ENERGY AUDIT REPORT

DETAILS OF THE CLIENT

B V C INSTITUTE OF TECHNOLOGY & SCIENCE

EDARAPALLI, AMALAPURAM, BATLAPALEM

ANDHRAPRADESH

INDIA - 533221

DATE OF AUDIT

06 & 07 May 2024

(Audited and Accounted for the period of 2023-24)

AUDIT CONDUCTED AND SUBMITTED BY

P S QUALITY CERTIFICATION PVT LTD

No.20, Ist Floor, Old bank of Baroda Street, Ambattur, Tamil Nadu 600 053.

Mobile: +91- 81240 88335

ACKNOWLEDGEMENT

P S QUALITY CERTIFICATION PVT LTD, New # 20, Old # 12, I Floor, Old Bank of Baroda Street, Ambattur, Tamil Nadu 600 053 is thankful to the Management, Principal, Faculty and Technical team members of **B V C INSTITUTE OF TECHNOLOGY & SCIENCE,** Edarapalli, Amalapuram, Batlapalem-533221, Andhra Pradesh for providing an opportunity to conduct a detailed Energy, Environment and Green Audit process for the college premises.

It is our great pleasure, which must be recorded here that the management of **B V C INSTITUTE OF TECHNOLOGY & SCIENCE** extended all possible support and assistance resulting in expeditious completion of the audit process. The audit team appreciates the cooperation and guidance extended during course of site visit and measurements. We are also thankful to all those who gave us the necessary inputs and information to carry out this very vital exercise of green audit.

Finally, we offer our sincere thanks to all the members in the engineering division/ technical/non-technical and office members who were directly and indirectly involved with us during collection of data and conducting field measurements.

Management Team Members	
Mr. Bonam Krishna Satish	**Chairman**
Dr. J V C Rama Rao	**Principal**
Prof. ANVJ Raja Gopal	**IQAC Coordinator**

Audit Team Members	
DR. G. ARIVARASAN	**BEE Certified Energy Auditor (EA-21875)** **Lead Auditor - ISO 14001, EMS**
DR. K. SATHYANARAYANAN	**Executive Director** **IRCA Registered Lead Auditor** **IRCA No: 73114**

ENERGY AUDIT REPORT

1. INTRODUCTION TO ENERGY AUDIT

A Thing which Burns Never Returns....

1.1 : Preface about the Institution:

BVC Group of institutions is led by our visionary founder, Sri Bonam Kanakayya, son of late Sri Bonam Venkata Chalamayya, a philanthropist & strong enforcer of the adage "Toil result will come to you. Built around the ancient scholastic concept of Gurukulam, making it a picturesque learning environment for students and teachers.

The Group has colleges located in BVCITS Amalapuram, BVCEC Odalarevu & BVCR Rajahmundry. The campuses are eco-friendly, well lit & ventilated, secure and most importantly, conducive to learning.

Armed with proficient & accomplished faculty members, state of the art learning centres and a wide range of Programs & courses, par excellence.

We are approved by AICTE, New Delhi and affiliated to JNTU, Kakinada

1.2 : Vision:

To be a Premier Institution in Education and Research, producing global leaders in Engineering. Technology and Management.

1.3 : Mission Statement:

- Imparting quality and outcome-based education forwards academic excellence
- Inculcating team spirit and professional ethics among stakeholders.
- Strengthening links with industry through internships and collaborative development works.

1.4 : Programs Offered:

UG Programs	PG Programs
Civil Engineering	M.Tech-VLSI
Electrical and Electronics Engineering	M.Tech-Computer Science and Engineering
Mechanical Engineering	Master of Business Administration
Electronics and Communication Engineering	Master of Computer Application
Computer Science and Engineering	
CSE-Artificial Intelligence & Data Science	
CSE-Artificial Intelligence and Machine Learning	

ENERGY AUDIT REPORT

PART-A: ENERGY AUDIT REPORT

2. EXECUTIVE SUMMARY

Leaks Make your Future Bleak….

EXECUTIVE SUMMARY

Electrical and Thermal Energy Analysis:

A detailed audit was conducted in **B V C INSTITUTE OF TECHNOLOGY & SCIENCE,** Edarapalli, Amalapuram, Batlapalem-533221, Andhra Pradesh, and the audit team has come out with 6 *Energy Conservation Proposals (ENCONs)* and the summary of all the ENCONs are given below:

Summary of Energy Conversion (ENCON) Proposals		
S. No.	**Description**	**Parameters**
1.	Present Annual Energy Consumption	207425 kWh
2.	Present Annual Energy Cost	27.27 lakhs
3.	Proposed % of Energy Savings	10% Electrical
4.	Proposed Annual Energy Savings	20742 kWh
5.	Proposed Financial Savings	2.72 lakhs
6.	Simple Payback Period	1.5 years

(* Audited and Accounted for Apr - 2023 to March - 2024)

Equipment's/Systems Audited:

• Electrical System & Network	• Diesel generators, pumps and motors
• Lighting, Fan & Air Conditioning System	• Inverter, UPS and Battery System
• Solar system	

Audit Conducted, Compiled and Verified by,

(Dr. G. ARIVARASAN)

BEE Certified Energy Auditor (EA-21875)

Lead Auditor - ISO 14001, EMS

Table-1: POSSIBLE ENERGY CONSERVATION PROPOSALS (ENCONS)

S. No.	Proposed Energy Conservation Measures	% Saving & Source	Remarks
1.	Reduction of kVA Demand and Active Power Consumption using Load End Capacitor Compensation	0.5 % on Total Consumption	Shift some of existing capacitors from PH and to load end
2.	Reduction of Energy Consumption in AC Compressors using Mist Pre-Cooler	10 % on HVAC	Try with low TR unitary AC and ensure energy and financial savings
3.	Replacement of Fluorescent Lamps with Energy Efficient Lamps (Swap FTL to LED Lamps)	50 % of FTL Consumption	Prepare the list of conventional FTL (of 36 W) and replace with LED of 18 W (one to one)
4.	Replacement of Existing Convention Ceiling Fans into EC - BLDC Fans	50 % of Fan Consumption	Replace the conventional ceiling fans with BLDC in a phased manner
5.	Preheat the boiling water using Solar thermal hot water system	5 % of LPG system	Try with a minimum Litre per day solar hot water generation (increasing water temperature from ambient to nearly 70 ^{0}C). Payback is less than 2 years.
6.	Expansion of Roof Top Solar Photovoltaic Power Plant (SPP) and Reduction in kWh Billing	**50 kW** roof top solar PV system	50 kW capacity of SPP roughly generates 200 to 250 units per day and generates nearly 64,000 to 80,000 units per Annum (considering 320 working days).

