.4 Installation of Energy Efficient Fan with Existing Fan

Table 8: Saving Potential with Celling Fan

Installation of Energy Efficient Fan with Existing Fan							
Sr. No.	**Lighting Description**	**Qty**	**Wattage**	**Actual Consumption in Kw**	**Proposed EEF Fan Wattage**	**Power Consumption in KW with 15 Watt LED FTL**	**Unit**
1	Celling Fan	100	65	6.5	45	4.5	Kw
2	Total kWh	---				2	Kwh
3	Electricity cost	8.96					Rs/kWh
4	Annual operating	2400					Hr./Year
	Saving potential per year	2.000	x	8.96	x	2400	
	Total Saving Potential in RS	43008					
	Imvestment Cost of New 15 Watt Fittings in RS	150000.00					
	Simple Payback Period in Months	41.85	=	150000.00	/	43008.0	

Chapter - 4

ENERGY CONSERVATION: GENERAL ENERGY CONSERVATION TIPS

General Energy Conservation Tips

- Apart from the above-mentioned areas, there are certain tips that plant should examine in future to increase energy efficiency and hence to cut down on energy costs.

Checklist & Tips For Energy Efficiency In Electrical Utilities

1.1.1 Electricity

- Optimise the tariff structure with utility supplier
- Schedule your operations to maintain a high load factor
- Minimise maximum demand by tripping loads through a demand controller
- Stagger star-up times for equipment with large starting currents to minimise load peaking.
- Use standby electric generation equipment for on-peak high load periods.
- Correct power factor to at least 0.95 under rated load conditions.
- Relocate transformers close to main loads.
- Set transformer taps to optimum settings.
- Disconnect primary power to transformers that do not serve any active loads
- Consider on-site electric generation or cogeneration.
- Export power to grid if you have any surplus in your captive generation.
- Check utility electric meter with your own meter.
- Shut off unnecessary computers, printers and copiers at night

1.1.2 Motors

- Properly size to the load for optimum efficiency.(High efficiency motors offer of 4 – 5% & higher efficiency than standard motors)
- Use energy-efficient motors where economical.
- Use synchronous motors to improve power factor.
- Check alignment.
- Provide proper ventilation (For every 10^0C increase in motor operating temperature over recommended peak, the motor life is estimated to be halved)
- Check for under-voltage and over-voltage conditions.
- Balance the three-phase power supply. (An Imbalanced voltage can reduce 3 – 5% in motor input power)
- Demand efficiency restoration after motor rewinding. (If rewinding is not done properly, the efficiency can be reduced by 5 – 8%)

1.1.3 Drives

- Use variable-speed drives for large variable loads.
- Use high-efficiency gear sets.
- Use precision alignment.
- Check belt tension regularly.
- Eliminate variable-pitch pulleys.
- Use flat belts as alternatives to v-belts.
- Use synthetic lubricants for large gearboxes.
- Eliminate eddy current couplings.
- Shut them off when not needed.

1.1.4 Fans

- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimise fan inlet and outlet obstructions.
- Clean screens, filters and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimise fan speed.
- Use low-slip or flat belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.
- Minimise bends in ductwork.
- Turn fans off when not needed

1.1.5 Blowers

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimise blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimise blower speed.
- Use low-slip or no-slip belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable blower loads.
- Use energy-efficient motors for continuous or near-continuous operation.
- Eliminate ductwork leaks.
- Turn blowers off when they are not needed

1.1.6 Pumps

- Operate pumping near best efficiency point.
- Modify pumping to minimise throttling.
- Adapt to side load variation with variable speed drives or sequenced control of smaller units.
- Stop running both pumps – add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small load as requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimise water waste.
- Balance the system to minimise flows and reduce pump power requirements.
- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

1.1.7 Compressors

- Consider variable speed drive for variable load on positive displacement compressors.
- Use a synthetic lubricant if the compressor manufacturer permits it.
- Be sure lubricating oil temperature is not too high (oil degradation and lowered viscosity) and not too low (condensation contamination).
- Change the oil filter regularly.

- Periodically inspect compressor intercoolers for proper functioning.
- Use water heat from a very large compressor to power an absorption chiller or preheat process or utility feeds.
- Establish a compressor efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressor efficiency-maintenance program a part of your continuous energy management program.

1.1.8 Compressed Air

- Install a control system to co-ordinate multiple air compressors.
- Study part-load characteristic and cycling costs to determine the most-efficient mode for operating multiple air compressors.
- Avoid over sizing – match the connected load.
- Load up modulation-controlled air compressors. (They use almost as much power at partial load as at full load.)
- Turn off the back-up air compressor until it is needed.
- Reduce air compressor discharge pressure to the lowest acceptable setting. *(Reduction of 1 kg/cm² air pressure (8kg/cm² to 7 kg/cm²) would result in 9% input power savings. This will also reduce compressed air leakage rates by 10%)*
- Use the highest reasonable dryer dew point settings.
- Turn off refrigerated and heated air dryers when the air compressors are off.
- Use a control system to minimise heatless desiccant dryer purging.
- Minimise purges, leaks, excessive pressure drops and condensation accumulation. *(Compressed air leak from 1 mm hole size at 7 kg/cm² pressure would mean power loss equivalent to 0.5 KW)*
- Use drain controls instead of continuous air bleeds through the drains.
- Consider engine-driven or steam-driven air compression to reduce electrical demand charges.
- Replace standard V-belts with high-efficiency flat belts as the old V-belts wear out.
- Use a small air compressor when major production load is off.
- Take air compressor intake air from the coolest (but not air conditioned) location. *(Every 5ºC reduction in intake air temperature would result in 1% reduction in compressor power consumption)*
- Use an air-cooled after cooler to heat building makeup air in winter.
- Be sure that heat exchangers are not fouled (eg. – with oil)
- Be sure that air / oil separators are not fouled.
- Monitor pressure drops across suction and discharge filters and clean or replace filters promptly upon alarm.
- Use a properly sized compressed air storage receiver.
- Minimise disposal costs by using lubricant that is fully demulsible and an effective oil-water separator.
- Consider alternatives to compressed air such as blowers for cooling, hydraulic rather than air cylinders, electric rather than air actuators and electronic rather than pneumatic controls.
- Use nozzles or venturi - type devices instead of blowing with open compressed air lines.
- Check for leaking drain valves on compressed air filter / regular sets. Certain rubber-type valves may leak continuously after they age and crack.
- In dusty environments, control packaging lines with high-intensity photocell units instead of standard units with continuous air purging of lenses and reflectors.
- Establish a compressed air efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressed air efficiency-maintenance program a part of your continuous energy management program.

1.1.9 Chiller

- Increase the chilled water temperature set point if possible.
- Use the lowest temperature condenser water available that the chiller can handle. *(Reducing condensing temperature by 5.5ºC, results in a 20 – 25% decrease in compressor power consumption)*
- Increase the evaporator temperature *(5.5ºC increase in evaporator temperature reduces compressor power consumption by 20 – 25%)*
- Clean heat exchangers when fouled. *(1 mm scale build-up on condenser tubes can increase energy consumption by 40%)*
- Replace old chillers or compressors with new higher efficiency models.
- Use water-cooled rather than air-cooled chiller condensers.
- Use energy-efficient motors for continuous or near continuous operation.
- Specify appropriate fouling factors for condensers.
- Do not overcharge oil.
- Install a control system to co-ordinate multiple chillers.
- Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple chillers.
- Run the chillers with the lowest operating costs to near base load.
- Avoid oversizing – match the connected load.
- Isolate off-line chillers and cooling towers.
- Establish a chiller efficiency-maintenance program. Start with an energy audit and follow-up, then make a chiller efficiency-maintenance program a part of your continuous energy management program.

1.1.10 HVAC (Heating / Ventilation / Air Conditioning)

- Tune up the HVAC control system.
- Consider installing a building automation system (BAS) or energy management system (EMS) or restoring an out-of-service one.
- Balance the system to minimise flows and reduce blower / fan / pump power requirements.
- Eliminate or reduce reheat whenever possible.
- Use appropriate HVAC thermostat setback.
- Use morning pre-cooling in summer and pre-heating in winter (i.e. – before electrical peak hours).
- Use building thermal lag to minimise HVAC equipment operating time.
- In winter during unoccupied periods, allow temperature to fall as low as possible without damaging stored materials.
- Improve control and utilisation of outside air.
- Use air-to-air heat exchangers to reduce energy requirements for heating and cooling of outside air.
- Reduce HVAC system operating hours (e.g. – night, weekend).
- Optimise ventilation.
- Ventilate only when necessary. To allow some areas to be shut down when unoccupied, install dedicated HVAC systems on continuous loads (e.g. – computer rooms).
- Provide dedicated outside air supply to cleaning rooms, combustion equipment, etc. to avoid excessive exhausting of conditioned air.
- Use evaporative cooling in dry climates.
- Reduce humidification or dehumidification during unoccupied periods.
- Use atomisation rather than steam for humidification where possible.
- Clean HVAC unit coils periodically and comb mashed fins.
- Upgrade filter banks to reduce pressure drop and thus lower fan power requirements.
- Check HVAC filters on a schedule (at least monthly) and clean / change if appropriate.
- Check pneumatic controls air compressors for proper operation, cycling, and maintenance.

- Isolate air conditioned loading dock areas and cool storage areas using high-speed doors or clear PVC strip curtains.
- Install ceiling fans to minimise thermal stratification in high-bay areas.
- Relocate air diffusers to optimum heights in areas with high ceilings.
- Consider reducing ceiling heights.
- Eliminate obstructions in front of radiators, baseboard heaters, etc.
- Check reflectors on infrared heaters for cleanliness and proper beam direction.
- Use professionally-designed industrial ventilation hoods for dust and vapour control.
- Use local infrared heat for personnel rather than heating the entire area.
- Use spot cooling and heating (e.g. – use ceiling fans for personnel rather than cooling the entire area).
- Purchase only high-efficiency models for HVAC window units.
- Put HVAC window units on timer control.
- Do not oversize cooling unit. (Oversized units will "short cycle" which results in poor humidity control.)
- Install multi-fuelling capability and run with the cheapest fuel available at the time.
- Consider dedicated make-up air for exhaust hoods. (Why exhaust the air conditioning or heat if you do not need to?)
- Minimise HVAC fan speeds.
- Consider desiccant drying of outside air to reduce cooling requirements in humid climates.
- Consider ground source heat pumps.
- Seal leaky HVAC ductwork.
- Seal all leaks around coils.
- Repair loose or damaged flexible connections (including those under air handling units).
- Eliminate simultaneous heating and cooling during yearal transition periods.
- Zone HVAC air and water systems to minimise energy use.
- Inspect, clean, lubricate and adjust damper blades and linkages.
- Establish and HVAC efficiency-maintenance program. Start with an energy audit and follow-up, then make an HVAC efficiency-maintenance program a part of your continuous energy management program.

1.1.11 Refrigeration

- Use water-cooled condensers rather than air-cooled condensers.
- Challenge the need for refrigeration, particularly for old batch processes.
- Avoid oversizing – match the connected load.
- Consider gas-powered refrigeration equipment to minimise electrical demand charges.
- Use "free cooling" to allow chiller shutdown in cold weather.
- Use refrigerated water loads in series if possible.
- Convert firewater or other tanks to thermal storage.
- Do not assume that the old way is still the best – particularly for energy-intensive low temperature systems.
- Correct inappropriate brine or glycol concentration that adversely affects heat transfer and / or pumping energy. If it sweats, insulate it, but if it is corroding, replace it first.
- Make adjustments to minimise hot gas bypass operation.
- Inspect moisture / liquid indicators.
- Consider change of refrigerant type if it will improve efficiency.
- Check for correct refrigerant charge level.
- Inspect the purge for air and water leaks.
- Establish a refrigeration efficiency-maintenance program. Start with an energy audit and follow-up, then make a refrigeration efficiency-maintenance program part of your continuous energy management program.

1.1.12 Cooling Tower

- Control cooling tower fans based on leaving water temperatures.
- Control to the optimum water temperature as determined from cooling tower and chiller performance data.
- Use two-speed or variable-speed drives for cooling tower fan control if the fans are few. Stage the cooling tower fans with on-off control if there are many.
- Turn off unnecessary cooling tower fans when loads are reduced.
- Cover hot water basins (to minimise algae growth that contributes to fouling).
- Balance flow to cooling tower hot water basins.
- Periodically clean plugged cooling tower water distribution nozzles.
- Install new nozzles to obtain a more-uniform water pattern.
- Replace splash bars with self-extinguishing PVC cellular-film fill.
- An old counter flow cooling towers, replace old spray-type nozzles with new square-spray ABS practically-non-clogging nozzles.
- Replace slat-type drift eliminators with high-efficiency, low-pressure-drop, self-extinguishing, PVC cellular units.
- If possible, follow manufacturer's recommended clearances around cooling towers and relocate or modify structures, signs, fences, dumpsters, etc. that interfere with air intake or exhaust.
- Optimise cooling tower fan blade angle on a yearal and / or load basis.
- Correct excessive and / or uneven fan blade tip clearance and poor fan balance.
- Use a velocity pressure recovery fan ring.
- Divert clean air-conditioned building exhaust to the cooling tower during hot weather.
- Re-line leaking cooling tower cold water basins.
- Check water overflow pipes for proper operating level.
- Optimise chemical use.
- Consider side stream water treatment.
- Restrict flows through large loads to design values.
- Shut off loads that are not in service.
- Take blowdown water from the return water header.
- Optimise blowdown water from the return water header.
- Automate blowdown to minimise it.
- Send blowdown to other uses (Remembers, the blowdown does not have to be removed at the cooling tower. It can be removed anywhere in the piping system.)
- Implement a cooling tower winterisation plan to minimise ice build-up.
- Install interlocks to prevent fan operation when there is no water flow.
- Establish a cooling tower efficiency-maintenance program. Start with an energy audit and follow-up, then make a cooling tower efficiency-maintenance program a part of your continuous energy management program.

1.1.13 Lighting

- Reduce excessive illumination levels to standard levels using switching, delamping, etc. (Know the electrical effects before doing delamping.)
- Aggressively control lighting with clock timers, delay timers, photocells, and / or occupancy sensors.
- Install efficient alternatives to incandescent lighting, mercury vapour lighting, etc. as follows: low pressure sodium, high pressure sodium, metal halide, fluorescent, mercury vapour, incandescent.
- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.
- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts.
- Consider lowering the fixtures to enable using less of them.

- Consider day lighting, skylights, etc.
- Consider painting the walls a lighter colour and using less lighting fixtures or lower wattages.
- Use task lighting and reduce background illumination.
- Re-evaluate exterior lighting strategy, type and control. Control it aggressively.
- Change exit signs from incandescent to LED.

1.1.14 DG Set

- Optimise loading
- Use waste heat to generate steam / hot water / power an absorption chiller or preheat process or utility feeds.
- Use jacket and head cooling water for process needs.
- Clean air filters regularly.
- Insulate exhaust pipes to reduce DG set room temperatures.
- Use cheaper heavy fuel oil for capacities more than 1MW.

1.1.15 Building

- Seal exterior cracks / openings / gaps with caulk, gasketing, weather-stripping etc.
- Consider new thermal doors, thermal window, roofing insulation, etc.
- Install windbreaks near exterior doors.
- Replace single-pane glass with insulating glass.
- Consider covering some window and skylight areas with insulated wall panels inside the building.
- If visibility is not required but light is required, consider replacing exterior windows with insulated glass block.
- Consider tinted glass, reflective glass, coatings, awnings, overhangs, draperies, blinds and shades for sunlit exterior windows.
- Use landscaping to advantage.
- Add vestibules or revolving doors to primary exterior personnel doors.
- Consider automatic doors, air curtains, strip doors, etc. at high-traffic passages between conditioned and non-conditioned spaces. Use self-closing doors if possible.
- Use intermediate doors in stairways and vertical passages to minimise building stack effect.
- Use dock seals at shipping and receiving doors.
- Bring cleaning personnel in during the working day or as soon after as possible to minimise lighting and HVAC costs.

1.1.16 Waste & Waste Water

- Recycle water, particularly for uses with less-critical quality requirements.
- Recycle water, especially if sewer costs are based on water consumption.
- Balance closed systems to minimise flows and reduce pump power requirements.
- Eliminate once-through cooling with water.
- Use the least expensive type of water that will satisfy the requirement.
- Fix water leaks.
- Test for underground water leaks. (It is easy to do over a holiday shutdown.)
- Check water overflow pipes for proper operating level.
- Automate blow down to minimise it.
- Provide proper tools for wash down – especially self-closing nozzles.
- Install efficient irrigation.
- Reduce flows at water sampling stations.

- Eliminate continuous overflow at water tanks.
- Promptly repair leaking toilets and faucets.
- Use water restrictors on faucets, showers, etc.
- Use self-closing type faucets in restrooms.
- Use the lowest possible hot water temperature.
- Do not use a heating system hot water boiler to provide service hot water during the cooling year – install a smaller, more-efficient system for the cooling year service hot water.
- If water must be heated electrically, consider accumulation in a large insulated storage tank to minimise heating at on-peak electric rates.
- Use multiple, distributed, small water heaters to minimise thermal losses in large piping systems.
- Use freeze protection valves rather than manual bleeding of lines.
- Consider leased and mobile water treatment systems, especially for deionised water.
- Seal sumps to prevent seepage inward from necessitating extra sump pump operation.
- Install pre-treatment to reduce TOC and BOD surcharges.
- Verify the water meter readings.

1.1.17 Miscellaneous

- Meter any unmetered utilities. Know what is normal efficient use.Track down causes of deviations.
- Shut down spare, idling or unneeded equipment.
- Make sure that all of the utilities to redundant areas are turned off – including utilities like compressed air and cooling water.
- Install automatic control to efficiently co-ordinate multiple air compressors, chillers, cooling tower cells, boilers, etc.
- Renegotiate utilities contracts to reflect current loads and variations.
- Consider buying utilities from neighbours, particularly to handle peaks.
- Leased space often has low-bid inefficient equipment. Consider upgrades if your lease will continue for several more years.
- Adjust fluid temperature within acceptable limits to minimise undesirable heat transfer in long pipelines.
- Minimise use of flow bypasses and minimise bypass flow rates.
- Provide restriction orifices in purges (nitrogen, steam, etc.).
- Eliminate unnecessary flow measurement orifices.
- Consider alternatives to high pressure drops across valves.
- Turn off winter heat tracing that is on in summer.

1.2 Checklist & Tips For Energy Efficiency In Thermal Utilities

1.2.1 Insulation

- Repair damaged insulation
- Insulate any hot or cold metal or insulation
- Replace wet insulation
- Use an infrared gun to check for cold wall areas during cold weather or hot wall areas during hot weather
- Ensure that all insulated surfaces are cladded with aluminium.
- Insulate all flanges, valves and couplings.
- Insulate open tanks.

