

Annual Quality Assurance Report (AQAR) for AY 2022-23

Criterion VII – Institutional Values and Best Practices

7.1 Institutional Values and Social Responsibilities

Metric	Details
No.	
7.1.6	Quality audits on environment and energy are regularly undertake by the
	Institution
	Green audit
	Energy audit
	Environment audit
	Clean and green campus recognitions/awards
	Beyond the campus environmental promotional activities



ENVIRONMENTAL AUDIT REPORTS

ENVIRONMENT & GREEN AUDIT REPORT

AUDIT CONDUCTED FOR B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE AND TECHNOLOGY

Seethakathi Estate, GST Road, Vandalur, Chennai, Tamilnadu, India – 600 048.

DATE OF AUDIT 09 & 10 JANUARY 2023 (Audited and Accounted from January 2023 to December 2023)



AUDIT CONDUCTED BY

RAM-KALAM CENTRE FOR ENERGY CONSULTANCY AND TRAINING

(An ISO 9001: 2015 Certified Company & Registered under MSME, GoI)

Mobile: +91- 80567 19372, 99420 14544 (WhatsApp) E-mail: ramkalamcect@gmail.com



TABLE OF CONTENT

Chapter No.	Description			
-	-	No.		
1.	Acknowledgement	3		
2.	Introduction to Environment-Green Audit Process	6		
3.	Executive Summary	10		
	PART-A: ENVIRONMENTAL AUDIT REPORT			
4.	Study on Energy Consumption Pattern	12		
	Estimation of CO ₂ Emission and Neutralization			
5.	(Electricity, LPG, Diesel, Solar PV, Solar Thermal & Mature	e 15		
	Trees)			
6	Usage of Chemicals, Salts & Acids	10		
0.	(Storage, Handling & Best Operating Practices)	10		
	PART-B: GREEN AUDIT REPORT			
7.	Water Utilization, Conservation & Water Management	22		
8.	Waste Handling & Management	30		
9	Assessment on List of Mature Trees and Green Energy	38		
у.	Generation	50		
10.	Audit Summary & Conclusion	45		
Annexure	Authorised Certificates of Auditor	48		



ACKNOWLEDGEMENT

RAM-KALAM CENTRE FOR ENERGY CONSULTANCY AND TRAINING, Coimbatore – 641 062 is thankful to the Management, Principal, Faculty and Technical team members of **M/s. B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE AND TECHNOLOGY,** Seethakathi Estate, GST Road, Vandalur, Chennai – 600 048, Tamilnadu, India for providing an opportunity to conduct a detailed Environment and Green Audit process in the college premises.

It is our great pleasure which must be recorded here that the Management of **M/s. B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE AND TECHNOLOGY** extended all possible support and assistance resulting in thorough completion of the audit process. The audit team appreciates the cooperation and guidance extended during the 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.

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

EXECUTIVE COMMITTEE & ADMINISTRATION					
Mr. ARIF BUHARY RAHMAN	PRESIDENT				
Mr. ABDUL QADIR A.RAHMAN BUHARI	SECRETARY				
Mr. AHMED BUHARI	MEMBER				
Mr. ASHRAF A.RAHMAN BUHARI	MEMBER				
Mr. KHALID A.K. BUHARI	MEMBER				
Mr. SYED MOHAMMED BUHARI	MEMBER				
Mr.M.MOHAMED HASSAN	MEMBER				
Mrs. QURRATH JAMEELA	MEMBER				
Mrs. MARIAM HABEEB	MEMBER				
Mrs. NILOFER	MEMBER				
Mrs. ZEENATH	MEMBER				
Mr. JUNAID YASEEN MOHAMED ABDUL CADER	MEMBER				

HEAD OF THE INSTITUTION					
Dr. T. MURUGESAN	VICE CHANCELLOR				
Dr. N. THAJUDDIN	PRO VICE-CHANCELLOR				
Dr. N. RAJA HUSSAIN	REGISTRAR				
Dr. A. ABUDHAHIR	DIRECTOR (IQAC)				
Dr A K KALILITHIN	Dy. DIRECTOR				
DI. A. K. KALILUIIIIN	(CAMPUS DEVELOPMENT &				
	MAINTENANCE)				