ENCON-I:

- In general, the college type loads are having wide variation especially i) during day & night time, ii) week days to weekend and iii) college working days and holidays. For this type of loads, it is highly recommended to connect the FC at the load end distribution panels and dedicated APFC must be fixed and function at the transformer end to maintain the PF close to unity.
- All the individual motor loads above 5 HP to be load end compensated with PF compensating capacitor along with isolation MCB for the capacitor at the motor end or at its motor panel end.

ENCON-II:

- It is recommended to install the mist cooling system in higher power and continuous running AC system and ascertain the performance (especially CoP).
- Implement the mist pre-cooler system and coupling of water mist with condenser reduces the compressor power up to 25%. The application of water mist condenser, inlet air pre-cooling could decrease the Specific Energy Consumption (SEC).
- Install a kWh meter, observe the result before and after the installation and ensure the specific power consumption. Compare the results and ensure the saving.

ENCON-III:

- In a phased manner, the college administration has to replace the FTL to LED of 18 W (20 W with choke) of branded round LED tube fitting without Blue Tinge.
- Retrofit a Surge Protection Device (SPD) at the lighting DB incoming so as to avoid failures in lighting due to micro second duration transients.
- Visual tasking is important aspect of productivity and we must give steady level of lighting.
- Improve data management: Energy management and other asset management tasks will be simplified if records of lamp and luminaries types are kept up to date.

ENCON-IV:

- Recommended to replace the existing conventional fans into EC-BLDC fans in a phased manner and ensure good energy saving.
- Further implementation of EE fans not only saves the kWh; but also saves kVA demand. A conventional fan draws nearly 100 VA, whereas the EE fan draws only 40 VA.

ENCON-V:

- The hybrid PTC model produces steam (assumed as saturated at 5-bar pressure) + hot water system.
- A steam separator inbuilt in the system separates the steam and the hot water is either taken separately through pipe system or stored in a hot water tank (later taken for application).

ENCON-VI:

- All the electricity consumers (irrespective of their tariff structure) are eligible to install SPP in their roofing; start generating power and being fully utilized by the consumer (connecting the inverter output to any of the SSB or in the MV panel).
- Installation of renewable energy based power generation might be mandatory in future (as per the government policies). Some bankers are now insisting that the customer has to install renewable energy system to reduce their carbon footprint.
- Further, during the environment assessment; power generation from the solar plant is being utilized to neutralize the CO_2 emission. Hence, it will be value added utility for the college.

ENERGY AUDIT REPORT

PART-A: ENERGY AUDIT REPORT

3. STUDY ON ENERGY CONSUMPTION & GENERATION PATTERN

Take Control of your Energy Bills….

3.1: Energy Consumption Pattern (Electrical and Thermal):

S. No.	Description	Details	
Electrical Energy (Consumption)			
1.	Name of the customer (As per the utility bill)	**M/S BVC INSTITUTE OF TECHNOLOGY & SCIENCE**	
2.	Type of Utility Supply, Service No.& Tariff	COMMERCIAL-HT II(A), RJY 876, VAN ID:APEPDC0100002416 & 7.65	
3.	Energy Suppliers	Eastern Power Distribution company of Andhra Pradesh	
4.	Permitted Demand (PD)	**90 CMD**	
5.	Capacity of Diesel Generator (DG) Sets	125 KVA 82.5KVA	
		All are air-cooling. Internal fuel tank & separate earthing done	
6.	Annual Electricity Generation from DG (kWh)	8156	
7.	Annual Diesel Consumption for DG (L)	**3685**	
8.	Types of Thermal Energy Used	Diesel (Ordinary)	Transport + DG
9.	Roof Top Solar	175 KW	
10	Fan Loads (Ceiling)	• All the ceiling fans are conventional fans.	
11.	HVAC System	• Unitary air-conditioning system installed in the required places. • Most of the AC units are **BEE star rated** and the outdoor units are mostly placed in shade. • A welcome step in the energy conservation is; all the air-conditioned rooms are set with 24^0 C as room temperature as per BEE norms.	
12.	Motors and Pump loads	• Mainly used for water distribution, purification, waste water treatment. • Small motors used in kitchen equipment' s.	
13.	Uninterrupted Power System (UPS)	• All the computers, server, surveillance system, projectors, telephonic units are connected with UPS with nominal back up time of 15 - 30 min.	

Table-2: Annual Consumption of Electrical & Thermal Energy Parameters (2022-23)

S. No.	Month	Units Consumed (kWh)	Amount Rs	Diesel Consumed (Litres)	Amount Rs
				Transport	
1.	Apr-23	17811	189411.00	370	36075
2.	May-23	19011	250152.00	530	51675
3.	Jun-23	20865	282732.00	350	34125
4.	Jul-23	21487	291149.00	350	34125
5.	Aug-23	18128	254337.00	400	39000
6.	Sep-23	17291	257445.00	175	17062
7.	Oct-23	16006	264992.00	335	32662
8.	Nov-23	19790	284053.00	365	35587
9.	Dec-23	13046	146683.00	120	11700
10.	Jan-24	10160	123230.00	215	20962
11.	Feb-24	13666	158841.00	250	24375
12.	Mar-24	20164	224438.00	225	21937
Average		17285.42	227288.6	307.08	29940
Total		**207425**	**2727463.00**	3685	359285

ENERGY AUDIT REPORT

4. AUDIT SUMMARY & CONCLUSION

Save Energy: Save Future Generation….