1.2.2 Waste Heat Recovery

- Recover heat from flue gas, engine cooling water, engine exhaust, low pressure waste steam, drying oven exhaust, boiler blowdown, etc.
- Recover heat from incinerator off-gas.
- Use waste heat for fuel oil heating, boiler feed water heating, outside air heating etc.
- Use chiller waste heat to preheat hot water.
- Use heat pumps.
- Use absorption refrigeration.
- Use thermal wheels, run-around systems, heat pipe systems and air-to-air exchangers.

SITE IMAGE GALLERY



Lux Level Measurement library



Physics Lab Lux Level





Load Measurement at Transformer and Hostel

CERTIFICATE OF ENERGY AUDIT

Education Instituties

Certificate No: 202122-EA 4520

This is to Certify that

JIJAMATA COLLEGE OF SCIENCE AND ARTS,

Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar

has successfully Completed the Statutory requirement of Energy Audit for Year 2021-22

issued this 25th day of March 2022

Valid until: March 2023

Hitech Energy Services

PowerTech Energy Solutions

Conserve to Consume

Energy, Green & Environment Audit Report of Jijamata College of Science and Arts, Dnyaneshwarnagar, Ahmednagar

Submitted By

PowerTech Energy Solutions

ENERGY,GREEN & ENVIRONMENT AUDIT COMPLETION CERTIFICATE

This is to certify that following utility has carried out Energy, Green & Environment Audit for the AY 2022-23 as per guidelines laid down in The Energy Conservation Act, 2001 in the month of Oct 2023

Name of the Installation	Jijamata College of Science and Arts, Dnyaneshwarnagar, Ahmednagar
Details of Facilities Audited	Main college building including lecture hall, libraries, Classroom etc.
Date of Energy and Green Audit	11 October 2023
Name of Certified Energy Auditor	Mr. Swapnil Gaikwad
Certification No.	EA 20121
Validity of the Certificate	10 October 2024

Authorised Signatory

Digitally signed by ATUL SHARAD KAKAD

Atul S Kakad

PowerTech Energy Solutions

Our Certificates

BEE Certified Energy Auditor Certificate

Regn. No. EA-20121

Certificate No. 8299

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr. / Mrs./ Ms. Swapnil Sanjay Gaikwad

son / daughter of Mr. Sanjay J. Gaikwad

has passed the National Certification Examination for Energy Auditors held in August - 2014, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India

Date : 9th January, 2015

Controller of Examination

Confidential report

2

Lead Auditor Certificate – ISO 50001: Energy Management System

TÜV NORD

PR366: ISO 50001:2018 Lead Auditor
(Energy Management System)
Training Course

Certificate of Achievement

Atul Kakad

has successfully completed the above mentioned course and examination.

26th - 30th November 2019

PUNE, INDIA

Certificate No. 35258395 07

Delegate No. 222777

for TÜV NORD CERT GmbH

Essen, 2020-01-08

The course is certified by CQI and IRCA (Certification No. 2088). The learner meets the training requirements for those seeking certification under the IRCA EnMS Auditor certification scheme.

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CERTIFIED COURSE

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MEDA Registration Certificate

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
(A Government of Maharashtra undertaking)
Aundh Road, Opposite Spicer College,
Near Commissionerate of Animal Husbandry, Aundh, Pune – 411 067
Ph No: 020-26614393/266144403
Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2022-23/CR-44/3803 — 4th October, 2022

CERTIFICATE OF REGISTRATION
FOR CLASS 'A'

We hereby certify that, the firm having following particulars is registered with ***MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)*** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm	:	M/s PowerTech Energy Solutions Office No. 10, B-wing, 3rd floor, Phuge Prima, Bhosari Dighi Road Bhosari, Pimpri Chinchwad- 411 039.
Registration Category	:	*Empanelled Consultant for Energy Conservation Programme for Class 'A'*
Registration Number	:	***MEDA/ECN/2022-23/Class - A/EA-31***

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **3rd October, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

1 Executive Summary – Energy Audit

ECM	Area	Observations	Proposed Action	Proposed Action	Estimated Monthly CO2 Emission Reduction	Estimated Monthly Monetary Savings	Estimated Investment	Payback Period
				kWh	Tones	Rs. Lakh	Rs. Lakh	Months
ECM-1	Lighting	Some of the porch lights in the girls' and boys' hostel areas are on for 12 to 13 hours every day	Recommend to replacing the existing porch lights in the girls' and boys' hostel areas with energy-efficient 10W dimming motion sensor lights.	194	0.2	0.03	0.15	5
ECM-2	Ceiling Fan	At present, conventional ceiling fans of 60W are installed in Class Room, Tutorial Room, Staff Room, Girls Hostel, Boys Hostel, Dept. of Chemistry, Physics, History, Marathi, Labs.	It is recommended to replace existing 60 W ceiling fans with new energy efficient 40W BLDC fan	1310	1.1	0.20	9.4	47
SUM				**1504**	**0.2**	**0.03**	**0.15**	**5**
Monthly Energy Consumption of the Jijamata College of Science and Arts				**12761**				
% Saving on Energy Usage				**11.8%**				
Monthly Energy Bill of the Jijamata College of Science and Arts (Rs. Lakh)				**1.94**				

2 Executive Summary – Green Audit

Sr.No	Area	Observations	Remark
1	Tree Plantation and Awareness about Energy Conservation	College has carried out tree plantation activity. Several types of trees have been planted by students and staffs	Good initiative taken by college toward green campus
2	Rain Water Harvesting	The college has implemented a rainwater harvesting system, collecting rainwater for use within the campus and distribution to nearby communities, promoting sustainability and reducing water waste.	The college's rainwater harvesting initiative is a commendable commitment to environmental sustainability, conserving water resources, and supporting a healthier environment.
2	Vermicomposting plant.	College has taken initiative to compost the daily solid waste by means of vermicomposting plant. College is using the compost in the campus garden area and distributing it to nearby farmers, as this promotes sustainability and helps to reduce waste.	This is good imitative by college and commitment towards to improve soil quality and support healthy plant growth.
3	E-waste	At present, there is no any SOP available for e-waste management	Suggested to dispose E-waste generated in campus through authorized E-waste collector

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Confidential report

Acknowledgement

PowerTech Energy Solutions extends gratitude Dnyaneshwarnagar, Ahmednagar for extending us the opportunity to conduct the Energy & Green Audit.

We are thankful to the professors & supporting staff of the college for their transparency & consistent support in sharing relevant information and for providing data about policies and projects along with their other valuable information. This report would have not been possible without their support.

The study team would like to acknowledge the following distinguished Dnyaneshwarnagar, Ahmednagar in person for the diligent involvement and cooperation.

Dr. Narendra Marutrao Ghule Patil (Ex.M.La)	President
Shri Chandrashekhar Marutrao Ghule Patil (Ex M.La)	Vice President
Shri. Pandurang Gamaji Abhang (Ex.M.L.A.)	Trustee
Adv. Desai Bhausaheb Deshmukh	Trustee
Shri. Kakasaheb Narayanrao Narwade	Trustee

3 About College

Jijamata College of Science and Arts Dnyneshwarnagar Bhende (BK), Tal-Newasa in Ahmednagar District Maharashtra state. This college is affiliated with Savitribai Phule University Pune. This college is established in June 1992 by Shri.Marutrao Ghule Patil Shikshan Santha' Dnyneshwarnagar Bhende (BK, premier educational institution founded By Hon. Late Shri.Marutrao Ghule Patil veteran social activist which has been imparting higher education KG to PG level in Science & Arts faculty.

Jijamata college of Science and Arts Dnyneshwarnagar Bhende (BK), campus consists of main buildings with ground, first and second floor. The administrative office, Library, Indoor stadium, various HOD cabins, staff rooms, classrooms, various laboratory like Physics, Chemistry, Botany, Zoology, Computer Sciences, etc. are the part of college campus. The college are functioning with basic motto to impart quality, employment, entrepreneur and higher education to mostly rural as well as marginal urban student.

Besides this there are one boy's hostel and two ladies hostel buildings for facilitating student accommodation to many rural boys & girl students. Similarly in campus two building are available for residential purpose for teaching as well as non-teaching staff. This college also provides gymkhana facility indoor stadium to student undergoing through various type of physical education. There is also well-furnished library where student studying in various branches have facility to refer books. The college developed botanical garden & green campus.

Total campus Area is 31.65 acre. College is affiliated to Pune University, Pune
College is accredited with NAAC with B' Grade (CGPA 2.72) grade in year 2018by NAAC.

Sr no	Particulars	Information
1	**Name of college**	Shri Marutrao Ghule Patil Shikshan Sanstha's Jijamata College of Science and Arts Bhende Tal Newasa Dist Ahmednagar.
2	**Address**	Dnyneshwarnagar Bhende (BK), Tal-Newasa in Ahmednagar District Maharashtra state.
3	**Latitude and Longitude**	latitudes – 19°27'14.59"N and longitude – 75° 1'25.75"E
4	**Area in acre**	31.65
5	**Faculty (Arts/commerce/science)**	Arts, Science, Commerce

4 Energy Audit

An energy audit is an inspection, survey and analysis of energy flows, for energy conservation in a building, process or system to reduce the amount of energy input into the system without negatively affecting the output(s). In commercial and industrial real estate, an energy audit is the first step in identifying opportunities to reduce energy expense and carbon footprints.

4.1 Electricity Bill Analysis

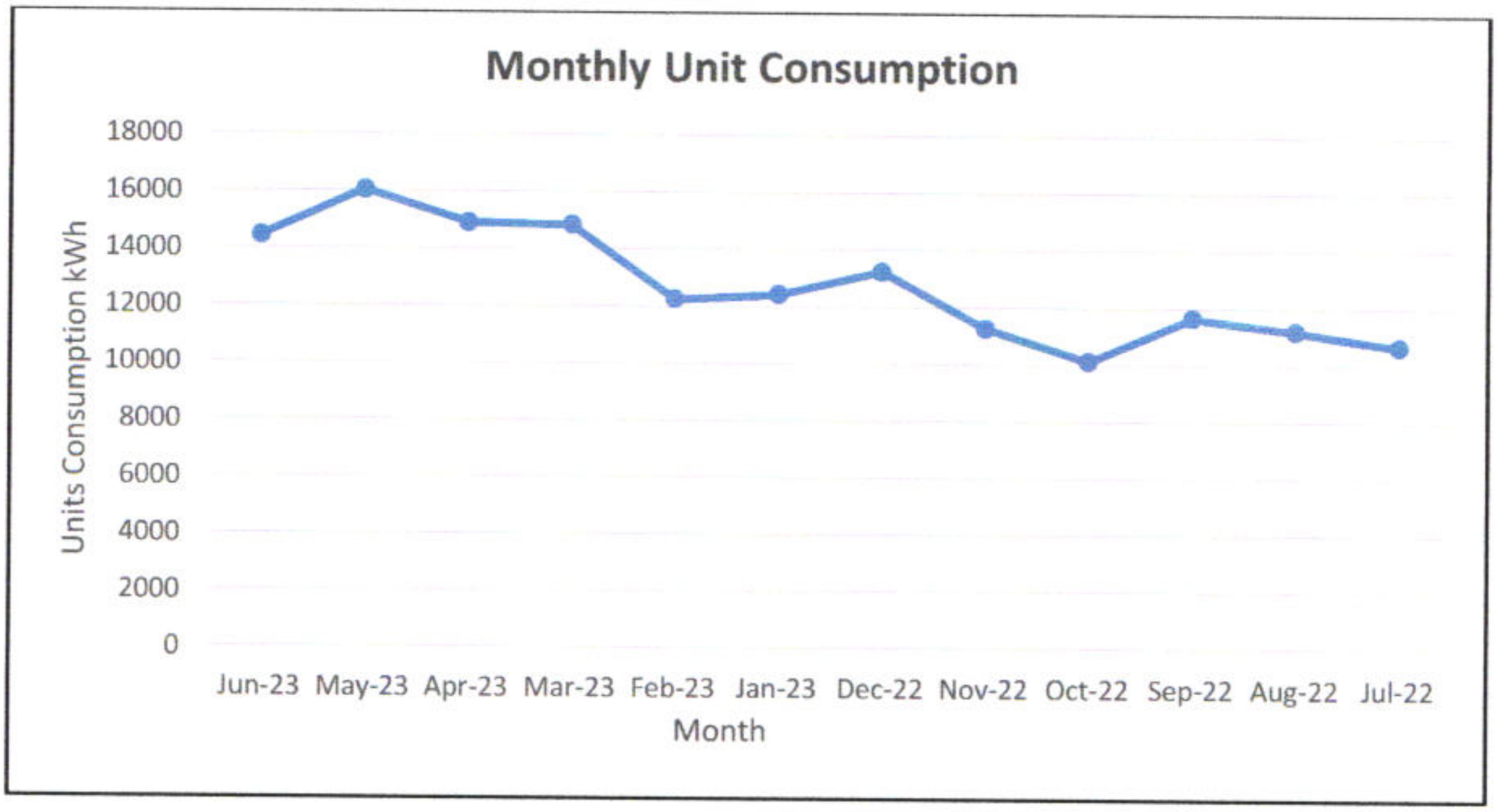
There is eighteen numbers of various types of electricity connection being power supplied by MSEDCL. Monthly electricity bill is served by MSEDCL against electricity used & is paid by college. A cost of power is worked out by summing up total KWH of all connections & their amount over the year 2023-2024. By dividing total amount by total KWH works out average cost of power per KWH.

Consumer Name	**M/S SECT SHRI MARUTRAO GHULE PATIL S .S**
Consumer Number	148389003228
Contract Demand (KVA)	58kVA
Connected Load (KW)	64 kW
Tariff	146 HT-VIII B

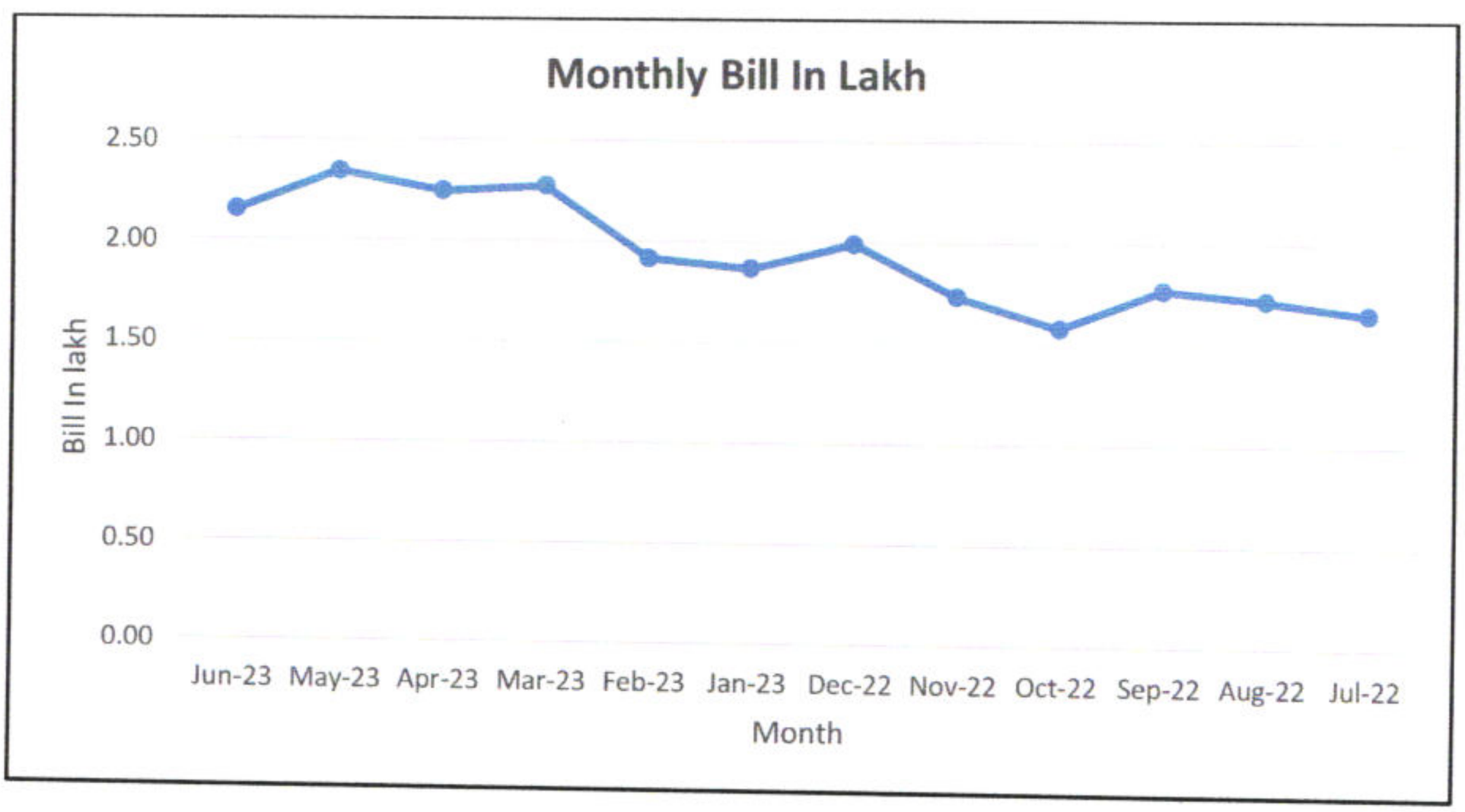
Below table shows the monthly energy consumption.