<u>Audit Team Members</u>						
	BEE Certified Energy Auditor (EA-27299)					
	Lead Auditor-ISO-14001:2015 (EMS),					
Dr. S.R. SIVARASU, Ph.D.,	IGBC AP, GRIHA CP, CII CP in SWM					
	Carbon Footprint Auditor & Implementor					
	Mobile: +91- 80567 19372, 99420 29372					
Er. P. MALLIGARJUN, M.E.,	Director (Technical)					



2.1: Preface about the Institution:

- Since 1984, B.S. Abdur Rahman Crescent Institute of Science and Technology is a renowned Quality Leadership Institution located at the greenest spot of Chennai near Tambaram.
- Through our long history of 38 years of excellence, the Institution has offered access to a wide range of academic opportunities. With 55 programmes, grouped under 12 different Schools, 30 Undergraduate programmes, 25 Postgraduate programmes, and Ph.D. (in all the departments), this institution is a rising stalwart in higher education with promising Quality, Security and Placement.
- We welcome students from all countries and our educational programmes are designed to equip the learners with virtual knowledge that helps them to achieve what they want to be and go where they want to go in the ladder of success.
- > This institution is an intellectual destination that challenges conventional thinking and stimulates passion to redefine learning. The distinctive teaching at this institution makes the students and scholars to compete with themselves and each other.
- Apart from providing top-notch education, our green campus and well-planned student life are solely dedicated to making students utilize the ambiance to the fullest.
- Through our wide array of educational programmes and unique clubs to foster student development activities, we provide opportunities and experiences that build community, help you grow personally and professionally, and create a place that you can call home now and throughout your life.

2.2: Vision:

✓ B.S. Abdur Rahman Crescent Institute of Science and Technology aspires to be a leader in Education, Training and Research in multidisciplinary areas of importance and to play a vital role in the Socio-Economic progress of the country in a sustainable manner.

2.3: Mission:

- To blossom into an internationally renowned Institute.
- To empower the youth through quality and value-based education.
- To promote professional leadership and entrepreneurship.
- To achieve excellence in all its endeavors to face global challenges.
- To provide excellent teaching and research ambience.
- To network with global Institutions of Excellence, Business, Industry and Research Organizations.
- To contribute to the knowledge base through scientific enquiry, applied research and innovation.



2.5: Scope of the Audit Process:

- **Environmental Audit:** Identification of history of activities, present environmental practices followed, monitoring records and known sources of environmental issues inside the college.
- **Green Audit:** Assessment on Campus greenery in terms of mature trees, flowering shrubs, bushes, medicinal plants, adoption of green energy generation and utilization, reduction of CO₂ due to green energy system and identification of possible implementation and enhancement of current greenery practices.

2.6: Audit Approach:

The audit team completed the assessment of energy consumption in the factory premises and operating hours of each machine (system) using two approaches namely **i) Objective Approach** in which a detailed measurement was taken and **ii) Subjective Approach** in which field data is collected from the maintenance department.



2.7: Coverage in Environment & Green Audit Process:

2.8: List of Staff assisted the Audit Process & Data Collection:

S. No.	Staff Details	Contribution		
1.	Dr. M. MOHAMMED THAHA Asst. Director (IQAC)	Coordinator for the Audit Process		
	Mr. M. RAMKUMAR			
	(Asst. Director)			
	Mr. H. RAHMATH KHATHUN Executive Asst			
2.	Mr. E. MANIVANAN	Collection of Electrical Energy		
	Juniour Engineer (Electrical)	College and Hostel Side		
	Mr. RAJEEV GHANDHI			
	Plumbing Incharge			
_	Mr. A. HABEEB SULTHAN			
3.	Manager	Collection of Greenery data		
	Mr. B. BALAJI			
4	Asst Engineer	Collection of HVAC and UPS Data		
1.	Mr. LOGANATHAN	concetion of firme and ere bata		
	AC Technician			
	Mr. M.S. MOHAMMED ASKAR	Collection of Transport and Fred		
5.	HUSSAIN	Concernation Data il		
	Assistant Manager (Transport)	Consumption Detail		



EXECUTIVE SUMMARY

Environment & Green Audit Analysis:

- → A detailed audit was conducted M/s. B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE AND TECHNOLOGY, Seethakathi Estate, GST Road, Vandalur, Chennai – 600 048, Tamilnadu, India.
- \rightarrow The following tables provide the balance sheet indicating various energy carriers associated with the regular activities and their CO₂ mapping.