SUMMARY OF THE AUDIT PROCESS:

In order to make the **B V C INSTITUTE OF TECHNOLOGY & SCIENCE** campus 100% energy efficient; Environmental sustainability and lush Greenery; the audit team recommends to implement the following measures:

I. Energy Conservation & Management - Electrical Energy:

1. Highly recommended to revamp the powerhouse with proper Energy Monitoring System (EMS) and fitted with adequate Automatic Power Factor Controller (APFC) & Fixed Capacitors in order to maintain the supply power factor near to unity.
2. Conduct Infrared Thermography audit at regular interval on all electrical panels, joints, cables, switchgears, boilers skin, steam pipes, and other external parts producing heat. Practice the audit in the maintenance schedule.
3. Also, conduct voltage drop test for the longest electrical path and determine the voltage regulation at each points. This regulation must be within the limit of 5 %.
4. Maintenance logbook must have the installation details like date of installation, fault history, repair/replacement of system, Mean Time between Failure (MTBF), repetitive faults etc.
5. All SSB must be fitted with digital energy meters and are the readings must be taken daily or connect those meters with EMS and monitor the energy pattern of each building.
6. Replace the existing analog meter located in each distribution panels from powerhouse side with smart kWh meter and connect them through networking. This must enable the user to monitor the energy pattern of each block remotely.
7. Energy consumption for seminar hall, auditorium and library must be separately noted
8. Block wise maintenance checklist of electrical and thermal system
9. In a phased manner, ceiling fans must be changed from conventional fans into BLDC fans. Also, change FTL into LED with adequate illumination levels
10. Implement automatic street light controller to turn on and off based on different time in a day. Use astrological timer for better results and energy savings.
11. Diesel flow meter must be fitted with each DG and calculate the UPL accurately.
12. Regularly conduct i) Illumination study, ii) Thermal comfort study, iii) Flue gas study on DG, iv) Water quality assessment (for all type of water utilized) and v) Indoor and ambient air quality study.

13. **Essentials in PH**

- Place the Single Line Diagram (SLD) –Available
- Details of connected load in the campus.
- Name of the PH officials along with their contact mobile number & E-mail.
- Name of the nearest substation, emergency contact no. of TANGEDCO officials and fire officials.

14. ***Best Practices of Earth Pit Maintenance:***

- Earth pits must be visible for easy access, regular maintenance and yearly measurement.
- Numbering of individual earth pits and maintain along with a diagram is always preferred.
- It is always good practice to represent the earth resistance value (last check value) either on the earth pit or inside the earth pit for ready reference.

15. **Retrofit of AIRCON Energy** Saver, AC House Keeping and Optimization of Air Conditioning Operation. Install AIRCON energy saver gadget which works on dynamic un-saturation principle with the sensor algorithms so that the air conditioners run hours are cut by 20 to 25 %.
16. **BLDC AC System:** Similar to Fan, now BLDC based AC is available in the market which consumes less amount of energy (Power) during its starting and running condition. This AC operates at same tonnage capacity and offer 100 % same cooling effect compared to conventional inverter AC.
17. **Replacement of Existing Water Pumps into BEE Star Labelled EE Pumps:** BEE star labelled pump system has i) High efficiency motor, ii) Lightweight materials and iii) Optimized suction-delivery system, ensures greater energy saving.
18. **Implementation of Servo-Stabilizer (SS) for Lighting Load Application:** Lighting loads are most sensitive to voltage variations and supplying a constant voltage provides two major advantages namely i) Reduction of breakdown of lamps and luminaries and ii) considerable amount of energy saving.
19. **Formation of Green Energy Team (GET):** In order to train the students to conserve the energy, each sections of the loads may be allotted with some group of students with a faculty mentor. These groups may fix up with a target for energy conservation and start working to achieve it. An incentive mechanism to the group of students conserving less energy will be moral example for other student.

COMPLETION OF THE REPORT

This synopsis report is prepared as a part of the Energy, Environment and Green Audit process conducted at B V C INSTITUTE OF TECHNOLOGY & SCIENCE, Edarapalli, Amalapuram, Batlapalem-533221, Andhra Pradesh, by **P S QUALITY CERTIFICATION PVT LTD**, New # 20, Old # 12, I Floor, Old Bank of Baroda Street, Ambattur, Tamil Nadu 600 053.

ENERGY AUDIT REPORT

ANNEXURE:

AUTHORISED CERTIFICATES OF THE AUDITOR

Regn No. EA-21875

Certificate No. 8963

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr. / Mrs. / Ms. Arivarasan G

son / daughter of Mr. Gopalakrishnan R

has passed the National certification Examination for Energy Auditors held in September - 2016, 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 : *10th March, 2017*

Controller of Examination

NATIONAL POWER TRAINING INSTITUTE

An ISO 9001 : 2000 & 14001 Certified Institution

(Ministry of Power, Govt. of India)

Sector- 33, Faridabad - 121 003, India

No. SR/ 06

Post Graduate Diploma in

Thermal Power Plant Engineering

Issued under Rule 3(2-A) of Indian Electricity Rule, 1956 amended in 1981

This is to certify that Mr./Ms. ARIVARASAN. G

Son/Daughter of Shri R. GOPALAKRISHNAN *has successfully Completed one year Post Graduate Diploma in Thermal Power Plant Engineering from the National Power Training Institute, Southern Region, Neyveli in the Year* 2010 - 2011.