Month	Unit Consumption	Bill Demand	Demand Charges	Wheeling Charges @0.60	Tax On Sale	Total Current Bill	Total Current Bill	Avg. Unit Rate
	kWh	kVA	Rs	Rs	Rs	Rs	Rs.Lakh	Rs/kWh
Jun-23	14444	46	22954	8666	2600	215145	2.15	14.9
May-23	16053	50	24950	9632	2890	234506	2.35	14.6
Apr-23	14906	51	25449	8944	2683	224621	2.25	15.1
Mar-23	14832	55	27445	8899	2670	227429	2.27	15.3
Feb-23	12268	55	27445	7361	2208	191944	1.92	15.6
Jan-23	12441	45	22455	7465	2239	187053	1.87	15.0
Dec-22	13245	45	22455	7947	2384	199532	2.00	15.1
Nov-22	11279	46	22954	6767	2030	173439	1.73	15.4
Oct-22	10121	45	22455	6073	1822	158108	1.58	15.6
Sep-22	11662	45	22455	6997	2099	177170	1.77	15.2
Aug-22	11210	45	22455	6726	2018	172214	1.72	15.4
Jul-22	10666	45	22455	6400	1920	165612	1.66	15.5
Min	**10121**	**45**	**22455**	**6073**	**1822**	**158108**	**1.6**	**15**
Avg	**12761**	**48**	**23827**	**7656**	**2297**	**193898**	**1.9**	**15**
Max	**16053**	**55**	**27445**	**9632**	**2890**	**234506**	**2.3**	**16**
Total	**153127**		**285927**	**91876**	**27563**	**2326773**	**23**	

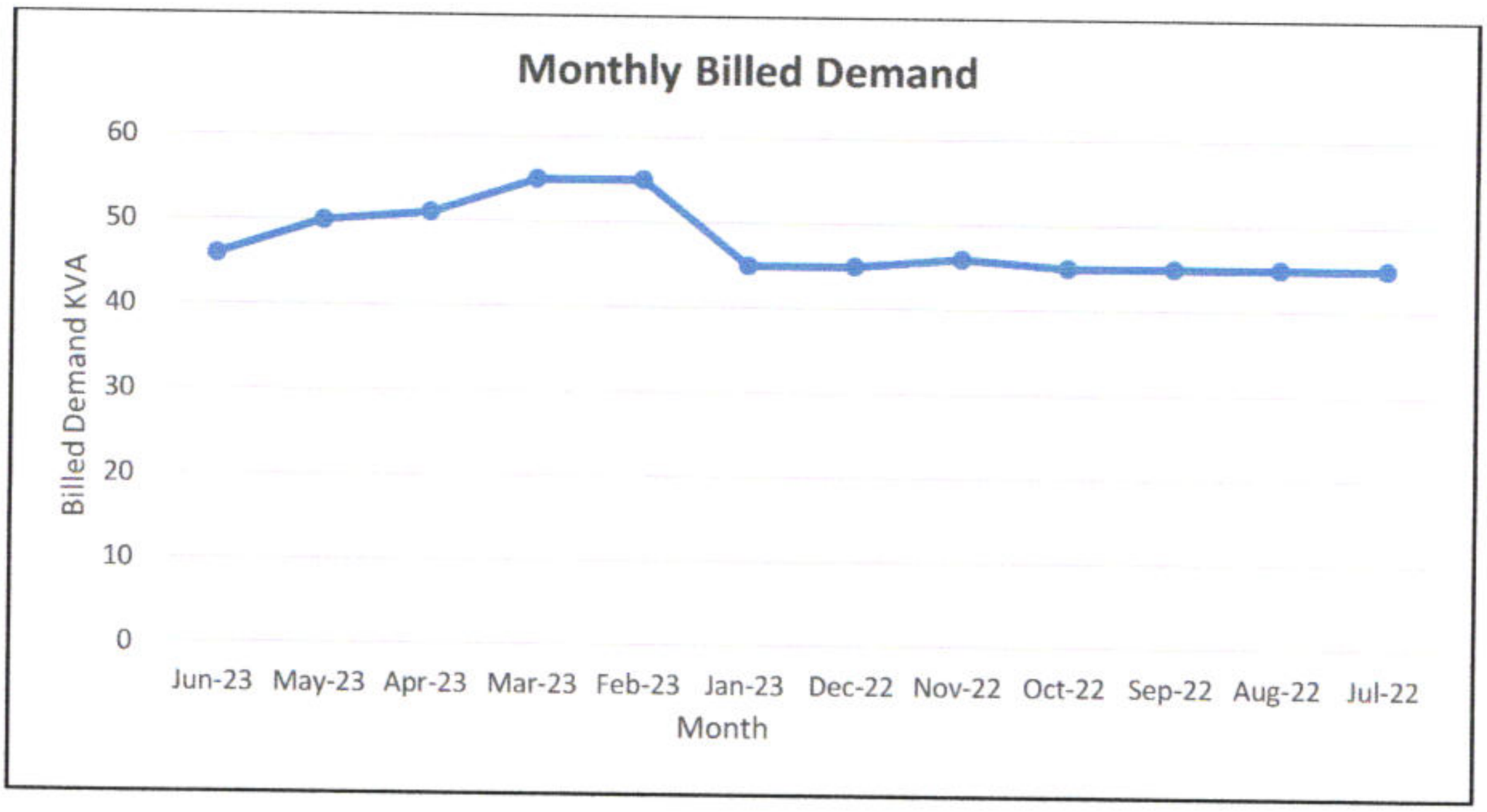
Below graph shows the monthly energy consumption.



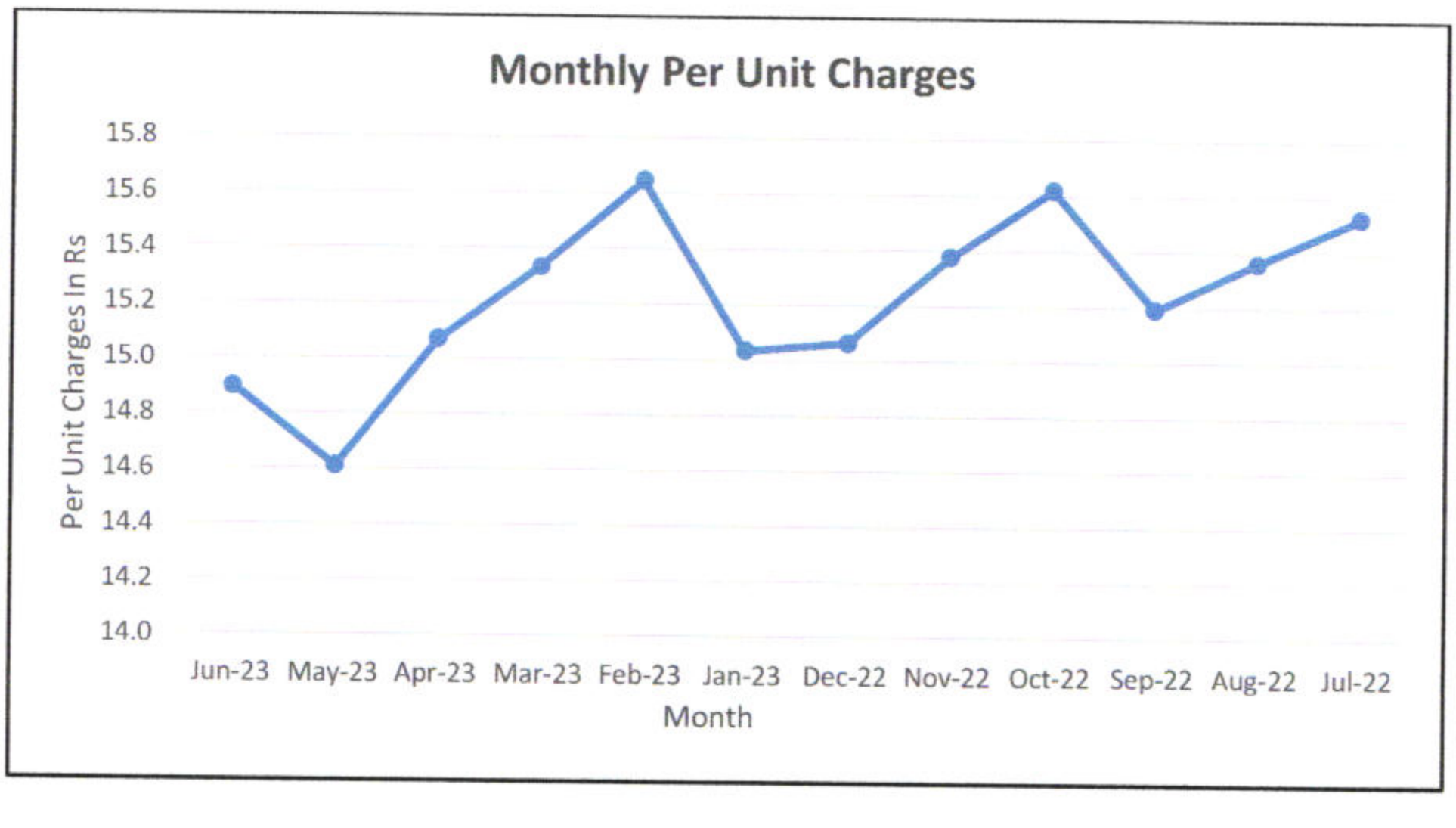
Below graph shows the monthly energy bill in lakh.



Below graph shows the monthly billed demand.



Below graph shows the monthly per unit charges.



4.2 Observations & Remark

Sr.No.	Parameter	Observation	Remark
1	Contract Demand	Contract demand of the plant is 58 KVA	No action required
2	Connected Load	Connected load of plant is 64 KW	No action required
3	Unit consumption	Minimum unit consumption recorded is 10121 In month of Oct-22	No action required
		Avg. unit consumption recorded is 12761	No action required
		Maximum unit consumption recorded is 16053 In month of May-22	No action required

4.3 Connected Load

Name of the Space	Type of Load	Total Qty	Used Qty	Wattage	Load in Kw
Principal Cabin	LED Tube Light	3	3	20	0.06
Principal Cabin	LED Light	1	1	12	0.01
Vice Principal Cabin(Art)	LED Tube Light	2	2	20	0.04
Vice Principal Cabin(Art)	LED Light	1	1	12	0.01
Vice Principal Cabin(Science)	LED Tube Light	2	2	20	0.04
Vice Principal Cabin(Science)	LED Light	1	1	12	0.01
Administration office	LED Tube Light	7	7	20	0.14
Administration office	LED Light	6	6	12	0.07
Exam Department	LED Tube Light	1	1	20	0.02
Exam Department	LED Light	1	1	12	0.01
Store Room	LED Tube Light	2	2	20	0.04
Store Room	LED Light	1	1	12	0.01
VLC	LED Tube Light	7	7	20	0.14
VLC	LED Light	2	2	12	0.02
Staff Room	LED Tube Light	5	5	20	0.10
Staff Room	LED Light	1	1	12	0.01
Ladies Room	LED Tube Light	3	3	20	0.06
Ladies Room	LED Light	1	1	12	0.01
Multipurpose Hall	LED Tube Light	7	7	20	0.14
Multipurpose Hall	LED Light	3	3	12	0.04
Department of Physics	LED Tube Light	11	11	20	0.22
Department of Physics	LED Light	3	3	12	0.04
Department of Zoology	LED Tube Light	11	11	20	0.22
Department of Zoology	LED Light	3	3	12	0.04
Department of Botany	LED Tube Light	14	14	20	0.28
Department of Botany	LED Light	3	3	12	0.04
Department of Math	LED Tube Light	2	2	20	0.04
Department of Math	LED Light	1	1	12	0.01
Department of History	LED Tube Light	2	2	20	0.04
Department of History	LED Light	1	1	12	0.01
Department of BCS	LED Tube Light	10	10	20	0.20
Department of BCS	LED Light	1	1	12	0.01
Department of Commerce	LED Tube Light	2	2	20	0.04
Department of Commerce	LED Light	1	1	12	0.01
Library	LED Tube Light	27	27	20	0.54
Library	LED Light	13	13	12	0.16
Department of Marathi	LED Tube Light	2	2	20	0.04
Department of Marathi	LED Light	1	1	12	0.01
Department of Hindi	LED Tube Light	6	6	20	0.12
Department of Hindi	LED Light	1	1	12	0.01

Name of the Space	Type of Load	Total Qty	Used Qty	Wattage	Load in Kw
Department of Politics	LED Tube Light	6	6	20	0.12
Records Room	LED Light	2	2	20	0.04
Records Room	LED Tube Light	2	2	12	0.02
Department of Chemistry	LED Tube Light	47	47	20	0.94
Department of Chemistry	LED Light	4	4	12	0.05
Department of Geography	LED Tube Light	6	6	20	0.12
Department of Geography	LED Light	1	1	12	0.01
Computer Lab	LED Tube Light	29	29	20	0.58
Lecture Room	LED Tube Light	26	26	20	0.52
Girls Hostel Room No 1 to 22	LED Tube Light	44	44	20	0.88
Girls Hostel Room No 1 to 22	LED light	22	22	10	0.22
Girls Hostel Porch & outside	LED light	6	6	24	0.14
Girls Hostel Room No1 to 9	LED Tube Light	18	18	20	0.36
Girls Hostel Room No1 to 9	LED light	9	9	10	0.09
Canteen	LED Tube Light	8	8	20	0.16
Canteen	LED light	2	2	10	0.02
Girls Hostel Porch & outside	LED light	6	6	24	0.14
Boys Hostel Room No1 to 22	LED Tube Light	44	44	20	0.88
Boys Hostel Room No1 to 22	LED light / CFL	22	22	20	0.44
Boys Hostel outer side light	Conventional light	12	12	40	0.48
Boys Hostel Inner side light	LED light	6	6	20	0.12
Principal Cabin	Ceiling fan	3	3	60	0.18
Vice Principal Cabin(Art)	Ceiling fan	1	1	60	0.06
Vice Principal Cabin(Science)	Ceiling fan	1	1	60	0.06
Administration office	Ceiling fan	7	7	60	0.42
Exam Department	Ceiling fan	1	1	60	0.06
Store Room	Ceiling fan	1	1	60	0.06
VLC	Ceiling fan	5	5	60	0.30
Staff Room	Ceiling fan	3	3	60	0.18
Ladies Room	Ceiling fan	1	1	60	0.06
Multipurpose Hall	Ceiling fan	5	5	60	0.30
Department of Physics	Ceiling fan	8	8	60	0.48
Department of Zoology	Ceiling fan	7	7	60	0.42
Department of Zoology	Table Fan	1	1	60	0.06
Department of Botany	Ceiling fan	12	12	60	0.72
Department of Botany	Table Fan	1	1	60	0.06
Department of Math	Ceiling fan	2	2	60	0.12
Department of History	Ceiling fan	2	2	60	0.12
Department of BCS	Ceiling fan	8	8	60	0.48
Department of Commerce	Ceiling fan	3	3	60	0.18
Library	Ceiling fan	3	3	60	0.18
Department of Marathi	Ceiling fan	2	2	60	0.12
Department of Hindi	Ceiling fan	6	6	60	0.36

Name of the Space	Type of Load	Total Qty	Used Qty	Wattage	Load in Kw
Department of Politics	Ceiling fan	6	6	60	0.36
Records Room	Ceiling fan	1	1	60	0.06
Department of Chemistry	Ceiling fan	31	31	60	1.86
Department of Geography	Ceiling fan	6	6	60	0.36
Computer Lab	Ceiling fan	5	5	60	0.30
Lecture Room	Ceiling fan	26	26	60	1.56
Girls Hostel Room No 1 to 22	Ceiling fan	44	44	60	2.64
Girls Hostel Room No1 to 9	Ceiling fan	18	18	60	1.08
Canteen	Ceiling fan	6	6	60	0.36
Boys Hostel Room No1 to 22	Ceiling fan	44	44	60	2.64
Principal Cabin	Computer	1	1	40	0.04
Principal Cabin	TV	1	1	40	0.04
Principal Cabin	Printer	1	1	250	0.25
Principal Cabin	Xerox Machine	1	1	1040	1.04
Principal Cabin	Fridge	1	1	200	0.20
Vice Principal Cabin(Arts)	Computer	1	1	40	0.04
Vice Principal Cabin(Arts)	Printer	1	1	250	0.25
Vice Principal Cabin(Science)	Computer	2	2	40	0.08
Vice Principal Cabin(Science)	Printer	1	1	250	0.25
Administration office	Computer	14	14	40	0.56
Administration office	Printer	7	7	250	1.75
Administration office	Fridge	1	1	200	0.20
Administration office	Xerox Machine	2	2	1040	2.08
Exam Department	Computer	1	1	40	0.04
Exam Department	Xerox Machine	2	2	1040	2.08
Store Room	Computer	1	1	40	0.04
Store Room	Printer	1	1	250	0.25
Store Room	Fridge	1	1	200	0.20
VLC	Computer	3	3	40	0.12
VLC	Printer	2	2	250	0.50
Department of Physics	Computer	2	2	40	0.08
Department of Physics	Printer	2	2	250	0.50
Department of Zoology	Computer	2	2	40	0.08
Department of Zoology	Printer	1	1	250	0.25
Department of Zoology	Fridge	1	1	200	0.20
Department of Botany	Computer	1	1	40	0.04
Department of Botany	TV	1	1	40	0.04
Department of Botany	Air Conditioner	1	1	900	0.90
Department of Math	Computer	1	1	40	0.04
Department of History	Computer	1	1	40	0.04
Department of History	Printer	1	1	250	0.25
Department of BCS	Computer	24	24	40	0.96
Department of BCS	Printer	1	1	250	0.25

Name of the Space	Type of Load	Total Qty	Used Qty	Wattage	Load in Kw
Library	Computer	7	7	40	0.28
Library	Printer	1	1	250	0.25
Department of Marathi	Computer	1	1	40	0.04
Department of Marathi	Printer	1	1	250	0.25
Department of Commerce	Computer	1	1	40	0.04
Department of Commerce	Printer	1	1	250	0.25
Department of Hindi	Computer	1	1	40	0.04
Department of Hindi	Printer	1	1	250	0.25
Department of Politics	Computer	1	1	40	0.04
Records Room	Computer	1	1	40	0.04
Department of Chemistry	Computer	3	3	40	0.12
Department of Chemistry	Printer	2	2	250	0.50
Department of Geography	Computer	1	1	40	0.04
Department of Geography	Printer	1	1	250	0.25
Computer Lab	Computer	17	17	40	0.68
Girls Hostel New	Computer	1	1	40	0.04
Girls Hostel New	Printer	1	1	250	0.25
Girls Hostel New	Cooler	1	1	250	0.25
Girls Hostel New	TV	2	2	40	0.08
Girls Hostel New	Water Heater	1	1	120	0.12
Girls Hostel New	CCTV	6	6	12	0.07
Girls Hostel Old	Cooler	1	1	250	0.25
Girls Hostel Old	Water Heater	1	1	120	0.12
Girls Hostel Old	CCTV	8	8	12	0.10
Boys Hostel	Computer	1	1	40	0.04
Boys Hostel	Printer	1	1	250	0.25
Boys Hostel	Electric Heater	1	1	120	0.12
Boys Hostel	Cooler	1	1	250	0.25
Boys Hostel	CCTV	8	8	12	0.10
Total		**922**		**14500**	**44**

4.4 Performance Assessment of Lighting System

Lighting system analysis is taking the data from college & hostel building areas. Most of the system is in energy efficient LED system. There are total 494 lights installed in the college building at different location and for different purposes. Out of 494 lights, 482 lights are of LED type. Remaining lights are conventional types of light fittings.