S.	Annual Energy Consumption & CO ₂ Emission			Annual CO ₂ Neutralization			
No.	Description	Parameters	Emission (Tons)	Description	Parameters	Neutralized (Tons)	
1.	Electricity	40,83,312 kWh	3,348.3	Solar PV	6,63,189 kWh	543.8	
2	Diesel	2,02,018	533.3	Electricity (DG)	87,944 kWh	72.1	
2.		Litters	000.0	Mature Tree	2,538 Nos	55.3	
	Total Emi	ission	3,881.6	Total-Neu	tralized	671.3	
	Balance CO ₂ to be Neutralized = 3,210.4 Tons/Annum; Per capita Consumption = 0.33 Tons/Person*						

Note:

• All types of energy carriers (like **Electricity**, **Diesal & Solar PV**) used for regular applications are considered for this audit process.

Audit Conducted & Verified by



(Dr. S.R. SIVARASU)

Dr. S.R. SIVARASU, Ph.D., BEE Certified Energy Auditor (EA-27299) Lead Auditor - ISO 14001: EMS IGBC - AP, GRIHA - CP Mobile: 80567 19372, 99420 29372 E-Mail: ramkalamcect@gmail.com



4.1: Assessment of Existing Electrical and Thermal Energy Systems:

S. No.		Description		Details				
	Electrical Energy Usage							
1.	Nam	e of the customer	B.S. AB	DUR R	AHMAN	CRESCENT II	NSTITU	UTE OF
		·		SCI				
2.	Addr	munication	See	thakat Thenna	i - 600 04	, GST Road, V 48 Tamilnadu	andalı India	ur,
3.	Serv.	ice Number Type 1pply & Tariff	SC No 099-09	4-110-1	185; HT 1	Cension (HT) C	Consun	ner; Tariff-II B
	Tarif	f Structure:	Descriptio	n		Old		New
	7 0	ld: Before July	Unit Charg	e	Rs. 7	.50/kWh	Rs	.7.65/kWh
4.	 2023 New: From July 2023 		⁷ Fixed Charg	ge	Rs. 550/kVA		Rs. 562/kVA	
5.	Ener	gy Suppliers	Tamilnadu Ge	neratio	n & Distr	ibution Corpo	oration	(TANGEDCO)
6.	Gene	erator Details	750+320 500	750+320 kVA (Internal fuel tank – 1000+500 L) 500 kVA (External fuel tank – 1000 L)				
7.	DG C	Operation		Αι	ıtomati	c Operatio	n	
An	nual	Electrical Energy	Consumption	, Elec	tricity	Consumpti	on fr	om DG &
			Diesel Con	sumpt	ion			Ir
Electr	ricity	40,83,312 kWh	Diesel for DG	28 Li	,975 tres	Units Generat	ed	87,944 kWh
	En	ergy Genertaion f	om Renewable S	Source	(Roof T	`op Solar PV	Syste	em)
E	Cnergy	Generation	6,63,189 kWh	A	Almost Installed all Blocks Rooftops			Rooftops
			General Loads	(Elec	trical)			
	 Indoor lighting: The management is now committee to convert the existing FTL into LED in a phase manner. 					w committed in a phased		
8.	Ligh	ting System	 Outdoor lighting: All the street lightings are LED based energy efficient lamps Requested to retrofit timer based ON-OFF control in the existing street lighting system 					ngs are LED OFF control
9.	Fan Loads (Ceiling) All the ceiling fans are conventional type only which consumes nearly 60-70 W/fan at maximum position. 							

		The audit team requested to change the conventional
		fans into BLDC based Electronically Commutated
		fans in a phased manner.
		✤ The average power consumption will be 35 W/fan at
		maximum position (More than 50 % reduction)
	Air Conditioning	• Mostly BEE star rated ACs and the outdoor units
10.	Sustam	are mostly placed in shaded area of the respective
	System	building
		• Mainly used for water distribution, purification and
1 1	Motors and Pump	waste water treatment
11.	loads	• Small motors are used in hotel kitchen equipment's
		& in the canteen
		• All the computers, server, surveillance, projectors,
10	Uninterrupted Power	telephonic units are connected with UPS with
12.	System (UPS)	nominal back up time of 15 - 30 Mins.
		• Total capacity of the UPS is nearly 230 kVA .