Date : 23 - 09 - 2011

Director

Principal Director

Director General

This Diploma authorizes the holder to operate or undertake maintenance of any part or whole of a generating station of capacity of 100 MW and together with the associated sub-station

18:07

1. **GREEN AUDIT**

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE, AMALAPURAM

1 INTERNALQUALITYASSURANCECELL(IQAC)

2023-24

1 GREENAUDITASSESSMENTTEAM(INTERNAL)

Dr.JVG Rama Rao	Principal
Dr.MCS Madan	Vice-Principal, HOD, Departmentof Civil Engineering
Sri.M.suresh	DepartmentOfChemistry
Smt.P.B.L.Aparna	DepartmentOfMCA
Dr.A.S.Narayana	DepartmentOf Management Studies
Ms.GV Bharathi	DepartmentOf CE
Sri Ch.Lakshmana Rao	Technician of CE
Smt.G.Meenakshi	Technician ofChemistry Lab
Sri.S.Sridhar	Gardener

1 INTRODUCTION:

Green Audit is a process of systematic identification, quantification, recording, reporting, andanalysis of components of the environmental diversity of the institute. It aims to analyze environmentalpractices within and outside of the concerned place, which will have an impact on the eco-friendly atmosphere. The green audit is a valuable means for a college to determine how and wherethey are using the most energy or water or other resources; the college can then consider how toimplementchangesandmakesavings.Itcancreatehealthconsciousnessan dpromoteenvironmental awareness, values, and ethics. It provides staff and students with a better understanding of theGreenimpacton campus.If self-inquiryisa natural andnecessary outgrowth of a qualityeducation,itcouldalsobestatedthatinstitutionalself-inquiryisanaturalandnecessaryoutgrowth of a quality educational institution. Thus the college must evaluate itscontributions toward a sustainable future. As environmental sustainability is becoming anincreasingly important issue for the nation, the role of higher educationalinstitutions concerningenvironmentalsustainabilityismoreprevalent.

The rapid urbanization and economic development at the local, regional, and global levels have led toseveral environmental and ecological crises. On this background, it becomes essential to adopt thesystem of the Green Campus for the institutes which will lead to sustainable development and atthe same time reduce a sizable amount of

atmospheric CO_2 from the environment. The NationalAssessment and Accreditation Council, New Delhi (NAAC) has made itmandatory that allHigher Educational Institutions should submit an annual Green Audit Report. Moreover, it is partof the Corporate Social Responsibility of the Higher Educational Institutions to ensure that theycontributetowardsthereductionofglobalwarmingthroughcarbonfootprintreductionmeasures.

2 OBJECTIVES:

In recent time, the Green Audit of an institution has been becoming a paramount important forself-assessmentof the institution which reflects the role of the institution inmitigating thepresent environmental problems. The college has been putting efforts to keep our environmentclean since its inception. Therefore, the purpose of the present green audit is to identify, quantify,describeandprioritizeframeworkofEnvironmentSustainabilityincompliancewiththeapplicable regulations, policies and standards. The main objectives of carrying out Green Auditare:

TomaptheGeographicalLocationofthecollege
Todocumentthefloralandfaunaldiversityofthecollege
Todocumentthewastedisposalsystem
ToestimatetheEnergyrequirementsofthecollege
Toreporttheexpenditureongreeninitiativesduringthelastfiveyears

Presently, the college runs nine Programs. It is housed in a sprawling pollution-free campus of 25.94acres and is located in the sacred surroundings of Konaseema of Br.A.Konaseema District of A.P.

3 METHODOLOGY:

The purpose of the green auditof Bonam Venkata Chalamayy Institute of Technology&Science is to ensure that the practicesfollowed in the campus are in accordance with the Green Policy of the country. The methodologyincludes: the collection of data, physical inspection of the campus, observation and review of thedocumentation,anddataanalysis.

4 ABOUTTHECOLLEGE:

5 VISIONANDMISSION

6 Our Vision

To become a center of excellence in Electrical and Electronics Engineering Education, Research, and Technology Development to handle the challenges of the nation, with innovation and critical thinking.

7 OurMission

DM 1. Empower stakeholders with state-of-the-art knowledge and technological skills.

DM 2. Promote industry institute interaction through practical problem-solving.

DM 3. To impart pieces of training for overall development.

DM 4. To develop the ability to function in multi-disciplinary teams with an emphasis on creativity and passion for the betterment of mankind.

8 INTRODUCTION:

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TomaptheGeographicalLocationofthecollege

Todocumentthefloralandfaunaldiversityofthecollege

Todocumenttheambientenvironmentalconditionsofweather,air,water, andnoiseinthecollege

Todocumentthewastedisposalsystem

ToestimatetheEnergyrequirementsofthecollege

Toreporttheexpenditureongreeninitiativesduringthelastfiveyears

10 METHODOLOGY:

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11 ABOUTTHECOLLEGE:

Bonam Venkata Chalamayya Institute of Technology and Science (BVCITS), Batlapalem, Amalapuram was established in the year 2002, pioneered by a great philanthropist (visionary) Sri Bonam Kanakayya, Secretary of B V C Educational Society, whose vision came true with inception of the first private engineering institution in East Godavari District, is an emerging center for excellence in Engineering education, renowned for its energetic, experienced and dedicated faculty, thriving students, state of the art infrastructure and very good placement record. The management encourages the students and the faculty to "Dare to Dream and Strive to Achieve". The institute is a "dream come true" for many aspiring youngsters from East Godavari District and Andhra Pradesh rural areas. The institute also admits students from other states of India and foreign nationals, especially from Nepal. The employees of the institute work in the spirit of the founder chairman and follow his philosophy "Work through your life, and The results prosper you". BVCITS is located in a sprawling campus of 25.94 acres surrounded by the exhilarating nature, away from the din of crowd habitant with a pleasant, calm, serene environment conducive to studying professional courses and personality development. The zeal in promoting technical education for rural literacy and the continuous good results of this institution fetched an overwhelming response from aspirants of engineering education.

The institution offers undergraduate and postgraduate programs - B.Tech., in six branches, M.Tech., in two specializations, and MBA and MCA programs. The institution received NBA accreditation for two branches in 2023. The institution was also accredited by NAAC with an "A" grade from 2023 up to 2026. The present intake strength at the first-year level is 960 in B.Tech, BBA, BCA, and PG.

BVCTS Management has undertaken various Green and Sustainability Initiatives.

Facilities for management of degradable and non-degradable waste management.

Waste Management steps include:

- Solid waste management
- Liquid waste management

- E-waste management
- Biogas production

1.1 Solid waste management:

Solid wastes generated from various sources on campus are classified into two categories: non-degradable and biodegradable. Separate dustbins have been placed throughout the campus, including in each classroom, for convenient use. Biodegradable waste, such as leaves and food scraps, is disposed of in a composite pit designed for this purpose, which also helps to produce manure.