Floor	Location	Light/Lumin	Qty	Wattage	Lighting Load Kw	Hours of usage	No of Days in a month	Daily consumption (kWh)	Monthly consumption (kWh)
Ground Floor	Principal Cabin	LED Tube Light-1X20W	3	20	0.06	8.00	25.5	0.5	12
Ground Floor	Principal Cabin	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Vice Principal Cabin(Art)	LED Tube Light-1X20W	2	20	0.04	8.00	25.5	0.3	8
Ground Floor	Vice Principal Cabin(Art)	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Vice Principal Cabin(Science)	LED Tube Light-1X20W	2	20	0.04	8.00	25.5	0.3	8
Ground Floor	Vice Principal Cabin(Science)	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Administration office	LED Tube Light-1X20W	7	20	0.14	8.00	25.5	1.1	29
Ground Floor	Administration office	LED Light-1X12W	6	12	0.07	8.00	25.5	0.6	15
Ground Floor	Exam Department	LED Tube Light-1X20W	1	20	0.02	8.00	25.5	0.2	4
Ground Floor	Exam Department	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Store Room	LED Tube Light-1X20W	2	20	0.04	8.00	25.5	0.3	8
Ground Floor	Store Room	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	VLC	LED Tube Light-1X20W	7	20	0.14	8.00	25.5	1.1	29
Ground Floor	VLC	LED Light-1X12W	2	12	0.02	8.00	25.5	0.2	5
Ground Floor	Staff Room	LED Tube Light-1X20W	5	20	0.10	8.00	25.5	0.8	20
Ground Floor	Staff Room	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Ladies Room	LED Tube Light-1X20W	3	20	0.06	8.00	25.5	0.5	12
Ground Floor	Ladies Room	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Multipurpose Hall	LED Tube Light-1X20W	7	20	0.14	8.00	25.5	1.1	29
Ground Floor	Multipurpose Hall	LED Light-1X12W	3	12	0.04	8.00	25.5	0.3	7
Ground Floor	Department of Physics	LED Tube Light-1X20W	11	20	0.22	8.00	25.5	1.8	45
Ground Floor	Department of Physics	LED Light-1X12W	3	12	0.04	8.00	25.5	0.3	7
Ground Floor	Department of Zoology	LED Tube Light-1X20W	11	20	0.22	8.00	25.5	1.8	45
Ground Floor	Department of Zoology	LED Light-1X12W	3	12	0.04	8.00	25.5	0.3	7
Ground Floor	Department of Botany	LED Tube Light-1X20W	14	20	0.28	8.00	25.5	2.2	57
Ground Floor	Department of Botany	LED Light-1X12W	3	12	0.04	8.00	25.5	0.3	7

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Floor	Location	Light/Lumin	Qty	Wattage	Lighting Load Kw	Hours of usage	No of Days in a month	Daily consumption (kWh)	Monthly consumption (kWh)
Ground Floor	Department of Math	LED Tube Light-1X20W	2	20	0.04	8.00	25.5	0.3	8
Ground Floor	Department of Math	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Department of History	LED Tube Light-1X20W	2	20	0.04	8.00	25.5	0.3	8
Ground Floor	Department of History	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Department of BCS	LED Tube Light-1X20W	10	20	0.20	8.00	25.5	1.6	41
Ground Floor	Department of BCS	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Department of Commerce	LED Tube Light-1X20W	2	20	0.04	8.00	25.5	0.3	8
Ground Floor	Department of Commerce	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Library	LED Tube Light-1X20W	27	20	0.54	8.00	25.5	4.3	110
Ground Floor	Library	LED Light-1X12W	13	12	0.16	8.00	25.5	1.2	32
Ground Floor	Department of Marathi	LED Tube Light-1X20W	2	20	0.04	8.00	25.5	0.3	8
Ground Floor	Department of Marathi	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Department of Hindi	LED Tube Light-1X20W	6	20	0.12	8.00	25.5	1.0	24
Ground Floor	Department of Hindi	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Department of Politics	LED Tube Light-1X20W	6	20	0.12	8.00	25.5	1.0	24
Ground Floor	Records Room	LED Light-1X20W	2	20	0.04	8.00	25.5	0.3	8
Ground Floor	Records Room	LED Tube Light-1X12W	2	12	0.02	8.00	25.5	0.2	5
Ground Floor	Department of Chemistry	LED Tube Light-1X20W	47	20	0.94	8.00	25.5	7.5	192
Ground Floor	Department of Chemistry	LED Light-1X12W	4	12	0.05	8.00	25.5	0.4	10
Ground Floor	Department of Geography	LED Tube Light-1X20W	6	20	0.12	8.00	25.5	1.0	24
Ground Floor	Department of Geography	LED Light-1X12W	1	12	0.01	8.00	25.5	0.1	2
Ground Floor	Computer Lab	LED Tube Light-1X20W	29	20	0.58	8.00	25.5	4.6	118
Ground Floor	Lecture Room	LED Tube Light-1X20W	26	20	0.52	5.00	25.5	2.6	66
Ground Floor	Girls Hostel Room No 1 to 22	LED Tube Light-1X20W	44	20	0.88	8.00	25.5	7.0	180
Ground Floor	Girls Hostel Room No 1 to 22	LED light-1X10W	22	10	0.22	8.00	25.5	1.8	45
Ground Floor	Girls Hostel Porch & outside	LED light-1X24W	6	24	0.14	12.00	25.5	1.7	44
Ground Floor	Girls Hostel Room No1 to 9	LED Tube Light-1X20W	18	20	0.36	8.00	25.5	2.9	73
Ground Floor	Girls Hostel Room No1 to 9	LED light-1X10W	9	10	0.09	8.00	25.5	0.7	18
Ground Floor	Canteen	LED Tube Light-1X20W	8	20	0.16	8.00	25.5	1.3	33
Ground Floor	Canteen	LED light-1X10W	2	10	0.02	8.00	25.5	0.2	4
Ground Floor	Girls Hostel Porch & outside	LED light-1X24W	6	24	0.14	12.00	25.5	1.7	44
Ground Floor	Boys Hostel Room No1 to 22	LED Tube Light-1X20W	44	20	0.88	8.00	25.5	7.0	180
Ground Floor	Boys Hostel Room No1 to 22	LED light / CFL-1X20W	22	20	0.44	8.00	25.5	3.5	90
Ground Floor	Boys Hostel outer side light	Conventional light-1X40W	12	40	0.48	12.00	25.5	5.8	147

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Floor	Location	Light/Lumin	Qty	Wattage	Lighting Load Kw	Hours of usage	No of Days in a month	Daily consumption (kWh)	Monthly consumption (kWh)
Ground Floor	Boys Hostel Inner side light	LED light-1X20W	6	20	0.12	12.00	25.5	1.4	37
Total			**494**		**9**			**77**	**1971**

4.5 ECM 1 – Replacement of lights with energy efficient LED dimming motion sensor lights

It has been observed that conventional lights are used at different areas in college. Recommendation to replacing the existing porch lights in the girls' and boys' hostel areas with energy-efficient 10W dimming motion sensor lights. Below table shows the estimated energy and monetary saving along with payback period.

Location	Qty	Wattage	kW Load	No. of Days in Month	Daily Consumption (kWh)	Monthly Consumption (kWh)	New Hours of Usage	New kWh	New Monthly kWh	Energy Saving in kWh	Monetary saving in Rs	Investment	Payback period in months
Boys Hostel Porch Light	12	40	0.48	25.5	5.76	147	2	1	34	113	1724	5880	3
Boys Hostel Porch Light	6	20	0.12	25.5	1.44	37	2	0	11	26	396	2940	7
Girls Hostel Porch Light	12	24	0.288	25.5	3.46	88	2	1	33	55	839	5880	7

4.6 Observation & Remark

Sr. No.	Area	Observation	Remark
1	Jijamata College of Science and Arts	Some of the porch lights in the girls' and boys' hostel areas are on for 12 to 13 hours every day	Recommendation to replacing the existing porch lights in the girls' and boys' hostel areas with energy-efficient 10W dimming motion sensor lights. This upgrade will not only conserve energy but also enhance security by automatically adjusting the lighting intensity based on motion, ensuring optimal illumination when needed.

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4.7 ECM-2 Replacement of conventional ceiling fans with energy efficient ceiling fans

It has been observed that conventional ceilings fans are used at different areas in college building offices, conference hall, labs, girls & boys hostel etc. It is recommended to replace existing 60W ceiling fans with 40W energy efficient fans. Below table shows the estimated energy and monetary saving along with payback period.

Floor	Location	Fan	Qty	Load in Kw	Hours of Usage	No. of Days in Month	Daily Consumption (kWh)	Monthly Consumption (kWh)	New Wattage	New kW	New Monthly kWh	Energy Saving in kWh	Monetary saving in Rs	Investment	Payback period in months
Ground Floor	Principal Cabin	Ceiling fan-60w	3	0.18	8	25.5	1.4	36.7	40	0.12	24	12.2	186	10500	56
Ground Floor	Vice Principal Cabin(Art)	Ceiling fan-60w	1	0.06	8	25.5	0.5	12.2	40	0.04	8	4.1	62	3500	56
Ground Floor	Vice Principal Cabin(Science)	Ceiling fan-60w	1	0.06	8	25.5	0.5	12.2	40	0.04	8	4.1	62	3500	56
Ground Floor	Administration office	Ceiling fan-60w	7	0.42	8	25.5	3.4	85.7	40	0.28	57	28.6	435	24500	56
Ground Floor	Exam Department	Ceiling fan-60w	1	0.06	8	25.5	0.5	12.2	40	0.04	8	4.1	62	3500	56
Ground Floor	Store Room	Ceiling fan-60w	1	0.06	8	25.5	0.5	12.2	40	0.04	8	4.1	62	3500	56
Ground Floor	VLC	Ceiling fan-60w	5	0.30	8	25.5	2.4	61.2	40	0.20	41	20.4	311	17500	56
Ground Floor	Staff Room	Ceiling fan-60w	3	0.18	8	25.5	1.4	36.7	40	0.12	24	12.2	186	10500	56
Ground Floor	Ladies Room	Ceiling fan-60w	1	0.06	8	25.5	0.5	12.2	40	0.04	8	4.1	62	3500	56
Ground Floor	Multipurpose Hall	Ceiling fan-60w	5	0.30	8	25.5	2.4	61.2	40	0.20	41	20.4	311	17500	56
Ground Floor	Department of Physics	Ceiling fan-60w	8	0.48	8	25.5	3.8	97.9	40	0.32	65	32.6	497	28000	56
Ground Floor	Department of Zoology	Ceiling fan-60w	7	0.42	8	25.5	3.4	85.7	40	0.28	57	28.6	435	24500	56
Ground Floor	Department of Zoology	Table Fan-60w	1	0.06	8	25.5	0.5	12.2							
Ground Floor	Department of Botany	Ceiling fan-60w	12	0.72	8	25.5	5.8	146.9	40	0.48	98	49.0	746	42000	56
Ground Floor	Department of Botany	Table Fan-60w	1	0.06	8	25.5	0.5	12.2							

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Floor	Location	Fan	Qty	Load in Kw	Hours of Usage	No. of Days in Month	Daily Consumption (kWh)	Monthly Consumption (kWh)	New Wattage	New kW	New Monthly kWh	Energy Saving in kWh	Monetary saving in Rs	Investment	Payback period in months
Ground Floor	Department of Math	Ceiling fan-60w	2	0.12	8	25.5	1.0	24.5	40	0.08	16	8.2	124	7000	56
Ground Floor	Department of History	Ceiling fan-60w	2	0.12	8	25.5	1.0	24.5	40	0.08	16	8.2	124	7000	56
Ground Floor	Department of BCS	Ceiling fan-60w	8	0.48	8	25.5	3.8	97.9	40	0.32	65	32.6	497	28000	56
Ground Floor	Department of Commerce	Ceiling fan-60w	3	0.18	8	25.5	1.4	36.7	40	0.12	24	12.2	186	10500	56
Ground Floor	Library	Ceiling fan-60w	3	0.18	8	25.5	1.4	36.7	40	0.12	24	12.2	186	10500	56
Ground Floor	Department of Marathi	Ceiling fan-60w	2	0.12	8	25.5	1.0	24.5	40	0.08	16	8.2	124	7000	56
Ground Floor	Department of Hindi	Ceiling fan-60w	6	0.36	8	25.5	2.9	73.4	40	0.24	49	24.5	373	21000	56
Ground Floor	Department of Politics	Ceiling fan-60w	6	0.36	8	25.5	2.9	73.4	40	0.24	49	24.5	373	21000	56
Ground Floor	Records Room	Ceiling fan-60w	1	0.06	8	25.5	0.5	12.2	40	0.04	8	4.1	62	3500	56
Ground Floor	Department of Chemistry	Ceiling fan-60w	31	1.86	8	25.5	14.9	379.4	40	1.24	253	126.5	1926	108500	56
Ground Floor	Department of Geography	Ceiling fan-60w	6	0.36	8	25.5	2.9	73.4	40	0.24	49	24.5	373	21000	56
Ground Floor	Computer Lab	Ceiling fan-60w	5	0.30	8	25.5	2.4	61.2	40	0.20	41	20.4	311	17500	56
Ground Floor	Lecture Room	Ceiling fan-60w	26	1.56	8	25.5	12.5	318.2	40	1.04	212	106.1	1615	91000	56
Ground Floor	Girls Hostel Room No 1 to 22	Ceiling fan-60w	44	2.64	12	25.5	31.7	807.8	40	1.76	539	269.3	4101	154000	38
Ground Floor	Girls Hostel Room No1 to 9	Ceiling fan-60w	18	1.08	12	25.5	13.0	330.5	40	0.72	220	110.2	1677	63000	38
Ground Floor	Canteen	Ceiling fan-60w	6	0.36	8	25.5	2.9	73.4	40	0.24	49	24.5	373	21000	56
Ground Floor	Boys Hostel Room No1 to 22	Ceiling fan-60w	44	2.64	12	25.5	31.7	807.8	40	1.76	539	269.3	4101	154000	38
		Total	**270**	**14**			**155**	**3954**	**1200**	**11**	**2619**	**1310**	**19943**	**938000**	**47**

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Fan Recommendation

Replace existing 60-watt conventional ceiling fans with 40-watt energy efficient fans

Parameter	Unit	Value
Present fan type		Conventional ceiling fan
Present wattage of ceiling fans	watt	60
Total no.of fans installed	Nos.	268
Present load of ceiling fans	kW	13
Present monthly energy consumption of ceiling fans	kWh	3929
Recommended fan type		Energy Efficient BLDC fan
New Estimated wattage of fan	watt	40
Estimated load of ceiling fan	kW	11
Power saving	kW	3
% Savings	%	20%
New Estimated monthly energy consumption	kWh	2619
Estimated monthly energy savings	kWh	1310
Estimated monthly carbon emission reduction	Tons	1.1
Estimated monthly monetary savings	Rs	19,943
Estimated investment for 1 fan	Rs	3500
Estimated total investment	Rs	938,000
Payback period	Months	47

4.8 Observation & Remark

Sr.No	Area	Observation	Remark
1	Jijamata College of Science and Arts	At present, conventional ceiling fans of 60W are installed in Class Room, Tutorial Room, Staff Room, Girls Hostel, Boys Hostel, Dept. of Chemistry, Physics, History, Marathi, Labs. There are total 268 no. of ceilings fans installed Total ceiling fan load is 13 kW	• New energy efficient fans are available in the market which deliver same air volume at less power consumption • It is recommended to replace existing 60 W ceiling fans with new energy efficient 40W BLDC fan • Estimated new load of fan is 11 kW • Estimated monthly energy saving is 1310units • Estimated monthly carbon emission reduction is 1.1 Tones • Estimated monthly monetary saving is Rs.0.20 Lakh • Estimated investment is Rs.9.38 Lakh • Payback period is 47 months

5 Requirements of NAAC

Percentage of lighting power requirement met through LED bulbs

= (Lighting power requirement met through LED bulbs / Total lighting power requirement) X 100

= (8.93/9)

= 99 %

Percentage of lighting power requirement met through renewable energy sources

= (Lighting power required met through renewable sources / Total lighting power requirement) X 100

= (0/12761) X 100

= 0%

6 Green Audit

Green audit was initiated with the beginning of 1970s with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. It exposes the authenticity of the proclamations made by multinational companies, armies and national governments with the concern of health issues as the consequences of environmental pollution. It is the duty of organizations to carry out the Green Audits of their ongoing processes for various reasons such as; to make sure whether they are performing in accordance with relevant rules and regulations, to improve the procedures and ability of materials, to analyze the potential duties and to determine a way which can lower the cost and add to the revenue. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit. Some of the incidents like Bhopal Gas Tragedy (Bhopal; 1984), Chernobyl Catastrophe (Ukraine; 1986) and Exxon-Valdez Oil Spill (Alaska; 1989) have cautioned the industries that setting corporate strategies for environmental security elements have no meaning until they are implemented.

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade a, Grade B or Grade C according to the scores assigned at the time of accreditation.

The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, colleges, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmentally friendly institute.

Goals of Green Audit

- The objective of carrying out Green Audit is securing the environment and cut down the threats posed to human health.
- To make sure that rules and regulations are taken care of
- To avoid the interruptions in environment that are more difficult to handle and their correction requires high cost.
- To suggest the best protocols for adding to sustainable development

Benefits of Green Audit

- It would help to shield the environment
- Recognize the cost saving methods through waste minimizing and managing
- Point out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- It portrays a good image of a company which helps building better relationships with the group of stakeholders
- Enhance the alertness for environmental guidelines and duties

7 Initiatives by College towards Sustainable Environment

Tree Plantation

Tree-planting is the process of transplanting tree seedlings, generally for forestry, land reclamation, or landscaping purpose. It differs from the transplantation of larger trees in arboriculture, and from the lower cost but slower and less reliable distribution of tree seeds.