Table-1: Annual Energy Consumption and Energy Generation (2022-2023)

s		Electricity	Diesel Co	onsumed (L)	Total Diesel	Solar Energy
No.	Month	Consumption			Consumption	Generation
NO.		(kWh)*	DG	Transport	(DG+Transport)	(kWh)
1.	Jan-23	2,45,496	780	15,179	15,959	58,407
2.	Feb-23	2,69,466	850	11,518	12,368	62,748
3.	Mar-23	3,71,754	600	16,000	16,600	58,141
4.	Apr-23	3,25,014	2,050	10,539	12,589	69,058
5.	May-23	4,31,052	5,990	14,866	20,856	59,994
6.	Jun-23	3,39,420	3,040	12,370	15,410	58,915
7.	Jul-23	2,83,956	1,745	12,490	14,235	51,732
8.	Aug-23	4,05,990	5,520	15,329	20,849	57,044
9.	Sep[-23	3,88,764	1,890	15,888	17,778	56,507
10.	Oct-23	3,82,566	1,950	17,370	19,320	42,397
11.	Nov-23	3,65,388	1,190	18,242	19,432	45,151
12.	Dec-23	2,74,446	3,370	13,252	16,622	43,095
Т	Total 40,83,312 28,975 1,73,043 2,02,018 6,63,189					
• Tł	• The cost of the electricity is Rs. 10.12/kWh.					
• Tł	• The contribution from Green Energu is nearly 13.4 %					



5.1: Assessment of Annual Energy Usage:

Table-2 shows the types of energy carriers used for their regular operation in the college campus along with application area and their source.

S. No.	Type of Energy Carrier	Application Area	Source of Procurement
1.	Electricity (HT Service - 01 No)	Powering to all electrical / electronic / HVAC equipment's	From TANGEDCO
2.	Diesel	Transport vehicles and Diesel Generator (Captive Generation)	From authorised distributor
3.	Mature Trees, Bushes & shrubs	The college has nearly 2,538 m varieties which are more than 20 ye	ears old.

Table-2: Energy Carriers, Application area and their sources used for College Operation

5.2: Environmental System: CO₂ Balance Sheet:

- \rightarrow CO₂ Balance sheet is the indicator on the carbon emission and their neutralization in a year
- → As per the Environmental Management System (EMS); only Scope-1 & Scope-2 based energy consumption is accounted.
- \rightarrow The following tables provide the balance sheet indicating various energy carriers associated with the regular activities and their CO₂ mapping.

	Annual Energy Consumption & CO ₂ Emission			Annual CO ₂ Neutralization			
s.							
No.	Description	Parameters	Emission	Description	Parameters	Neutralized	
			(Tons)			(Tons)	
2	Flootrigity	40,83,312 2 248 2 Solar I		Solar DV	6,63,189		
з.	Electricity	kWh	3,346.3		kWh	5-5.0	
4	Diesel	2,02,018	533.3	Electricity (DG)	87,944 kWh	72.1	
		Litters	000.0	Mature Tree	2,538 Nos	55.3	
	Total Em	ission	3,881.6	Total-Neu	tralized	671.3	
	Balance CO ₂ to be Neutralized = 3,210.4 Tons/Annum;						
	Per capita Consumption = 0.33 Tons/Person*						

Table-3: Environmental System: CO₂ Balance Sheet (Jan-2023 to Dec-2023)

(*Note: No. of Students, Faculty & Staff for the year 2022-2023 is 9,839)

5.3: Calculation Table:

For Electricity = $\left[kWh \times \frac{0.82 \text{ kg of CO2 emission}}{kWh} \right]$	
A mature tree is able to absorb nearly CO_2 at a rate of 21.8 kg/annum;	$\frac{(21.8 x 2,538)}{1,000} =$
55.3 Tons Annum	

5.4: Recommendations:

From the above discussion points; it is evident that activities taken forward to neutralize the CO_2 is predominant and to become a Net-Zero Carbon Emission buildings. The management has to plan several activities achieve the target.

- Increase the foot print of trees planted inside the college campus.
- Encourage the students to plant more trees and account them all.
- It is a right time to install considerable amount of roof top solar PV plant and generate the electricity. This must reduce the utility supply and hence reduce the direct CO₂ reduction.
- As per the Solar Policy-2019 from Government of Tamilnadu; for any educational institutions have to implement substantiate a minimum of 6 % of its energy generation from renewable energy source.
- Convert existing convention street lightings into solar based battery-operated lightings.
- Identify higher fuel consuming vehicle and either rework or replace it.
- Conduct training programmes for the transport staffs at regular interval and encourage them to maintain the vehicles at good condition throughout the year.