To conserve both renewable and non-renewable resources, we have adopted the RRR strategy (Reuse, Recycle, Reduce). Housekeeping personnel are responsible for the collection and management of solid waste, under the supervision of the civil department. They collect solid waste from all departments, including the canteen and mess, ensuring that items are properly segregated into biodegradable and non-biodegradable categories. Non-biodegradable items are handed over to a local vendor, who transports them to a nearby recycling plant. Meanwhile, biodegradable items are disposed of in the composite pit, where they undergo degradation and decomposition.

Drinking water and other water resources available on the campus:

The main source of water for drinking, and other purposes is the ground water. There are six bore wells (fitted with 1.5HP motors each) on the campus, from these six bore wells, groundwater will be pumped into water storage tanks situated on top floors with a capacity of 1000-2000 liters. One bore well adjacent to ECE block is earmarked for the RO plant due to the good quality of water and free from iron etc from which treated water i.e. Ozonized drinking water (5000-7000 liters on average per day) will be supplied to the central drinking water facility located opposite to library block and also to all the blocks- including hostels, canteen, kitchen and mess through a good network of distribution system. Water from the remaining 5 bore wells will be pumped and stored in storage tanks in all the blocks meant for supplying water to washrooms etc located in hostels and all the blocks including maintaining greenery. Wastewater from these sources will be collected through a good network of pipes and channelized into a sewer and disposed of by mixing with runoff and rooftop collection water into a shallow oxidation pond i.e. dilution and also applied to greenery as a means of wetting i.e. land treatment. As such there is no waste water to dispose of, i.e. Zero discharge. Cent percent utilization of wastewater for maintaining greenery on the campus.

Plant Species

SNO	Scientific Name	Generic Name(common Name)	Count
1	Gomphrena globosa L		56
2	Parthenecissus quinquefolia (L)	Planch(woodbine)	64
3	Chenopodium album L	(Fat-hen)	33
4	Artemisia annua L	(Annual warmwood)	2+1
5	Euphorbia milli Des Moul	(christ's plant)	104
6	Philadelphus Ccronarius	(Sweet moek orange)	11
7	Taberneemontana Divericata L	(Adams-apple)	10+1
8	Hibiscus rosa-Sinensis L	(chinese hibiscus)	15
9	Ruellia simplex C.wright	(Britton's wild petunia)	2
10	Crataegus Monogyna Jacq	(Hawthorn)	7 (creepres)
11	Neriumolender	(Olender)	43
12	Psidium guajava L	(Common gova)	16
13	Plantago lanceolata L	(Narrow-leaf plantain)	39
14	Viburnum lantuna L	(Mealytree)	8
15	Cocos nucifera L	(Coconut)	10
16	Prunus domestica L	(Wild plum)	9+4
17	Pittosporum Tobira	(Thunb) (Australian-laurel)	73
18	Aloe-vera L	(Barbados aloe)	4
19	Tithonia diversifolia (Hemsi) A.Gray	(Maxican sunflower)	9
20	Carica papaya L	(Paw paw)	28
21	Annona Squamosa. L	(Custard-apple)	7
22	Azadirachta indica A.Juss	(Neem)	2
23	Mangifera indical	(Common Mango)	8
24	Acacia dealbata link	(Memosa)	1
25	Bauhinia variegata. L	(Mountain-ebony)	2
26	Colchicum Aupumnale.L	(Colchium)	
27	Rosa Chinensis Jacq	(Bengal Rose)	6
28	Cycas revoluta Thunb	(Sango cycas)	8
29	Phoenix dactylifera-- L	(Date)	2
30	Bambusa Tuldoides munro	(verdant bambao)	3
31	Punica granatum L	(Pomagranate)	6
32	Calotropis procera (Aiton) Dryand	(Rooster trce)	1
33	Phytolacca Americana L	(Pigeon berry)	1
34	Plectranctus amboinicus (Lour).spreng	(Cuban Oregano)	4
35	Ficus benjamina L.	(Malayan Banyan)	3
36	Chlorophytum Comosom (Thomb)Jacqu	(Ribbon Plant)	12
37	Cinnamomum Verum J.Presl	(Cinnamon)	6
38	Ficus benghalensis L	(Bengal Banyan)	2
39	Maclura Pomifera (Raf) C.K.schneid	(Osage orange)	1
40	Arto carpus heterophyllus Lam		2

1.2 Liquid waste management and wastewater recycling:

To supply potable water to the students, an Ozonized drinking water plant (RO plant) is available. Wastage of drinking water is restricted through proper monitoring. Waste water is properly drained out to a shallow water body situated near boys' hostel where oxidation will take. Waste water is also being used for maintaining greenery in the campus providing ecologically aesthetic environment. The proper drainage system is arranged for all the buildings in the campus. The waste water released from the RO plant is used for gardens. The rainwater from rooftop, runoff and liquid waste from canteen is disposed of into rainwater harvesting structures (pits constructed with the size of 5*5*4feet-l*b*d). It can be used for 7 – 10 years. It naturally filters the liquid waste since blast bricks, gravels and coarse sand are used for filtration. It helps to control waste water and water contaminated diseases. It results in increase of the ground water level also. Rain water is prevented from contamination by adopting protected rain harvesting techniques.

1.3 Maintenance of water bodies:

To conserve water resources, recharge the ground water table, and avoid wastage of water - there are 6 rainwater harvesting structures (recharge pits) on the campus and also, the diversion of rainwater to a pond and channelizing of rooftop collection system to wet coconut groves/greenery in the campus is available.