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List of plant species observed in the campus during the field visit

SrNo	Botanical Name	Local Name	Family	No of Plants	Type
1	Acacia nilotica	Babul tree	Fabaceae	7	Tree
2	Adansonia digitata	Gorakchinch	Bombacaceae	3	Tree
3	Adathoda vasica	Adulsa	Acanthaceae	5	Shrub
4	Aegle marmelos	Bel	Rutaceae	4	Tree
5	Albizia julibrissin	Silk plant	Fabaceae	2	Tree
6	Alstonia scolaris	Saptaparni	Apocynaceae	35	Tree
7	Annona reticulata	Ramphal	Annonaceae	4	Tree
8	Annona squmosa L.	Shitaphal	Annonaceae	49	Tree
9	Araucaria columnaris J. R. Forst Hook.	X-Mas tree	Araucariaceae	2	Tree
10	Artocarpus heterophyllus	Jackfruit/fanas	Moraceae	3	Tree
11	Azadirachta indica	Neem	Meliaceae	121	Tree
12	Bambusa bamboo	Bamboo tree	Poaceae	1	Tree
13	Bauhinia racemosa	Apta	Caesalpiniaceae	12	Tree
14	Bauhinia variegate	Raktakanchan	Fabaceae	17	Tree
15	Bombax ceida	Silk cotton tree	Malvaceae	2	Tree
16	Bougainvillea spectabilis	Kagadigulab	Nyctaginaceae	7	Shrub
17	Butea monosperma	Palas	Fabaceae	1	Tree
18	Callistemon lanceollatus	Bottle brush	Myrtaceae	7	Tree
19	Calotropis giaganthe	Ruie	Asclepiadaceae	15	Shrub
20	Canna indica L.	Kardal	Cannaceae	10	Shrub
21	Capparis zeylanica	Ceylon caper	Capparaceae	3	Tree
22	Carica papaya	Papaya	Caricaceae	9	Tree
23	Cassia fistula	Golden rain tree	Caesalpiniaceae	40	Tree
24	Cassia marginata Roxb.	Red cassia	Caesalpiniaceae	2	Tree
25	Cassia siamea Lam.	Yellow Cassia	Caesalpiniaceae	75	Tree
26	Catharanthus roseus L.	Sadaphuli	Apocynaceae	50	Shrub
27	Clitoria ternatea L.	Gokharna	Fabaceae	4	Tree
28	Cocus nucifera	Coconut	Aracaceae	46	Tree
29	Cordia dichotoma G. Forst	Bhokar	Boraginaceae	1	Tree
30	Cuscuta refelxa Roxb.	Amar bel	Convolvalaceae	2	Tree
31	**Cycas revolute**	**Cycas**	**Cycadaceae**	**5**	Tree

Sr No	Botanical Name	Local Name	Family	No of Plants	Type
32	Dalbergia sisso Roxb.	Shisham	Fabaceae	59	Tree
33	Delonix regia (Box ExHook)	Gulmohar	Fabaceae	15	Tree
34	Dypsis l utescens H. Wendl	Areca palm	Arecaceae	10	Shrub
35	Emblica officinalis	Amla	Phyllanthaceae	7	Tree
36	Eucalyptus lanceolatus	Nilgiri	Myrtaceae	10	Tree
37	Ficus benghalensis	Wad/Banyan	Moraceae	7	Tree
38	Ficus benjamina L.	Weeping fig	Moraceae	27	Shrub
39	Ficus elastic Roxb ex	Rubber tree	Moraceae	2	Tree
40	Ficus racemosa	Umbar	Moraceae	3	Tree
41	Ficus religiosa	Pimpel	Moraceae	4	Tree
42	Ixora coccinea	Ixora/Rugmini	Rubiaceae	22	Shrub
43	Lantana Camera	Ghaneri	Verbenaceae	20	Shrub
44	Leucaena leucocephala	Subhabul	Fabaceae	16	Tree
45	Limonia acidissima L.	Kauth	Rutaceae	2	Tree
46	Livistona chinensis	Fan palm	Arecaceae	2	Tree
47	Madhuca longifolia	Sontharad	Sapotaceae	2	Shrub
48	Mangifera indica	Mango/Amba	Anacardiaceae	53	Tree
49	Milingtonia hortensis	Jasmine plant/Buuch	Bignoniaceae	22	Tree
50	Mirabilis jalapa L.	4 O clock plant	Nyctaginaceae	2	Shrub
51	Murraya koenigii	Kadipatta	Rutaceae	5	Tree
52	Musa paradisiaca L.	Banana	Musaceae	6	Tree
53	Neolamarckia cadamba	Cadamba	Rubiaceae	3	Tree
54	Nephrolepis exaltata L.	Fish bone Fern	Nephrolepidaceae	26	Shrub
55	Nyctanthes arbor-tristisL.	Parijaat	Oleaceae	3	Tree
56	Parkinosonia aculeateL.	Jelly bean tree	Fabaceae	2	Tree
57	Peltophorum pterocarpum	Soanmohar	Fabaceae	367	Tree
58	Piper betle L.	Banaras wel	Piperaceae	4	climber
59	Pithcolombium dulce (Roxb)	Vilayati Chinch	Fabaceae	1	Tree
60	Plumeria obtuse	chapha	Apocynaceae	5	Tree
61	Polyalthia longifolia	Ashoka	Annonaceae	108	Tree
62	Pongania pinnata	Karanj	Fabaceae	152	Tree
63	Psidium guajava	Peru	Myrtaceae	13	Tree
64	Rauvolfia serpentine	Sarpagandha	Apocynaceae	2	Tree
65	Ricinus communis	Castor	Euphorbiaceae	1	Shrub
66	Roystone aregia	Cuban royalpalm	Arecaeae	2	Tree
67	Samniea saman	Shiris	Mimoceaceae	7	Tree
68	Santalum album	Chandan	Santalaceae	6	Tree
69	**Saraka Indica**	**Sitecha Ashok**	**Fabaceae**	**10**	Tree

Sr No	Botanical Name	Local Name	Family	No of Plants	Type
70	Spathodia campanulata	Fountain tree	Bignoniaceae	14	Tree
71	Swetenia mahugani	Mahoguni	Meliaceae	4	Tree
72	Syzygium cumini L.	Jambhul	Myrtaceae	10	Tree
73	Syzygium cumini L.	Jambhul	Myrtaceae	4	Tree
74	Tabernaemontana divaricate R. Br.	Chandanipat	Apocynaceae	4	Shrub
75	Tamarindus indica	Chinch, Imli	Fabaceae	49	Tree
76	Tecoma stans L.	Yellow bells	Bignoniaceae	38	Tree
77	Tectona grandis	Burma/ Saag	Lamiaceae	9	Tree
78	Terminalia arjuna	Arjun tree	Combretaceae	3	Tree
79	Terminalia catappa L.	Badam	Combretaceae	8	Tree
80	Thespesia populnea	Indian Tulip tree/Ranbhendi	Malvaceae	2	Shrub
81	Thevetia peruviana	Yellow Oleander	Apocynacae	21	Tree
82	Thuja occidentalis	Morpankhi	Cupressaceae	20	Tree
83	Ziziphus jujuba	Bore	Rhamnaceae	13	Tree
		Total		**1751**	

Total 67 tree species, 15 shrubs species and 1 climber species are observed in thecollege campus area.

- 1544 numbers of trees, 203 shrubs and 4 number of Climber are planted in college campus area.
- Good vegetation was observed at boundary of college.
- College actively participated in tree plantation Programme
- College conducted and participated in various Planation activity programs are being organized at college campus and surrounding villages through various activities of college.
- The plantation program includes various types of indigenous species of ornamental and medicinal wild plant species

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Water & Waste Water Management & Rainwater Harvesting

The college has implemented a rain harvesting system to harness the natural resource of rainwater for various sustainable purposes. This system involves the collection and storage of rainwater from rooftops and other surfaces, channelling it into tanks or reservoirs. The harvested rainwater is then used for a range of purposes such as watering the campus gardens, flushing toilets, and even for educational purposes, highlighting the importance of conservation and eco-friendly practices. This initiative not only reduces the college's reliance on traditional water sources but also promotes a culture of environmental responsibility among its students and staff.

Rain water is collected at 2000 lit capacity tank and are using for the chemistry department laboratory



Rainwater Harvesting Calculations

- Area for Rainwater Harvesting = 2870 SQ. M
- Average Seasonal Rainfall in Newasa Taluka from last five year = 531MM OR 0.531 M
- Run-Off Co-Efficient = 0.9
- Rain water harvesting potentional = 0.531 x 2870 x 0.9 = 1371 CU. M

Water Conservation

Roof top Rain water harvesting system is installed and water collected at natural tank behind the Main Building of college. Collected water will be used for gardening after rainy season in month of October to December.



Vermicomposting Plant

College has taken initiative to compost the daily solid waste by means of vermicomposting plant.

The compost generated through vermicomposting can be used as a natural fertilizer for plants and gardens, which helps to improve soil quality and support healthy plant growth. It's great to hear that your college is using the compost in the campus garden area and distributing it to nearby farmers, as this promotes sustainability and helps to reduce waste.

Following is the details of vermicomposting plant



To reduce waste in the college campus, recycling efforts are taken. Waste is collected and segregated properly. Students, faculty, and staff are aware and educated on proper waste management practices such as waste source and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste is divided into two categories: dry waste and wet waste

- Wet waste: biodegradable waste
- Dry waste: no Biodegradable waste

Category	Quantity kg/day	Disposal
Paper Waste	5	Sale to Vendor for recycling
Plastic waste	4	Sale to Vendor for recycling
Glass waste	0.50	Sale to Vendor for recycling
Metal waste	2.0	Sale to Vendor for recycling
Canteen waste (Food waste)	20	Vermi composting and used as manure for garden
Garden waste	120	Vermi composting and used as manure for garden

Sr. No.	Title of the Activities	Date of Program	Organizing unit / agency	No of Teacher s coordinate such activities	No of Students participated in such activities
1	Mahatma Gandhi and Lal Bahadur Shastri Jayanti	02-10-2020	National Service Scheme	5	25
2	Dr. A.P.J. Abdul Kalam Jayanti and Readingday	15-10-2020	Library	25	150
3	Teachers Day	05-09-2020	Student Welfare	25	20
4	Loknete Marutrao Ghule Patil Jayanti	15-09-2020	MGPS Education Society	45	300
5	Campus Cleaning	27-08-2020	National Service Scheme	30	200
6	Womens Day	08-03-2021	Jijamata Vidyarthini Manch	10	81
7	Savitribai Phule Jayanti	03-01-2021	National Service Scheme	20	90
8	Yoga Day	21-06-2020	Physical Education	60	170

Confidential report

Tax Invoice

CLEANTEAM -23-24 331, 2nd Floor, Matrix Business Center KALDA Corner, Ch. Sambhaji Nagar GSTIN/UIN: 27AFOPG9500L2Z2 State Name : Maharashtra, Code : 27 E-Mail : pritam@cleanteam.co.in	Invoice No. **2324/0026** Dated **6-Oct-23** Delivery Note Mode/Terms of Payment Reference No. & Date. Other References Buyer's Order No. Dated Dispatch Doc No. Delivery Note Date Dispatched through Destination Terms of Delivery

Buyer (Bill to)

Jijamata College of Science and Arts
At Dnyaneshwar Nagar,
PO Bhenda(Bk)
Taluka Newasa
Dist Ahmednagar
State Name : Maharashtra, Code : 27

Sl No.	Description of Goods and Services	HSN/SAC	Quantity	Rate	per	Amount
1	**Sale of Solar Rooftop System**	85414300	**79.92 kwp**	32,845.35	kwp	**26,25,000.37**
2	**I & C Solar Rooftop System**	995461	**79.92 kwp**	14,076.57	kwp	**11,24,999.47**
						37,49,999.84
	CGST					**2,58,749.97**
	SGST					**2,58,749.97**
	Round Off					**0.22**
	Total		**159.84 kwp**			**₹ 42,67,500.00**

Amount Chargeable (in words) *E. & O.E*

INR Forty Two Lakh Sixty Seven Thousand Five Hundred Only

HSN/SAC	Taxable Value	Central Tax		State Tax		Total Tax Amount
		Rate	Amount	Rate	Amount	
85414300	26,25,000.37	6%	1,57,500.02	6%	1,57,500.02	3,15,000.04
995461	11,24,999.47	9%	1,01,249.95	9%	1,01,249.95	2,02,499.90
Total	**37,49,999.84**		**2,58,749.97**		**2,58,749.97**	**5,17,499.94**

Tax Amount (in words) : **INR Five Lakh Seventeen Thousand Four Hundred Ninety Nine and Ninety Four paise Only**

Company's Bank Details
Bank Name : **ICICI BANK**
A/c No. : **145505003823**
Branch & IFS Code : ICIC0001455

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

for **CLEANTEAM -23-24**

Authorised Signatory

This is a Computer Generated Invoice

MAHAVITARAN
Maharashtra State Electricity Distribution Co. Ltd

Maharashtra State Electricity Distribution Company Limited

Welcome MADHUKAR E NAVGIRE Logout

Web Self Service Home > View History

Web Self Service

- My Account
- Change Password
- Update Profile
- Consumption Calculator
- Energy Bill Calculator
- New Connection Request
- Track Status,Upload Documents and Pay Charges
- *Online Payment of Other Charges
- *Register / Update Mobile number, Email,Aadhar number, TDS and PAN No

View History

Connection Information

Consumer Number	148389003228	Circle Code	570 A-NAGAR CIRCLE
Name	M/S SECT SHRI MARUTRAO GHULE PATIL S S	Connection Type	HT
Connection Status	P.D.		

Billing | Payments History

Bill Month	Consumption (Units)	Status	Bill Amount	Prompt Payment Date	Due Date	View/Download
Feb 2024	0		0.00			
Jan 2024	0		0.00			
Dec 2023	0		0.00			
Nov 2023	0		0.00			
Oct 2023	0		0.00			
Sep 2023	0		0.00			
Aug 2023	0		0.00			
Jul 2023	5,373		87,620.00	17 Aug 2023	25 Aug 2023	
Jun 2023	14,444		207,280.00	13 Jul 2023	21 Jul 2023	
May 2023	16,052		225,640.00	20 Jun 2023	29 Jun 2023	
Apr 2023	14,906		208,030.00	16 May 2023	24 May 2023	
Mar 2023	14,833		231,560.00	12 Apr 2023	20 Apr 2023	

View Consumption Graph View Billing Graph

Scanned with OKEN Scanner

Maharashtra State Electricity Distribution Co. Ltd.

MAHAVITARAN
Maharashtra State Electricity Distribution Co. Ltd.

BILL OF SUPPLY FOR THE MONTH OF JUL-2023

202307957000921

GSTIN:27AAECM2933K1ZB Website:www.mahadiscom.in HSN CODE:27160000

AHMEDNAGAR CIRCLE - 570 A'NAGAR RURL - 571 NEWASA SUB-DIVISION - 199 1

Consumer No. : 148389003228

Consumer Name : M/S SECT SHRI MARUTRAO GHULE PATIL S S

Address : DNYANESHWAR NAGER P BHENDA
TAL NEWASA DIST AHMEDNAGAR

Village: DNYANESHWAR NR **Pin Code :** 414603

BILL DATE	11/08/2023	87,620.00
DUE DATE	25/08/2023	
IF PAID UPTO	17/08/2023	86,850.00
IF PAID AFTER	25/08/2023	88,770.00

Last Receipt No./Date: 0009014695 / 15-07-2023

Last Month Payment : 2,07,280.00

Scale / Sector : Small Scale /

Email : ***kltd@gmail.com

Mobile No. : 97******90	**Meter No :** 055-X1082842	**Seasonal :**	**Load Shed Ind :** AG.DOM
Sanctioned Load (KW): 0	**Connected Load (KW) :** 64.00	**Urban/Rural :** Rural	**Express Feeder :** Yes
Contract Demand (KVA) : 58.00	**70% of Con. Demand (KVA) :** 40.60	**Feeder Voltage (KV) :** 11	**LIS Indicator :**
Tariff : 146 HT-VIII B	old trf HT-VIII B		

Date of Connection : 28/02/1987	**Category :** PUBL. SERVICES OTH	**GSTIN :**	
Supply at : HT	**Elec. Duty :** 07 PART B	**PAN :** AABTS1948N	
Prev. Highest (Mth) : FEB	**Prev. Highest Bill Demand (KVA) :** 55		
S.D. Held Rs. : 2,86,015.47	**Addl. S.D. Demanded Rs. :** 0.00	**MIDC Zone:** OTHER	
Bank Guarantee Rs. : 0	**S.D. Arrears Rs. :** 87,800.00		

BILLING HISTORY

Bill Month	Units	Bill Demand(KVA)	Bill Amount
JUN-23	14,444	46	2,15,145
MAY-23	16,053	50	2,34,506
APR-23	14,906	51	2,24,621
MAR-23	14,832	55	2,27,429
FEB-23	12,268	55	1,91,944
JAN-23	12,441	45	1,87,053
DEC-22	13,245	45	1,99,532
NOV-22	11,279	46	1,73,439
OCT-22	10,121	45	1,58,108
SEP-22	11,662	45	1,77,170
AUG-22	11,210	45	1,72,214
JUL-22	10,666	45	1,65,612

CUSTOMER CARE Toll Free No.
1912, 1800-233-3435, 1800-212-3435

Rule & Procedure for Consumer Grievances Redressal is available at www.mahadiscom.in -> consumer portal -> CGRF

For making Energy Bill payment through RTGS/NEFT mode, use following details
- o Beneficiary Name: MSEDCL
- o Beneficiary Account Number: **MSEDHT01148389003228**
- o IFS Code: **SBIN0008965 (fifth,sixth and seventh character is zero)**
- o Name of Bank: SBI Bank
- o Name of Branch: IFB, BKC Branch-MSEDCL

Disclaimer: Please use above bank details only for payment against consumer number mentioned in beneficiary account number.

Follow us on :

- **Tariff Revised w.e.f. 01.04.2023. Tariff Order is available at Mahavitaran Portal.**
- **Physical Bills are not served. You can view and pay bill online at portal https://wss.mahadiscom.in/wss/wss**
- **Consumer can pay bill through portal using various online modes.**
- **As per Income Tax provision vide section 269 ST cash receipt of Rs. 2.00 lakhs and above will not be accepted by MSEDCL against any type of payment.**
- **As per MERC order dt. 24/02/2021, monthly energy bill payment in cash is limited Rs.5000/- w.e.f. 01/11/2021.**
- **As per GoM Notification dtd. 14.08.2020, rate of Electricity Duty for Part-F Industrial is revised from 9.3% to 7.5% from billing month Aug-20**
- **Activity: EDUCATIONAL INSTITUTIONS SCHOOLS AND COLLEGES OTHER THAN THE STATE OR CENTRAL GOVERNMENT OR LOCAL SELF GOV.BODIES**

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.
- This Electricity Bill should not be used for the address proof and as a proof of property ownership.
- For any payment to MSEDCL , ENSURE & INSIST for computerized receipt with unique system generated receipt number. Do not accept hand written receipt. Pay online to avoid any inconvenience.