Our College is situated on the outskirts of the Amalpuram town. Our college will depend upon rain for its water requirement. Ground water is the only source of water for boys and girl hostels, canteen, mess, washrooms and for gardening purpose including drinking water. Our college is playing a responsible role in the society has implemented rain water harvesting system in the campus. All the buildings within the campus have been equipped with rain water harvesting system to improve the ground water table level. Roof top of each block is catchment of rain water which passes through the pipelines connecting the canals. Two different rain water canals have been constructed, so that they flow towards the common rain water pond located in the North-east corner of the campus. The water collected in this shallow pond helps the college to make an attempt to raise the subsoil water. All of these steps help the college to save a lot of water without going waste as well as liquid waste management system. The waste water and surface runoff water draining out into a trench which leads into a shallow pond where natural oxidation of waste through biological means will happen.

Biomedical and hazardous waste management: as such no biomedical or hazardous wastes were noticed in the solid wastes

1.4 E-waste management

The used/old electronic goods from Physics, Electronics, Computer and other Laboratories, and office monitors,keyboards, wires,mouse,printers,LCD's and peripherals are sold to certified scrap dealers, who collect and dispose end-of-life electric and electronic equipments in responsible manner. There is a mechanism in the campus to dispose of the condemned batteries and damaged computers. The out dated/damaged items will be collected and disposed of through outside agencies. The low configured computers are donated to nearest schools. Other E-waste materials are properly disposed. NSS unit will conduct awareness programmes regularly to create awareness about E-waste management to all the stake holders of the institution. For proper disposal of E-waste, college management has signed an MOU with a local vendor to collect all kinds of E-waste from college premises.

1.5 Disposal Procedures for Laboratory Chemicals

It is the clear responsibility of all students and staff to ensure the safe and correct disposal –dilution of all wastes produced in the course of their work.

1.6 Biogas plant

The systems that are used to create bio-energy can greatly contribute to reducing greenhouse gases as they have the possibility of reducing the need to use fossil fuels. By providing a non-polluting energy source which is also renewable, the earth is being kept clean of harmful emissions. A mini biogas plant with a capacity of 36 Cft is in operation in the college mess. The raw materials for bio gas production are: leftovers of food items, vegetable peelings and cow dung and water etc. The gas produced will be used in the college mess kitchen for cooking of items on small scale.

1.7 Green campus initiatives:

Sensitization of students, employees –ethics, values, rights, duties responsibilities of citizens. The institute focuses on green practice throughout the campus. BVCITS is located in a pollution free environment in the nature's lap which is far away from the urban and industrial area. To prevent pollution a number of initiatives are taken. The buildings are constructed with natural ventilations and lighting with a view to conserving energy. An experimental wind turbine was also setup over the civil engineering block to harness the wind energy which is generating non-conventional energy, efforts are on to increase the installed capacity of wind energy soon.

1.8 Green landscaping with trees and plants:

BVCITS is spreads over 25.69 acres of land of which paved surface accounts 35% and unpaved accounts65% of the land and decorated with beautiful landscaping and lush green environment. The natural landscape predominates the campus with a rich bio-diversity of flora consisting of a good no of trees and plants with varieties, Including-Coconuts, Palms, Mango, Neem, Plantain, Jackfruit, Papaya, Guava and

several varieties in and around the campus the campus, which are taken care of by the institution. Students and staff of the campus extend their hands in planting and growing trees in and around the campus because the institution believes that the Natural environment helps the students to have a peaceful and serene mind to increase their learning capacity. These are maintained by NSS and Civil Student Volunteers and inmates of hostels. Festival environment is created among students and staff on Environmental day, Ozone day, Tree Plantation Program, etc. The management also encourages paperless office and plastic free campus to reduce environmental pollution. As per the curriculum of JNTUK the Environmental Studies subject is mandatory course for all students who are admitted from the academic year 2005 onwards.

1.9 Use of Solar PV System for power Generation

BVCITS has installed 181kW solar PV plant to generate the electricity through solar energy.

This is connected to Gird using Grid-tie inverters.

BVCITS has installed 181kW solar PV plant to generate the electricity through solar energy.

Solar power plant is generating 171598 units annually which results in reduction of 135

Tons of CO_2 emission*.

*Note: C considering 1kW = .820 grams of CO_2 emissions

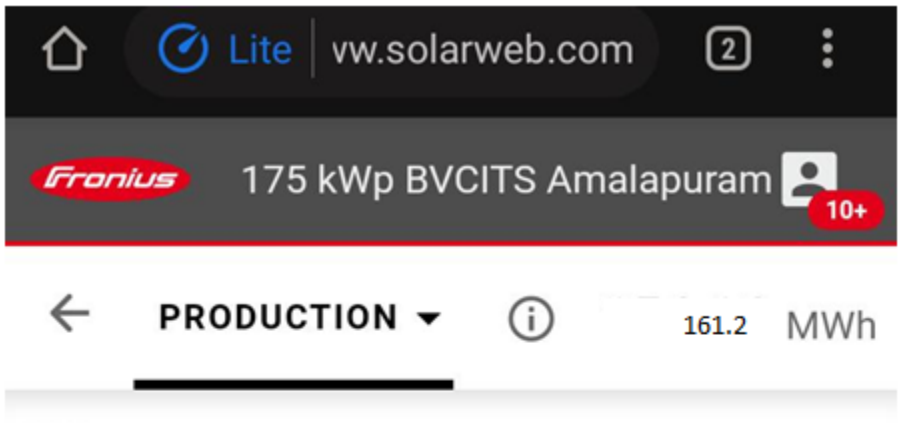
Source: https://en.wikipedia.org/wiki/Life-cycle_greenhouse-gas_emissions_of_energy_sources

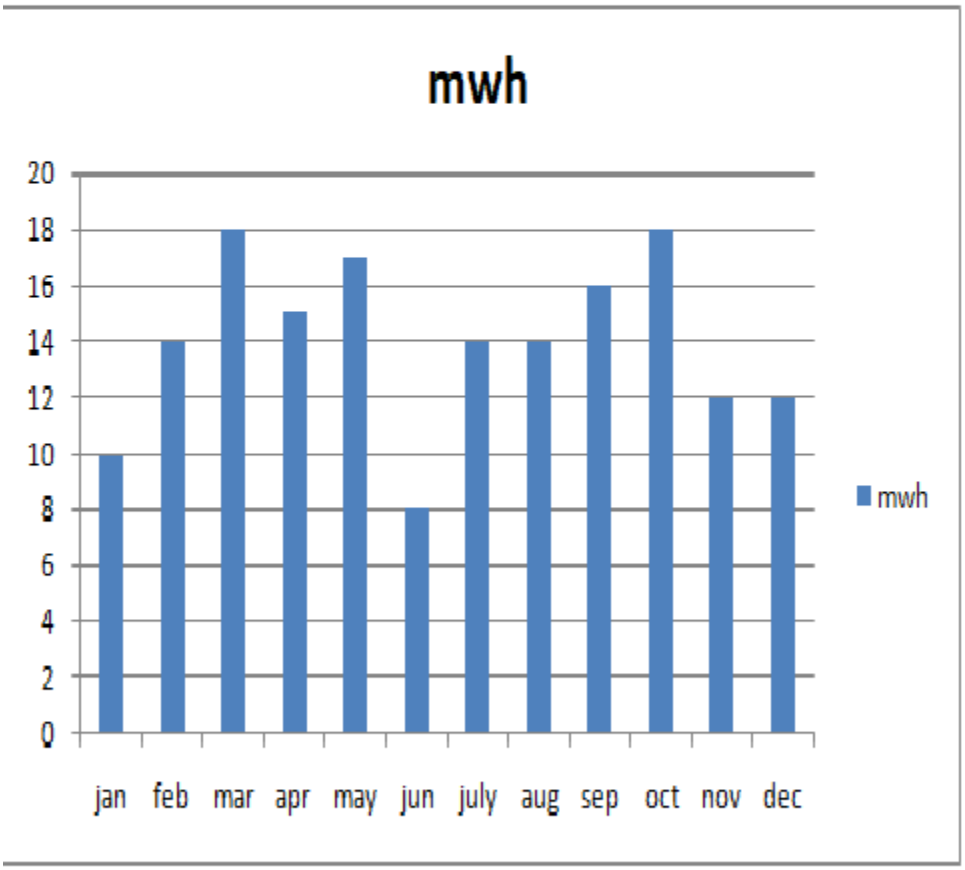
Excess energy after utilisation is **wheeled** to the grid , APESPDCL through NET METER.

PV System installed Capacity	Month & Year	Academic year	Location
102.08 KW_P	Mar-17	2016-2017	Administration block
24.32 KW_P	Mar-18	2017-2018	EEE block
4.23 KW_P	Mar-18	2017-2018	EEE block
25.6 KW_P	Mar-18	2017-2018	Mechanical block
25.6 KW_P	Mar-18	2017-2018	S&H block

Solar PV Plant - 100kWp installed on Administration block

Grid-Tie inverters connected to 100kWp Solar PV Plant.
Solar PV Energy Generation Reports for the Year 2018.


Lite
vw.solarweb.com
2
Fronius
175 kWp BVCITS Amalapuram
10+
PRODUCTION
161.2
MWh


mwh
20
18
16
14
12
10
8
6
4
2
0
jan
feb
mar
apr
may
jun
july
aug
sep
oct
nov
dec
mwh


2023

Below is the Energy Bill from the Power Distribution company of Andhra Pradesh which has details and accounted for the energy exported from the

EASTERN POWER DISTRIBUTION COMPANY OF ANDHRA PRADESH LIMITED

HT bill for the month of : 03/2023 Dated : 05-04-2023 GST No. 37AAACE9876B1ZH

17/4/2023

Payable on or before	19-Apr-2023	RJY876	
Contracted MD (KVA/HP)	90	M/S BVC INSTTITUT OF TECHNOLOGY & SCIENCE,	
Specified Voltage(KV)	11	BATLAPALEM	
Actual Volatge(KV)(Comm Fdr)	11	AMALAPURAMEAST GODAVARI	
Category	IIA(i)	COMMERCIAL-HT	

(DISC.DT : 04-May-2023) , MC Date : , MF Date : , MRT Date :

Changes		KWH	KVAH	KVA	PF	LF%
Reading On (1)(A)	01/04/2023	357561.5000	425587.0000	54.4200		
Reading On	01/03/2023	349157.5000	417183.5000			
Difference		8404.00	8403.50			
Multiplying Factor		2	2	2		
Total Consumption		16808	16807	108.8400	1.00	20
Monthly Min Consumption			2721	72.00		
Main Consumption		16807	Colony	0 L&F		

Demand Charges Normal Rate	Rs	475.00	For	90.0000	KVA	42750.00
Demand Charges Penal Rate (120.93 %)	Rs	475.00x2	For	18.8400	KVA	17898.00
Energy Charges Rate(All Units)	Rs	7.65	For	13389	KVAH	102425.85
Excess Energy Charges Rate	Rs	For	2909	KVAH	33380.78	
Electricity Duty Charges		1.00	For	16807	KVAH	16807.00
Colony Charges Rates			For		KVAH	
L&F Charges Rate			For		KVAH	
Energy Charges Include Fuel Cost Adj	Ps		For		KVAH	
Fuel Surcharge Adjustment (,) (,)	Ps		For		KWH	0.00
True up Charge	Ps		For		KWH	2852.04
				TODCharges		2801.00
				TODIncentive(-)		0.00

Supplier Name	KWH Share	KVA Share	TOD	INCENTIVE	% Wheeling
SOLAR UNITS	509				

Sub Total	218914.67
Customer Charges	1406.00
Grid support charges	1500.00
Wheeling Charges	0.00
Transmission Charges	0.00
RKVAH Surcharge HYDEL	0.00
RKVAH Surcharge WIND	0.00
OPEN ACCESS CROSS SUBSIDY	0.00
ACD SURCHARGE	0.00
Late Payment Charges	0.00
Interest On ED	0.00
Penal Interest	0.00
Transformer Hire Charges	0.00
Difference Voltage Charges	0.00
Load Factor Incentive (-)	0.00
	0.00
Total	221820.67
TCS	0.00
TCS S/F	0.00
25% Rebate Application	0.00
Ferro Incentive (-)	0.00
PooledCost Adj (-)	0.00
NetIcdAmt(Icd-Tds)(0.00-0.00) (-)	0.00
Other Credit Adj	0.00
Loss (or) Gain	0.33
Net Bill Amount	221821.00
(Previous Years)Arrears before 31-Mar-2022	0.00
(Current Years)Arrears after 01-Apr-2022	-0.14
Net Payable	Rs221821.00