Consumer No. : 148389003228

CURRENT CONSUMPTION DETAILS

Reading Date	KWH	KVAH	RKVAH (LAG)	RKVAH (LEAD)	KW (MD)	KVA (MD)
Current 20/07/2023	197027.500		68317.000	8587.000	17.560	18.360
Previous 30/06/2023	194403.000		67747.000	8587.000		
Difference	2624.500		570.000	0.000		
Multiplying Factor	2.000		2.000	2.000	2.000	2.000
Consumption	5249.000		1140.000	0.000	35.120	36.720
L.T. Metering	0.000		0.000	0.000	0.000	0.000
Adjustment	0.000		0.000	0.000	0.000	0.000
Assessed Consumption	0.000		0.000	0.000	0.000	0.000
Total Consumption	5249.000	5372.000	1140.000	0.000	35.000	37.000

BILLING DETAILS

Amount in Rs.

Billed Demand (KVA)	41	@ Rs.	499.00
Assessed P.F.		Avg. P.F.	0.977
Billed P.F.	0.977	L.F.	19

Consumption Type	Units	Rate	Charges Rs.
Public Services	4,144	10.40	43,097.60
Residential	1,228	6.95	8,534.60
Commercial	0	12.83	0.00

E.D. on (Rs.)	Rate %	Amount Rs.
0.00	0.00	0.00
13,948.18	16.00	2,231.71
62,401.23	21.00	13,104.26

TOD Zone	Rate	Units	Demand	Charges Rs.
00:00 Hrs-06:00 Hrs & 22:00 Hrs-24:00 Hrs	-1.50	426	23.00	-639.00
06:00Hrs-09:00Hrs & 12:00Hrs-18:00Hrs	0.00	1,981	37.00	0.00
09:00 Hrs-12:00 Hrs	0.80	842	36.00	673.60
18:00 Hrs-22:00 Hrs	1.10	896	26.00	985.60

Amount In Words: **EIGHTY -SEVEN THOUSAND SIX HUNDRED TWENTY ONLY**

Demand Charges		20,459.00
Wheeling Charge @ 0.60 Rs/U		3,223.20
Energy Charges		51,632.20
TOD Tariff EC		1,020.20
FAC @ 0.00 Ps./U		0.00
Electricity Duty		15,335.97
Bulk Consumption Rebate		0.00
Tax on Sale @ 18.00 Ps./U		728.82
Incremental Consumption Rebate		0.00
		0.00
Charges For Excess Demand		0.00
Tax Collection at Source		0.00
Debit Bill Adjustment		0.00
TOTAL CURRENT BILL		92,399.39
Current Interest	08/08/2023	0.00
Principal Arrears		- 4,783.01
Interest Arrears		0.00
Total Bill Amount (Rounded) Rs.		**87,620.00**
Delay Payment Charges Rs.		1,154.99
Amount Payable After 25/08/2023 (Amount Rounded to Nearest Rs. 10/-)		**88,770**

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 MSEDCL.

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. In case of payment made through RTGS/NEFT/Cheque/DD/Pay Order, the date of amount credited to MSEDCL's account will be treated as receipt date.

Collection Hours : 10:30 to 16:00 Hours (Except on Bank Holidays, Sundays, 2nd and 4th Saturdays)

Consumer No. : 148389003228

Third Installment of Adjustments due to FCA rate revision for the period from Mar-2022 to Mar-2023 are passed in this bill.
$$ Incremental Consumption Rebate Ref consumption : 9723

TOTAL AMOUNT PAYABLE IS REGULAR BILL PLUS ADDITIONAL SD. ;
****** PROMPT DISCOUNT Rs. 763 IF PAID ON OR BEFORE 17-AUG-23**

Consumer No. : 148389003228

Adjustment Details		
Adjustment Type	**Debit Amount (incl in Bill)**	**Credit Amount (incl in Arrears)**
Prior Period Recovery/Receipt(Excl.Curr Fin.Year)	0.00	804.64
Adjustment to FAC Prior Period(Excl.Curr Fin.Year)	0.00	3,980.26
Incremental Consumption Rebate	0.00	3,075.00

MAHAVITARAN
Maharashtra State Electricity Distribution Co. Ltd.

Maharashtra State Electricity Distribution Co. Ltd.

BILL OF SUPPLY FOR THE MONTH OF SEP-2022

202209857093945

GSTIN:27AAECM2933K1ZB Website:www.mahadiscom.in HSN CODE:27160000

AHMEDNAGAR CIRCLE - 570 A'NAGAR RURL - 571 NEWASA SUB-DIVISION - 199 1

Consumer No. : 148389003228

Consumer Name : M/S SECT SHRI MARUTRAO GHULE PATIL S S

Address : DNYANESHWAR NAGER P BHENDA
TAL NEWASA DIST AHMEDNAGAR

Village: DNYANESHWAR NR **Pin Code :** 414603

BILL DATE	09/10/2022	1,77,170.00
DUE DATE	25/10/2022	
IF PAID UPTO	15/10/2022	1,75,710.00
IF PAID AFTER	25/10/2022	1,79,380.00

Last Receipt No./Date: 0005503312 / 12-09-2022

Last Month Payment : 1,70,800.00

Scale / Sector : Small Scale /

Email : ***kltd@gmail.com

Mobile No. : 97******90	**Meter No :** 055-X1082842	**Seasonal :**	**Load Shed Ind :** AG.DOM
Sanctioned Load (KW): 0	**Connected Load (KW) :** 64.00	**Urban/Rural :** Rural	**Express Feeder :** Yes
Contract Demand (KVA) : 58.00	**65% of Con. Demand (KVA) :** 37.70	**Feeder Voltage (KV) :** 11	**LIS Indicator :**
Tariff : 146 HT-VIII B	old trf HT-VIII B		

Date of Connection : 28/02/1987	**Category :** PUBL. SERVICES OTH	**GSTIN :**	
Supply at : HT	**Elec. Duty :** 07 PART B	**PAN :** AABTS1948N	
Prev. Highest (Mth) : MAY	**Prev. Highest Bill Demand (KVA) :** 60		
S.D. Held Rs. : 2,86,015.47	**Addl. S.D. Demanded Rs. :** 0.00	**MIDC Zone:** OTHER	
Bank Guarantee Rs. : 0	**S.D. Arrears Rs. :** 0.00		

BILLING HISTORY

Bill Month	Units	Bill Demand(KVA)	Bill Amount
AUG-22	11,210	45	1,72,214
JUL-22	10,666	45	1,65,612
JUN-22	11,684	49	1,80,150
MAY-22	17,194	60	2,31,337
APR-22	14,447	50	1,94,133
MAR-22	13,736	44	1,84,225
FEB-22	10,108	44	1,38,295
JAN-22	9,186	44	1,28,571
DEC-21	9,683	44	1,33,469
NOV-21	8,569	54	1,24,534
OCT-21	10,264	54	1,44,730
SEP-21	20,229	58	2,60,262

CUSTOMER CARE Toll Free No.
1912, 1800-233-3435, 1800-212-3435

IGRC: vidyut bhavan,Ahmednagar, Phone - 0241-2340240

In case of non-redressal of grievance here, consumer may make his representation to below forum

CGRF: KHARVANDA PARK,DWARKA,NASHIK, Phone - 0253-6526484

For making Energy Bill payment through RTGS/NEFT mode, use following details
- o Beneficiary Name: MSEDCL
- o Beneficiary Account Number: **MSEDHT01148389003228**
- o IFS Code: **SBIN0008965 (fifth,sixth and seventh character is zero)**
- o Name of Bank: SBI Bank
- o Name of Branch: IFB, BKC Branch-MSEDCL

Disclaimer: Please use above bank details only for payment against consumer number mentioned in beneficiary account number.

- **Tariff Revised w.e.f. 01.04.2022. Tariff Order is available at Mahavitaran Portal.**
- **Physical Bills are not served. You can view and pay bill online at portal https://wss.mahadiscom.in/wss/wss**
- **Consumer can pay bill through portal using various online modes.**
- **As per Income Tax provision vide section 269 ST cash receipt of Rs. 2.00 lakhs and above will not be accepted by MSEDCL against any type of payment.**
- **As per MERC order dt. 24/02/2021, monthly energy bill payment in cash is limited Rs.5000/- w.e.f. 01/11/2021.**
- **As per GoM Notification dtd. 14.08.2020, rate of Electricity Duty for Part-F Industrial is revised from 9.3% to 7.5% from billing month Aug-20**
- **Activity: EDUCATIONAL INSTITUTIONS SCHOOLS AND COLLEGES OTHER THAN THE STATE OR CENTRAL GOVERNMENT OR LOCAL SELF GOV.BODIES**

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.
- This Electricity Bill should not be used for the address proof and as a proof of property ownership.
- For any payment to MSEDCL , ENSURE & INSIST for computerized receipt with unique system generated receipt number. Do not accept hand written receipt. Pay online to avoid any inconvenience.

Consumer No. : 148389003228

CURRENT CONSUMPTION DETAILS

Reading Date	KWH	KVAH	RKVAH (LAG)	RKVAH (LEAD)	KW (MD)	KVA (MD)
Current 30/09/2022	139155.000		46075.500	8583.500	20.120	21.200
Previous 31/08/2022	133697.500		44089.500	8583.500		
Difference	5457.500		1986.000	0.000		
Multiplying Factor	2.000		2.000	2.000	2.000	2.000
Consumption	10915.000		3972.000	0.000	40.240	42.400
L.T. Metering	0.000		0.000	0.000	0.000	0.000
Adjustment	0.000		0.000	0.000	0.000	0.000
Assessed Consumption	0.000		0.000	0.000	0.000	0.000
Total Consumption	10915.000	11662.000	3972.000	0.000	40.000	42.000

BILLING DETAILS

Amount in Rs.

Billed Demand (KVA)	45	@ Rs.	454.00
Assessed P.F.		Avg. P.F.	0.936
Billed P.F.	0.936	L.F.	28

Consumption Type	Units	Rate	Charges Rs.
Industrial	9,541	8.96	85,487.36
Residential	2,121	5.70	12,089.70
Commercial	0	10.95	0.00

E.D. on (Rs.)	Rate %	Amount Rs.
0.00	0.00	0.00
20,683.66	16.00	3,309.39
1,25,252.99	21.00	26,303.13

TOD Zone	Rate	Units	Demand	Charges Rs.
00:00 Hrs-06:00 Hrs & 22:00 Hrs-24:00 Hrs	-1.50	1,560	23.00	-2340.00
06:00Hrs-09:00Hrs & 12:00Hrs-18:00Hrs	0.00	4,400	40.00	0.00
09:00 Hrs-12:00 Hrs	0.80	1,597	42.00	1277.60
18:00 Hrs-22:00 Hrs	1.10	1,984	27.00	2182.40

Amount In Words: ONE LAKH SEVENTY -SEVEN THOUSAND ONE HUNDRED SEVENTY ONLY

Demand Charges		20,430.00
Wheeling Charge @ 0.55 Rs/U		6,414.10
Energy Charges		97,577.06
TOD Tariff EC		1,120.00
FAC @ 175.00 Ps./U		20,408.50
Electricity Duty		29,612.52
Bulk Consumption Rebate		0.00
Tax on Sale @ 18.00 Ps./U		1,607.40
Incremental Consumption Rebate		0.00
Charges For Excess Demand		0.00
Tax Collection at Source		0.00
Debit Bill Adjustment		0.00
TOTAL CURRENT BILL		1,77,169.58
Current Interest	07/10/2022	0.00
Principal Arrears		- 1.19
Interest Arrears		0.00
Total Bill Amount (Rounded) Rs.		**1,77,170.00**
Delay Payment Charges Rs.		2,214.62
Amount Payable After 25/10/2022 (Amount Rounded to Nearest Rs. 10/-)		**1,79,380**

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 discrepency 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 MSEDCL.

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. In case of payment made through RTGS/NEFT/Cheque/DD/Pay Order, the date of amount credited to MSEDCL's account will be treated as receipt date.

Collection Hours : 10:30 to 16:00 Hours (Except on Bank Holidays, Sundays, 2nd and 4th Saturdays)

Consumer No. : 148389003228

****** PROMPT DISCOUNT Rs. 1459 IF PAID ON OR BEFORE 15-OCT-22**

Consumer No. : 148389003228

Adjustment Details		
Adjustment Type	**Debit Amount (incl in Bill)**	**Credit Amount (incl in Arrears)**
PROMPT PAYMENT DISCOUNT	0.00	1,417.00

पंचनामा

दि० १६/१/२०१८

आज दि० १६/१/२०१८ रोजी जिजामाता शास्त्र व कला महाविद्यालयातील लेडिज कॉमन कम महील्य सॅनटरी नॅपकीन वेडिंग मशीनचे कुलूप खवालील पंचा समक्ष उघडण्यात आले.

वेळ दुपारी १२=१५

पंचाची नावे पुढील प्रमाणे

① डॉ.बी.जे अप्पाराव
② डॉ भुक्ते एन.पी
③ डॉ भोसले मृणाल
④ चाभुटे बी.एस
⑤ नानेय प्रतिक्षा S/O S.C (विद्यार्थिनी)

वरील पंचासमक्ष कुलूप उघडून रकमेत - 350/- मशीनमध्ये तिच्या पालकांच्या ठेवली होती. वरील पंचासमक्ष परत मशीनला कुलूप लावण्यात आले.

आज ~~दि०~~ दि० १६/१/२०१८ रोजी कार्यालयात श्री.चोपडे यांचेकडे रक्कम रुपये 350/- (अक्षरी- तीनशे पन्नास मात्र) पावती नं - 5980 ने जमा केली.

लेडिज कॉम प्रमुख
Absent
(प्रा० भोसले कॉम.डी.)
१६/१/२०१८

SHRI MARUTRAO GHULE PATIL EDUCATION SOCIETY, BHENDE

JIJAMATA COLLEGE OF SCIENCE AND ARTS

Bhende

Member ID: 0 **Misc. Fee Receipt** **Section:** SR COLLEGE

Name:	BHOSALE MRUNAL GULAB	**Class:**	
GR/PRN No.:	0	**Division Type:**	NON-GRANT
Date:	16/01/2018	**Roll No.:**	0
Receipt No.:	4980	**Division:**	
Bank Details:	**No.:** 0		

T.C. fee	0	Book Fine	0	Dup Markseet Fe	0		0
Bonafide Fee	0	I Card Loss Fin	0	Markseet Fee	0		0
Hostel form Fee	0	Online A P Fee	0	Tally Fee	0		0
Prospectus	0	Entry Charges	0		0		0
Breakage	0	Library deposit	0		0		0
Exam Form Fee	0	Physical EDPFee	0		0		0
Other Fee	350	SCHOLARSHIP	0		0		0
Sale of Journal	0	Poem Workshop	0		0		0
Xerox	0	Subject Change	0		0		0
Book Loss Fine	0	Medical fee	0		0	***	0

Fee In **Words:** Rupees Three Hundred Fifty Only **Paid Fee** 350

Total Pending Fee Till Date: 0

Narration: Ledige Room (weding Mashain)

Seal & Sign.

For Principal
JIJAMATA COLLEGE OF SCIENCE AND ARTS

www.vriddhisoftware.com

Rec 9/2/2018

PAGE No.
DATE

दि० ०९/०७/२०१८

पंचनामा

आज दि० ०९/०७/२०१८ रोजी आपल्या महाविद्यालयातील विद्यार्थीनी विद्यापीठकेमधील मॅनेजरी मॅचकीत वेडिंग मशीनचे कुलूप खालील पंचासमक्ष उघडण्यात आले. वेळ सकाळी -११.०० पंचान्वि नावे खालील प्रमाणे—

① प्रा० पानसरे सीडी — Pansare
② प्रा० भोसले क्रम. जी — Bhosale
③ कु० जाधव रुपाली — T.Y.B.A (विद्यार्थीनी) जाधव
④ कु० चिलवंत राणी — T.Y.B.A (विद्यार्थीनी) Rani

वरील पंचासमक्ष कुलूप उघडून रुपये रक्कम ४१०/- (अरुपये चारशे दहा रुपये मात्र) वरील पंचासमक्ष परत कुलूप लावण्यात आले.

आज दि० ९/७/२०१८ रोजी कार्यालयात श्री०-चोपडे यांचेकडे रक्कम रुपये ४१०/- (अरुपरी चारशे दहा रुपये मात्र) कार्यालयात श्री० दत्ता गायकवाड यांचेकडे रक्कम रुपये ४१० रु. मात्र (अरुपरी-चारशे दहा रुपये मात्र) पावती क्रमांक 235 ने जमा केली.

लेडिजकम प्रमुख
Ghsale
(प्रा० भोसले क्रम. जी.)

SHRI MARUTRAO GHULE PATIL EDUCATION SOCIETY, BHENDE

JIJAMATA COLLEGE OF SCIENCE AND ARTS

Bhende

Member ID: 0 **Misc. Fee Receipt** **Section:** SR COLLEGE

Name:	BHOSALE M.G	**Class:**	
GR/PRN No.:	0	**Division Type:**	NON-GRANT
Date:	17/07/2018	**Roll No.:**	0
Receipt No.:	2355	**Division:**	
Bank Details:	BOB No.: 0		

T.C. fee	0	Book Fine	0	Dup Markseet Fe	0		0
Bonafide Fee	0	I Card Loss Fin	0	Markseet Fee	0		0
Hostel form Fee	0	Online A P Fee	0	Tally Fee	0		0
Exam Fee	0	Entry Charges	0		0		0
Breakage	0	Library deposit	0		0		0
Exam Form Fee	0	Physical EDPFee	0		0		0
Other Fee	410	SCHOLARSHIP	0		0		0
Sale of Journal	0	Poem Workshop	0		0		0
Xerox	0	Subject Change	0		0		0
Book Loss Fine	0	Medical fee	0		0	***	0

Fee In Words: Rupees Four Hundred Ten Only **Paid Fee** 410

Total Pending Fee Till Date: 0

Narration: Ledies Comm room

Seal & Sign.

For Principal
JIJAMATA COLLEGE OF SCIENCE AND ARTS

www.vriddhisoftware.com

Rs 0900/0297

PAGE No. 2 DATE

PAGE No.
DATE

पंचनामा दि. 28/02/2019

आज दि०28/02/2019 रोजी आपल्या महाविद्यालयातील विद्यार्थिनी विश्रामीके मधील सॅनटरी नॅपकीन वेडींग मशीनचे कुलूप खवालील पंचासमक्ष उघडण्यात आले.

वेळ सकाळी— 10.30 वाजता

पंचाची नावे खवालील प्रमाणे

(1) कु० कुटे कोमल माधिंद — S.Y. BSc. Komal
(2) कु० कोडिले सुवर्णा नानासोहेब - S.Y. BSc. Suvarna
(3) सौ. गाडे वैशाली पावलस. Gadde
(4) प्रा० भोसले मृणाल गुलाबराव Bhosale

वरील पंचासमक्ष कुलूप उघडून रुपये रक्कम अक्षरी सतरा दहा रुपये मात्र (₹१७० रु.) वरील पंचासमक्ष परत कुलूप लावण्यात आले

आज दि० 28/2/2019 रोजी कार्यालयास श्री-चोपडे यांचेकडे रक्कम रुपये ₹१७०/ (सतरा दहा रु.) मात्र पावती क्रमांक-6956 ने जमा केली.

लेडिज रुम प्रमुख
Bhosale
(प्रा. भोसले एम. जी.)

SHRI MARUTRAO GHULE PATIL EDUCATION SOCIETY, BHENDE

JIJAMATA COLLEGE OF SCIENCE AND ARTS

Bhende

Member ID: 0

Misc. Fee Receipt

Section: SR COLLEGE

Name:	BHOSALE MRUNAL GULAB	**Class:**	
GR/PRN No.:	0	**Division Type:**	NON-GRANT
Date:	26/02/2019	**Roll No.:**	0
Receipt No.:	6956	**Division:**	
Bank Details:	BOB **No.:**		

T.C. fee	0	Book Fine	0	Dup Markseet Fe	0		0
Bonafide Fee	0	I Card Loss Fin	0	Markseet Fee	0		0
Hostel form Fee	0	Online A P Fee	0	Tally Fee	0		0
Exam Fee	0	Entry Charges	0	Fitnes Center	0		0
Breakage	0	Library deposit	0		0		0
Exam Form Fee	0	Physical EDPFee	0		0		0
Other Fee	610	SCHOLARSHIP	0		0		0
Sale of Journal	0	Poem Workshop	0		0		0
Xerox	0	Subject Change	0		0		0
Book Loss Fine	0	Medical fee	0		0	* * *	0

Fee In Words: Rupees Six Hundred Ten Only **Paid Fee** 610

Total Pending Fee Till Date: 0

Narration: Ledige Room (weding Mashain)

Seal & Sign.

For Principal
JIJAMATA COLLEGE OF SCIENCE AND ARTS

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Rs 28/2/2019

PAGE No.
DATE

GARDENING LANDSCAPING AND BEAUTIFICATION SECTION (G.L.B.S.)

The campus of Jijamata College of Science and Arts is rich in floral diversity. It is beautifully landscaped with plants and trees that are well maintained. Plants are labelled with their scientific names; a tree plantation is drive within campus by Botany department and NSS and Green club. College has well facilitated botanical garden which includes conservation of rare and endangered species, medicinal plants and flowering plants. Botanical garden also has well established Cactus house with 49 different species of cactus are conserved and grown. Some of the species of plants are Tinospora , Butea, Terminalia, Cycas, Peltophorum, Rouwelfia, Adhatoda, Asparagus, Cathranthus, Cassia, Spathodia, Putranjiva, Pongammia etc. along with aquatic diversity.

The Gardening landscaping and Beautification Section (G.L.B.S.) has developed the college campus in such a way that creates a conductive & pleasant atmosphere in the campus which in stimulate the students and teachers to feel fresh. The section is also involved to achieve bio- aesthetic planning of the campus. The progress is towards it by way planting of ornamental trees, shrubs, climbers and avenue trees.

For the creating of ecological balance, reducing global warming and increasing the green and pleasant environment for the teaching and research. The Gardening landscaping and Beautification Section (G.L.B.S.) has been established in the college having a complete infrastructure.

A. Profile: -

The Gardening landscaping and Beautification Section (G.L.B.S.) of Jijamata college has a Coordinator, and Beautification Expert.

- **Coordinator: - Dr. Sagade A.B**
- **Beautification Expert: - Dr. R. V. Nawale**
- **Garden Assistant: -** 01
- **Head Mali/Field Supervisor (Out sourcing): -** 02
- **Workman (Out sourcing): -** 04

B. Activities and Achievement: -

1. Advancement in Botanical Garden in college campus.
2. Development of Lawn Infront of Main building of college administrative building.
3. Mass plantation for college to protect further Environmental degradation and to improve the environment for making environmental sustainability in general and particularly of the campus in era of climatic change and climatic variability.
4. Cleaning programme organized by the NSS section during Swachh Bharat Abhiyan. Section started a campaign to clean the campusby the pooling of all green club members and Garden workers for one hour.
5. Development of Cactus house in Botanical Garden.
6. Development of Medicinal section in garden.
7. Maintained the Lawn Infront of Main building.
8. Plantation and maintenance of Botanical Garden.

C. Future Plan: -

1. To facilitate for permanent irrigation system in various parts ofthe College.
2. To Develop flower section in college campus
3. To production of Organic manure (pellets) in the college Campus.
4. Collaboration with various Ayurvedic farms to utilized available florain the college campus for the increasing the earning of the colleges.
5. To develop an herbal garden which may helpful in imparting Ayurvedic (Indigenous medicine) knowledge amongst students on going.
6. To maintain the lawn / garden through annual contract maintenance.
7. To start a organic production of fruit and vegetables for mess in the hostels to provide chemical free Vegetables to the student for their better health.



College main building



Botanical Garden



Cactus Garden



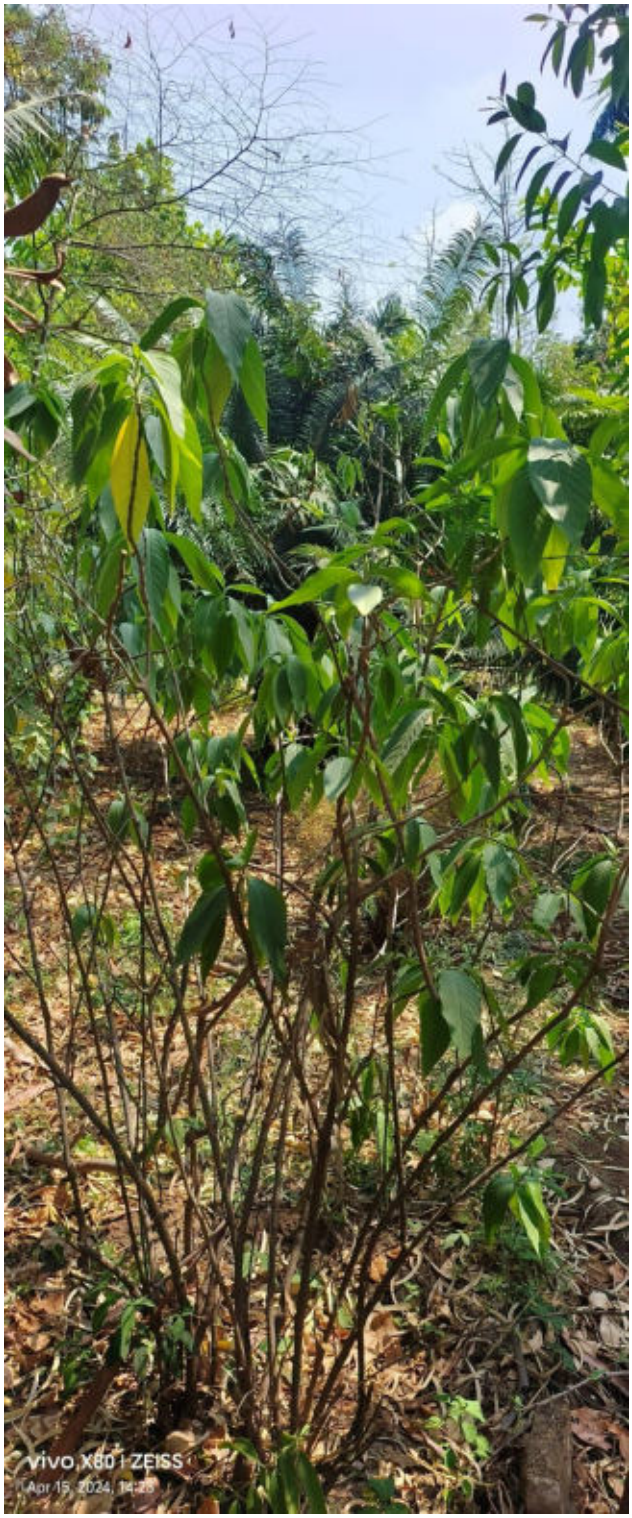




Asparagus racemosus



Rauwolfia serpentina



Adhatoda vasica



Pandanus tectorius



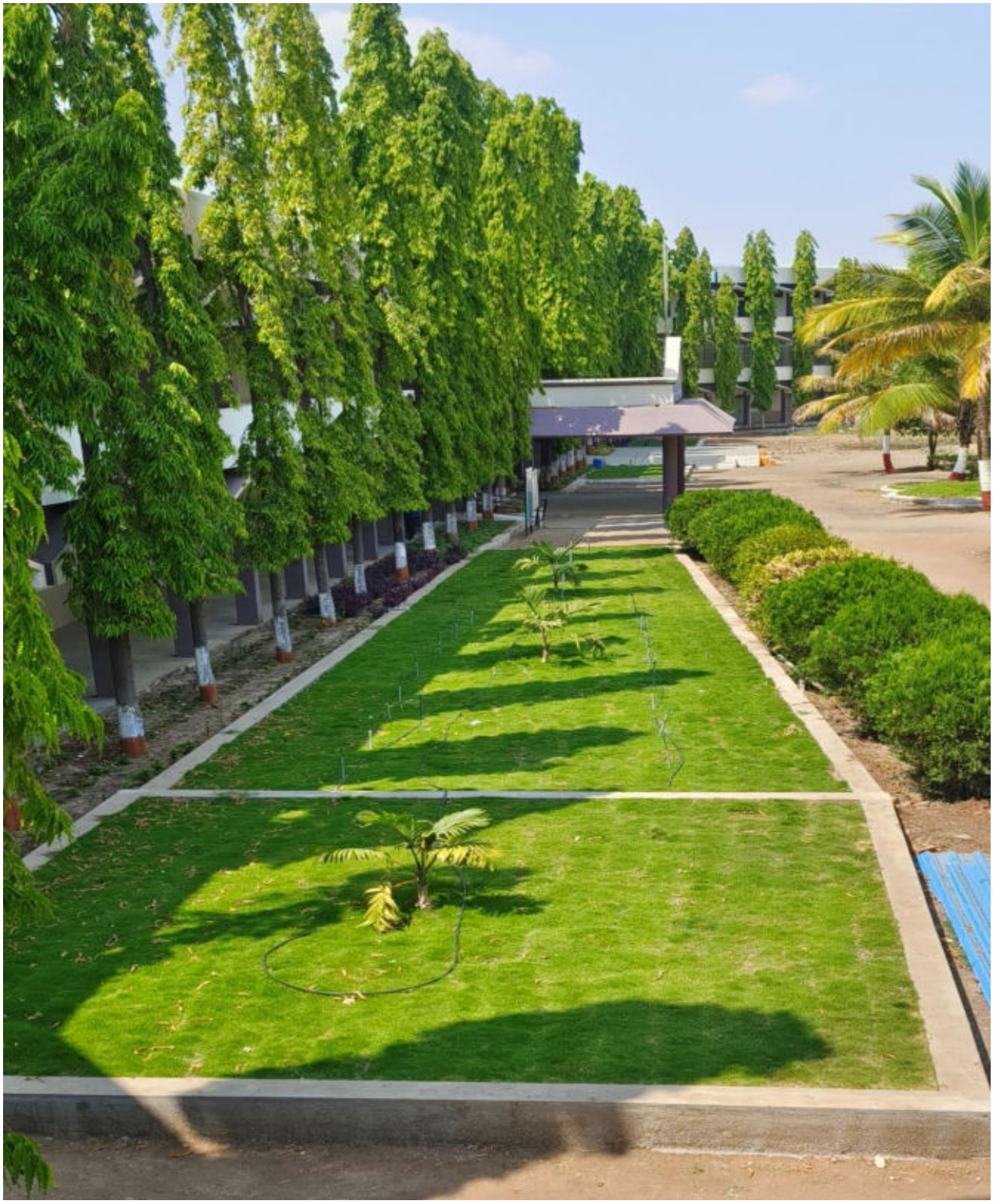
Bougainvillea sps.





Ixora sps.


vivo X80 | ZEISS
Apr 15, 2024, 14:11



Lawn in front of college building



Ornamental Plants in front of Main Building



Potted Plants

Dr. R. V. Nawale

Beautification Expert (G.L.B.S.)

Dr. Sagade A.B

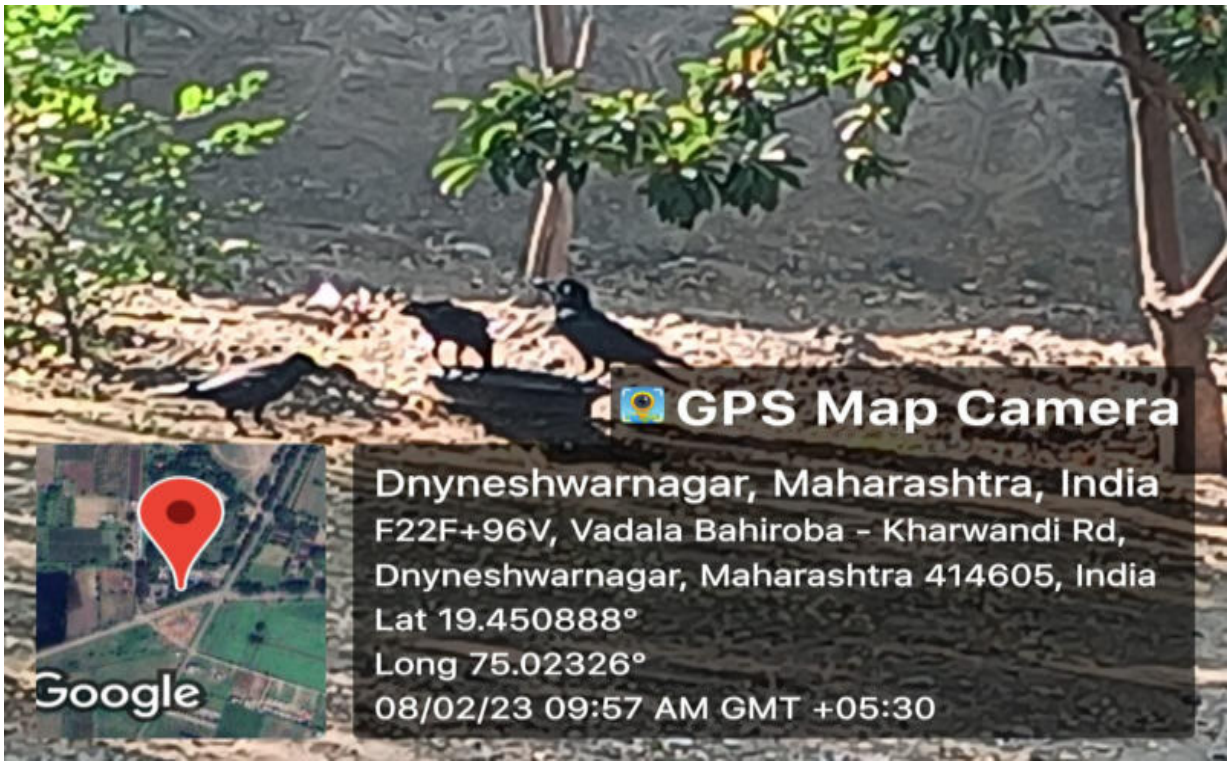
Coordinator (G.L.B.S.)

Bird Nesting Boxes, Water for Birds and Animals On-Campus

Jijamata College of Science and Arts is a bird friendly, in this time of declining birds' population we have bird feeders, water feeders, and nests installed at various location of the college campus that provide solace to bird during scorching summers especially to sparrows.



Bird feeder set up



Water Drinker



Waste Management through Eco-Friendly and Sustainable way.

Target: -

Target of the waste management practice is to convert organic waste coming from college campus and surroundings and gardens of Jijamata college of science and arts into compost by using Vermicomposting technique thereby achieving dual outcomes of sustainable waste management and its use as organic compost.

Jijamata College has enriched with botanical garden and many trees in and around the college campus. As the vegetation in this region are mainly of deciduous type because of which senescence of leaves are very common particularly from the months of Late January to June. As much number of dried leaves and plant clippings dispersed throughout the ground and are only meant to be collected and burnt out. Instead to vein all these natural elements department of Botany and zoology of college decided to utilize it in proper way by setting up a vermicomposting unit, the product which can be utilized for the development and enhancement of green campus. Intended outcomes of vermicomposting practice would not only a sustainable organic waste management but also produced compost of superior value with very high nutritional value. The vermicompost is not only used on campus gardens but is proposed to make it available to public at very affordable rate.

The Context: -

Lot of waste is generated from senescent leaves of trees and plants which is wiped and collected by cleaning and garden maintenance staff of the college every day. Organic waste from college campus includes leaves, wood sticks, garden waste such as flowers, branches etc. It also includes non-degradable items such as, plastics, polythene etc. Though the waste is segregated at the source itself, it still consists of plastics etc. Later this non-degradable waste was sent to the vendor who proceed it for recycle. After this Institute has applied the NO PLASTIC POLICY for the minimize the plastic waste.

The Practice

According to plan vermicompost unit were set up near the botanical garden, providing the ideal conditions for earthworm activity. The pits are filled with organic waste every day. Each pit has capacity of 300-400 kg. The organic waste is thoroughly mixed with cow dung. This is to ensure proper mixing and faster decomposition. It also improves the quality of compost.

Implementation: -

We are converting 50-60% of waste into compost using Vermicomposting in 04 pits, where each pit has capacity of 300-400 kg. The compost is of good quality. The compost is used in college gardens for enriching the soil it also utilized for the development of green campus. This has eliminated the need for chemical fertilizers for the same.

We also have future plans to provide skill training to other institutes and individuals like farmers, gardeners and students who wish to learn this skill of composting. This enhances their job potential and provides a sustainable source of income to them. We also encourage Schools teachers and students to visit our department and learn about practices of Sustainable Organic Waste Management. Active involvement of faculty, non-teaching staff, students, of the department enhance their waste management skills and inculcate green habits in them.

Evidence of Successes:

Here biodegradable waste can be utilized to make vermicompost. Plastic and can be segregate from the waste and after this it will be collected by the vendor in garbage van for recycling. Tree leaves can also be utilized to make vermicompost. which is a very good substitute for synthetic fertilizer.

Following objective are achieved: -

1. Zero waste Generation
2. No pollution of nearby natural water body
3. Minimum plastic waste by No Plastic Policy



Vermicompost Unit

Waste Management Facilities



Awareness of vermicompost to farmers and students



Trolly



Addition of cow dung



Garbage Trolly for waste Collection

E Waste Management

Objectives:

1. To reduce, reuse, and recycle e-waste.
2. Reduce hazardous substances in electrical and electronic components.
3. To create an E-waste collection center.