TimeBlock	TodTariff	kvah
00:00-06:00	Rs.0	0
06:00-10:00	Rs.0	0
10:00-15:00	Rs.0	3495
15:00-18:00	Rs.0	0
18:00-22:00	Rs.1.00	2801
22:00-00:00	Rs.0	0

TOD Peak	2801
TOD Off Peak	0

SD Available:Rs 381500.00

VOUCHER NO. 124

(Rs Two Lakhs Twenty One Thousand Eight Hundred andTwenty One only)

NOTE: U/s 206C(1H) of IT Act, TCS at applicable rates will be collected on payments exceeds Rs.50 Lakhs during the year and remitted to IT Dept. For furhter details please contact SAO/Operation circle.

Senior Accounts Officer
Operation Circle,APEPDCL
RAJAHMUNDRY

Gudam
539340
15/4/23
12/04/23

1.10 Bicycles:

To conserve energy, save fuel, control Noise pollution, the students and staff are encouraged to use bicycles in the college premises. A separate parking slots for girl students, boys are earmarked.

1.11 Public Transport:

Transport facility is provided to the interested staff and students. Students are also encouraged to use public transport instead of their own vehicles like cars, motorbikes etc., to avoid air pollution. Motor cycles are prohibited inside the campus and students are allowed to park the motorbikes outside of the gate to avoid pollution.

1.12 Pedestrian Friendly Roads:

Roads are laid in the campus which can be used in all seasons.

1.13 Plastic Free Campus:

As per the policy of the college, our college encourages students and staff not to use plastic bags. The students and staff are advised not to use polythene bags in the campus. They are educated on the harmful effects of plastics. Sign boards are provided for minimizing the usage of plastic. Using of plastic bags is minimized in campus stores and canteens.

1.14 Paperless Office:

For the paperless office and staff-, Smart Brainee software is used for accounts, administration, admissions-mailing of circulars etc. our faculty using hard drive server for data sharing. Efforts have been made to make it a paperless office by sharing documents using official emails.

Initiatives by College Towards Sustainable Environment

1.1. Energy conservation Awareness programs.

During the Audit, Energy conservation awareness programme was conduct for the college staff. Session covers topic on Energy Conservation, Energy Efficiency and use of Renewable, global warming and the climate changes indicators. Around 140 staff participated the session.

GOOD ENERGY PRACTICES BEING FOLLOWED IN-HOUSE

- Lot of Greenery, fields in outdoor plant to create ambient and healthy atmosphere.
- Replacements of LED lights.
- AMCs for all the utility equipment as Air Conditioners.
- Regular preventive maintenance is carried out.
- To increase the installed capacity of RO water for drinking and in Hostles,Canteen/dining hall.

POINTS TO BE IMPROVED:

- Lighting Lux level can be improved.
- Housekeeping can be improved.
- **Air conditioners more than 10 years old to be replaced by efficient 5 star rated Air conditioners.**
- Auto water lever controller to be provided in the pump house pumps.
- Area around the bore well pumps is to be cleaned and unnecessary material to be removed.
- To provide PIR sensors in the Toilets to switch off the lighting.
- Individual energy meter to be provided to all the individual buildings.
- Voltage stabilizers is recommending to improve the voltage range.

WATER MANAGEMENT SYSTEM:

- There are 5 bore well used for water suppliers.
- There 5 rainwater harvesting pits. Rainwater collect the roof top water to the pits to improve the water table so that ground water table level is increased.
- Rain water can also be collected in the storage tanks through filter and can be used for all purposes to avoid pumping cost.
- There are two numbers of 1000 Liters each RO plants, bore water is used in RO plants. Resulting in higher wastage of water.
- Water meters to be provided to the bore wells to know the quantity of water being utilized.

ADDRESSES OF SUPPLIERS

1. **LED Supplier :**
   EESL - East Godavari District
   Mobile 90593 33788
2. **Energy Efficient Fan Supplier:**
   Gorilla Fan
   Atomberg Technologies
   Mumbai
   https://atomberg.com/gorilla-fans/ceilingfan.php
3. **PIR Sensor Suppliers**
   SURMOUNT ENERGY SOLUTIONS PVT. LTD.
   B-003-004, Platform level, 1st floor, Tower#10,
   ITC, Belapur Station Complex CBDBelapur,
   Navi Mumbai – 400 614
   Phone: 022-61340340/350
   E-mail: sales@buildtrack.in
4. **SINICON Water Level Controller System**
   M/s. Agarwal Trading Corporation
   5-1-14, R P Road,
   Secunderabad
   Ph: 040-66331140, 9248300482.
   For More information, visit:
   https://sinicon.net/WaterSwitch_System_IA_and_IIA
5. **AIRTRON Suppliers**

✓ MAGNATRON INTERNATIONAL
801, K.C. Dey sarani, Block – P,
New Alipore,
Kolkata – 700 053,
W.B., India.
Ph: +91 7595052890
Mobile: +91 9748727966
E-mail: indiaenergysavers@gmail.com

2 GREENAUDITASSESSMENTTEAM(INTERNAL)

Name	Designation	Signature
Dr.JVG Rama Rao	Principal	
Dr.MCS Madan	Vice-Principal, HOD, Departmentof Civil Engineering	
Sri.M.suresh	DepartmentofChemistry	
Smt.P.Aparna	Departmentof MCA	
Dr.A.S.Narayana	Departmentof Management Studies	
Ms.GV Bharathi	Departmentof CE	
Sri Ch.Lakshmana Rao	Technician of CE	
Smt.G.Meenakshi	Technician ofChemistry Lab	
Sri.S.Sridhar	Gardener	

PRINCIPAL

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BVC Institute of Technology & Science
BAIRAPALEM, AMALAPURAM - 533 224

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AMALAPURAM