The Context:

The management of E-waste has become an important aspect. It is more hazardous than other waste because electronic components contain cadmium, lead, and mercury, which can damage health and theenvironment.

The practice:

E-waste generated in campus is of minimal quantity. It is being effectively managed. An awareness program was conducted by the college regarding E-waste management.

Success of evidence:

As a result of the awareness drive, 5 kg of e-waste were collected. Both students and teachers participated. The e-waste items were adapters, earphones, cables, and other gadgets.

Alternative Sources of Energy (Solar Energy) & Conservation of Energy

1. **Objectives**

In order to protect the environment, the college has switched over to the use of solar energy since it is a clean, renewable and emission free source of energy. Solar energy is produced by the sun's light which offers many benefits that make it one of the most promising energy. It is renewable, inexhaustible, non-polluting, avoids global warming, reduces use of fossil fuels, and contributes to sustainable development.

Use of solar energy also helps in managing the electrical cost. It has reduced the burden of heavy electricity bills.

There are Jain solar water heater system of maximum capacity of 2000 liters in the girl's hostel which serve in reducing the electricity bills and provide a regular supply of hot water which is beneficial to the students.

Our institution has switched to **LED bulbs** and tube lights completely for the energy efficiency and improved environmental performance. It also serves in minimizing the electricity cost as well as prevention of global warming.

The Context

It is the need to shift the institution to renewable, inexhaustible and nonpolluting source of energy which contributes towards environment protection and its sustainable development. Thus, we decided to work in the areas of minimal power consumption, its alternative sources and energy conservation as per national policy and objectives of the UN Sustainable Development Goal no. 7, 'Affordable and clean energy for all'.

Solar panels have been installed on the roof top of Jijamata public school which is in premises of Jijamata college.

2. **The Practice**

Institution has also replaced all the traditional bulbs with LEDs and tubes in the whole campus to minimize the consumption of electricity and putting a step forward to reduce global warming and this has also helped in reducing the electricity bill. In the future, more and more addition of Solar Street lights will be made. 'Save Electricity' campaigns are conducted throughout the academic year. Thus, the institution has put an effort to spread this message in practical form.

3. **Evidence of Success**

- The institution has installed solar panels of capacity 80 kWp which generates approx.8049 KWH (unit) energy per month, which help to Minimize electricity bill to 95 percent to that of MSEB bill. The campus lighting is now totally shifted to solar light.
- The electricity consumption bill has been minimized.
- Maximum use of pollution free, ecofriendly and renewable sources of energy.

SOLAR PANELS







LED TUBE LIGHTS

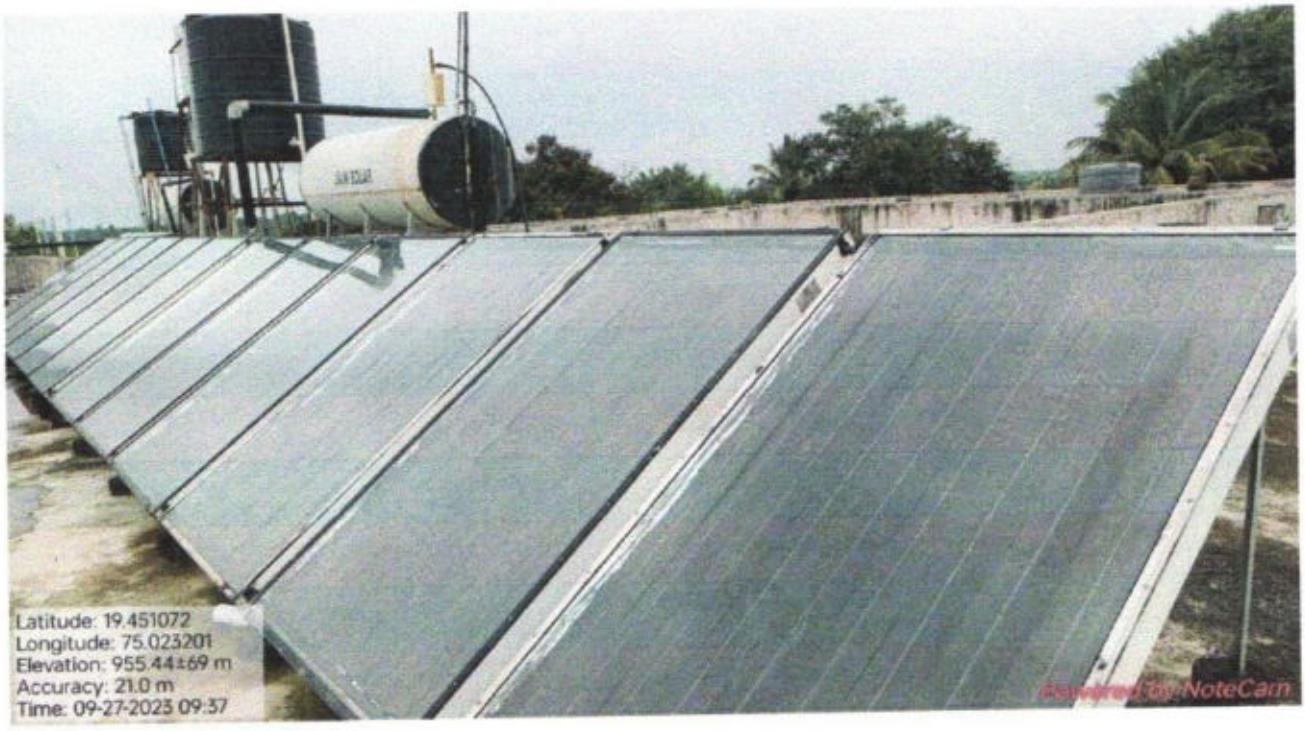



Latitude: 19.454604
Longitude: 75.023319
Elevation: 546.63±9 m
Accuracy: 14.0 m
Time: 12-19-2023 12:41
Note: solar
Powered by NoteCam

Jain Solar Water Heater System for Girls Hostel



Jain Solar Water Heater System, close Loop 1000 LPD



Jain Solar Water Heater System, close Loop 1500 LPD



Jain Solar Water Heater System, close Loop 2000 LPD

Asha Nursery

Kangoni phata, Near ghodegaon,
Nagar-Sambhajinagar road, Tal-Newasa, dist.Ahmednagar.

Mob. 98 9060 9194 | 9373 273 273

To,
Jijamata Sr. College, Bhenda, Tal. Newasa, Dist. Ahmednagar

Sr. No.	Sections	Particulars	Rate	Qty.	Total
1	Fancing Road Side	Jatropha (3-4 feet)	45	220	9900
2	Gate Section	Water Heliconia (2-3 feet)	300	10	3000
3		Areca Palm (6 feet)	550	10	5500
4		Pendunus Grass	60	35	2100
5		Lawn (100 Sq. Feet)	18	100	1800
6	Main Building	Water Heliconia (2-3 feet)	300	8	2400
7		Honey Suckle	30	156	4680
8		Red Reep Plant	15	156	2340
9		Ixora Mix Color	30	126	3780
10		Pendunus Grass	60	54	3240
11		Kamini	30	93	2790
12		Madhu malti	25	93	2325
13		Kunda	30	93	2790
14		Lantana	25	93	2325
15		Champion palm	1200	3	3600
16	Lawn Boxes	Left side of Flag Stage Lawn (334 Sq. Feet)	18	334	6012
17		Right side of Flag Stage Lawn (347 Sq. Feet)	18	347	6246
18		Botany Department Front Lawn Small Box (462 Sq. Feet)	18	462	8316
19		Botany Department Front Lawn Big Box (1270 Sq. Feet)	18	1270	22860
				Total	96004
				Grand Total	96004

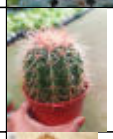
Asha Nursery

Kangoni phata, Near ghodegaon,
Nagar-Sambhajinagar road, Tal-Newasa, dist.Ahmednagar.

Mob. 98 9060 9194 | 9373 273 273

To,
Jijamata Sr. College, Bhenda, Tal. Newasa, Dist. Ahmednagar

Sr. No.	Name	Photograph	Rate	Qty.	Total
1	Christmas Cactus		140	2	280
2	Hoya Heart		90	2	180
3	Orange and yellow Grafted cactus		330	1	330
6	Mammilaria albilanata		470	1	470
7	Mammilaria polythele		470	1	470
8	Echinopsis Calochlora		470	1	470
9	Parodia magnifica variegata		470	1	470
11	Gymnocalcium Pink		250	1	250
12	Gymnocalcium Yellow		250	1	250
13	Gymnocalcium Red		250	2	500
14	Gymnocalcium Orange yellow		250	1	250
18	Grafted Pink Cactus		300	1	300

	19	Grafted Yellow Cactus		300	1	300
	20	Grafted Red Cactus		300	2	600
	22	Echinopsis Chamaecereus		370	1	370
	27	Painted Non-Grafted Red Cactus		370	1	370
	28	Painted Non-Grafted Orange Cactus		370	1	370
	33	Mammillaria Elongata Copper		100	2	200
	34	Opuntia Ficus Indica		200	1	200
	36	Cereus Repandus var. Montrosus		180	2	360
	38	Mammilaria Varigata		270	1	270
	40	Black Cactus		150	2	300
	41	Sulcorebutia Rauschii		900	1	900
	43	Echinopsis Chamaecerius		90	2	180
	44	Cereus Variegated		180	1	180
	46	Notocactus Magnificus		650	1	650
	47	Opuntia Microdasys Yellow		90	3	270
	48	Parodia Chrysocantha		900	1	900
	49	Opuntia Microdasys White		900	1	900

	50	Cereus Peruvians		90	3	270
	51	CLEISTOCACTUS SENILIS YELLOW		900	1	900
	55	Opuntia Tuna Montrosa		90	3	270
	56	Opuntia Microdasys Red		90	4	360
	57	Opuntia Mini Red		250	2	500
	62	Echonopsis Subdenudata		900	1	900
	65	Echinopsis Oxygona		90	3	270
	66	Mamillaria Elongata Lemon		90	3	270
	67	Echinopsis Cucumber		90	3	270
	68	Mammilaria Bocasana		270	1	270
	69	Euphorbia Anopolia		170	2	340
				Total	**65**	**16160**
	1	Ayurvedic Department	Akkalkadha	40	4	160
	2		Ritha	100	4	400
	3		Ashwagandha	50	4	200
	4		Kandvel	40	4	160
	5		Umbar	100	4	400
	6		wala	40	4	160
	7		Dhotra	130	4	520
	8		Nag keshar	250	4	1000
	9		Naral	300	4	1200
	10		Panfuti	35	4	140
	11		PanOva	30	4	120
	12		Palas	90	4	360
	13		Parijat	50	4	200
	14		Pangara	90	4	360
	15		Charoli	300	4	1200
	16		Bakul	90	4	360
	17		Bel	50	4	200
	18		Idlimbu	140	4	560
	19		Mehndi	80	4	320
	20		Rudraksha	300	4	1200
	21		Vekhand	50	4	200
	23		Lajalu	50	4	200
	24		Lodhra	300	4	1200

	25		Kokam	300	4	1200
	26		Lavang	300	4	1200
	27		Chameli	50	4	200
	28		Shirish	90	4	360
	29		Saag	90	4	360
	30		Sonchafa	200	4	800
	31		Velchi	300	4	1200
	32		Bramhi	50	4	200
	33		Raktchandan	50	4	200
				Total	**128**	**16540**
				Cactus		**16160**
				Ayurvedic		**16540**
				Grand Total		**32700**

7.1.3.3









Campus Cleaning



Bird feeder units installed in campus



Our Secretary Anil Shevale and Vice Chairman Abhang Saheb



Vermicomposting Plant

CERTIFICATE OF ENERGY AUDIT

Education Instituties

Certificate No : 202021-EA 4401

This is to Certify that

JIJAMATA COLLEGE OF SCIENCE AND ARTS,

Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar

has successfully Completed the Statutory requirement of Energy Audit for Year 2020-21

issued this 26th day of Jan 2021

Valid until: March 2021

Hitech Energy Services

CERTIFICATE

GREEN & ENVIRONMENT AUDIT

This is to certify that **Jijamata College of Science and Arts, Dnyneshwarnagar, Bhende (BK), Tal-Newasa, Dist -Ahmednagar** has successfully undergone **Green & Environment Audit** for year 2020-21

Date : 26th January 2021

Dr. Adhikrao Yewale
Universe Environment Consultancy, Pune

CERTIFICATE OF ENERGY AUDIT

Education Instituties

Certificate No: 202122-EA 4520

This is to Certify that

JIJAMATA COLLEGE OF SCIENCE AND ARTS,

Dnyaneshwarnagar, Bhende Bk, Tal Newasa, Dist Ahmednagar

has successfully Completed the Statutory requirement of Energy Audit for Year 2021-22

issued this 25th day of March 2022

Valid until: March 2023

Hitech Energy Services

CERTIFICATE

GREEN & ENVIRONMENT AUDIT

This is to certify that **Jijamata College of Science and Arts, Dnyneshwarnagar, Bhende (BK), Tal-Newasa, Dist -Ahmednagar** has successfully undergone **Green & Environment Audit** for year 2021-22

Date : 25TH MARCH 2022

Dr. Adhikrao Yewale
Universe Environment Consultancy, Pune

ENERGY,GREEN & ENVIRONMENT AUDIT COMPLETION CERTIFICATE

This is to certify that following utility has carried out Energy, Green & Environment Audit for the AY 2022-23 as per guidelines laid down in The Energy Conservation Act, 2001 in the month of Oct 2023

Name of the Installation	Jijamata College of Science and Arts, Dnyaneshwarnagar, Ahmednagar
Details of Facilities Audited	Main college building including lecture hall, libraries, Classroom etc.
Date of Energy and Green Audit	11 October 2023
Name of Certified Energy Auditor	Mr. Swapnil Gaikwad
Certification No.	EA 20121
Validity of the Certificate	10 October 2024

Authorised Signatory



Digitally signed by ATUL SHARAD KAKAD

Atul S Kakad

PowerTech Energy Solutions

Shri Marutrao Ghule Patil Shikshan Sanstha's

JIJAMATA COLLEGE OF SCIENCE AND ARTS

At. Dnyaneshwarnagar, Po. Bhende (Bk). Tal. Newasa, Dist. Ahmednagar
PIN- 414605; Phone: 02427-255304 Fax: 02427-255809
Permanently affiliated to University of Pune (Id/No PU./AN/S/043/1992)
Winner of Pune University's Best Rural College Award & Accredited at 'B+' Grade by NAAC
ISO 9001 : 2015 Certified Website: www.jijamatacollege.com;
E-mail:principal@jijamatacollege.com



Late Marutraoji Ghule Patil
1930 -2002

ENVIRONMENT POLICY STATEMENT

2018-2023

ENVIRONMENT POLICY STATEMENT

I. Preamble

The Shri Marutrao Ghule Patil Shikshan Sanstha's (MGPSS) **JIJAMATA COLLEGE OF SCIENCE AND ARTS** (JCS&A) is very keen to protect environment and any of the activities practiced in the institution are not causing any harm to its stakeholders or to the society in general. Specific action would be taken to prevent that. The primary goal of environmental policy is to protect natural systems. It is, therefore, a core value of the institute to preserve and protect the environment. As we advance, scientific understanding regarding the fundamental interrelationship between human health and the environment, we will proactively demonstrate our commitment to environmental stewardship and sustainable development.

Through implementation of this policy, MGPSS's JCS&A College, will serve as a leader by advancing environmental conservation commitment within our own programs and facilities, and in the broader community.

II. Aims and Objectives of the Policy:

i. Develop and maintain environmental management programs with objectives and targets to minimize adverse environmental impacts.

ii. Comply with all applicable environmental, health, and safety laws, regulations, and other requirements.

iii. Implement effective pollution prevention and waste minimization programs to reduce, reuse, and recycle materials.

iv. Ensure that energy and water are used responsibly and conserved through innovative practices and procedures.

v. Provide all institute staff with the knowledge and tools needed to meet the goals of this policy and to actively participate in efforts to prevent negative environmental impacts.

vi. Measure progress toward our environmental goals.

III. The Policy

Accordingly, it is resolved that the MGPSS's JCS&A College will:

1. **Provide facilities for alternate sources of energy and energy conservation measures like:**
   - Solar energy
   - Biogas plant

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

2. Create facilities for the management of the following types of degradable and non-degradable wastes:

- Solid waste management
- Liquid waste management
- E-waste management
- Waste recycling system
- Hazardous chemicals and radioactive waste management.

3. Provide Water Management and Water conservation facilities like:

- Rain water harvesting
- Bore well /Open well recharge
- Construction of tanks and bunds
- Waste water recycling
- Maintenance of water bodies and distribution system in the campus

4. **Take Green campus initiatives like:**

- Restricted entry of automobiles
- Use of Bicycles/ Battery powered vehicles
- Pedestrian Friendly pathways
- Ban on use of Plastic
- landscaping with trees and plants

5. Regularly conduct quality audits on environment and energy, which include:

- Green audit
- Energy audit
- Environment audit
- Clean and green campus recognitions/awards
- Beyond the campus environmental promotional activities

6. Implement Carbon Management Strategy, which include:

- To implement a carbon management strategy, including the efficient use of energy.
- To reduce greenhouse gas emissions in the college campus.
- To ensure the uptake of low carbon technologies in buildings and equipment.

7. Provide Awareness and Training:

- To communicate internally and externally, the college's environmental objectives and performance.

- To raise awareness of staff and students about the college's environmental impact, activities and performance and good practices.
- To provide appropriate environmental educational programmes for staff and students.
- To encourage and facilitate feedback and suggestions on ensuring good practices.
- Evaluation of Environmental Policy.
- To undertake a regular review of environmental management procedures and activities to ensure suitability, adequacy and effectiveness.

IV. Responsibilities:

- The main responsibility for implementation of this policy lies with the Students, Teaching and non-teaching staff and Principal of College.
- The Heads of departments are responsible for ensuring compliance with Environment Policy within their area of control.
- The committee will actively monitor the performance of Colleges and Divisions in the implementation of the aims and objectives of this Policy in the activities under their control.
- Whilst the college accepts the main responsibility for implementation of this policy, individuals have a very important role in co-operating with those responsible for safeguarding the environment. Individuals are required to abide by rules and requirements made under the authority of this policy.

Waste Reduction and Recycling:

- To set and achieve targets for reducing resource use.
- To minimize the adverse environmental impacts of the decommissioning and disposal of college assets.
- To increase the rate of recycling of all appropriate materials, based on life-cycle principles.
- To implement sustainable resource management practices, based on reduce, reuse and recycle principles.



Plantation Preparation





Plantation – Village, Najik Chincholi



Green Campus Campaign



Plantation – Village, Najik Chincholi



Solar Panel