5.5: References:

¹ https://ecoscore.be/en/info/ecoscore/co2

³http://www.tenmilliontrees.org/trees/#:~:text=A%20mature%20tree%20absorbs%20carbon,t he%20average%20car's%20annual%20mileage



CO₂ Emission: 3,881.6 Tons/Annum



Planned CO₂ Reduction 671.3 Tons/Annum



CO₂ to be Neutralized 3,210.4 Tons/Annum



6.1: Handling of Chemicals/Salts/Acids used in the Laboratories:

The Department of S & H and Civil Engineering use chemicals for experimental applications and are having strict safety rules as follows;

- Well trained faculty and lab assistants who have knowledge about the hazardous nature of each and every chemical are only allowed to handle the chemicals safely
- Strictly follow the manufacturer's instruction on the container in order to prevent accidents
- Volatile or highly odorous chemicals, fuming acids are stored in a ventilated area
- Chemicals are stored in eye level and never on the top shelf of storage unit
- All stored chemicals; especially flammable liquids are kept away from heat and direct sunlight. Reactive chemicals are not stored closely
- Hazardous and corrosive chemicals are kept on sand platform to avoid corrosion
- First aid box and fire extinguishers are readily available in the laboratory

6.2: Storage of Chemicals/Salts/Acids:

Less concentrated chemicals, salts and acids are stored in proper racks, cupboards and high concentrated acids are stored in separate area filled with sand.

- Most of the chemicals, salts and acids used in the science departments are inorganic in nature and no harmful effects are created during the experiment process
- However, after completion of each experiment, the wastes are washed in the water sink and are rooted to common choke pit.
- Only trained teaching and non-teaching staffs are handling the chemicals and also, they are well trained to handle any abnormal laboratories with chemicals are well ventilated with proper emergency exits. Adequate and correct sequence of fire extinguishers are placed near all the laboratories





Storage of Chemicals/Salts/Acids Storage

6.3: Recommendations:

- \Rightarrow Display the Dos and Don'ts inside the laboratory
- \Rightarrow Print the Dos & Don'ts in the Students laboratory manual
- \Rightarrow During the first class, demonstrate a PPT presentation and explain the safety procedures
- \Rightarrow Provide training to the teaching and technical staffs member on latest updates on chemical storage, handling, and safe disposal
- \Rightarrow Also encourage to conduct such type of training programmes by the faculty member to nearby schools and college (as an outreach programme)
- \Rightarrow Fix the First Aid Box (with all necessary medicines)
- \Rightarrow Place the names (along with their photo and mobile number) of the professionals training to handle fire extinguishers
- ⇒ Prepare & adopt a Chemical Policy (Including procurement, storage, handling, distribution, & disposal

6.4: Use of Chemical for Vessels & Floor Cleaning:

In order to maintain hygiene in the College campus; the administration regularly clean the floors and restrooms. In addition to this, the hostel management has to monitor i) the cleaning of vessels, kitchen floor, dining hall, store room and gas station. Table-4 shows the cleaning agents used to clean the above-mentioned area;

Fable-4: Cleanin	g Agents	s used for	r Floor and	d Vessel	Cleaning
-------------------------	----------	------------	-------------	----------	----------

S. No.	Cleaning Agent	Application
1.	Vim bar & Vim Liquid	Vessel Cleaning
2.	Soap Oil	Floor Cleaning



6.5: Recommendations: Eco Friendly – Green Cleaning Agents:

- It is recommended to use natural ingredients like orange peel extract & vinegar. It leaves a mild and pleasant fragrance after use. The formula is free from all harmful chemicals & toxins. It is pH-neutral, gentle on the skin as well as on the surface where it is used
- Also, these products are **IGBC GreenPro** certified. GreenPro is a mark of guarantee that the product is environment friendly throughout its life cycle



Green Pro Certified Eco-Friendly Cleaning Agents (ZERODER)



7.1: Source of Water, Storage and Distribution:

Table-5 shows the source of water, location of storage along with their application.

Type of Water	Source	Application
Fresh Water	RO Water	Drinking application
Bore Water	1. Science Block – 300 Ft	
	1. Ladies Hostel – 30 Ft	
Open Well	2. Mens Hostel – 40 Ft	Utensil Cleaning, Bathing, Cloth
	3. Near Main Canteen – 30 Ft	Washing & Gardening
Lorry Woter	1.150 Tankers/Month	
Lorry water	(10,000/Tank)	
	1.College/Life Science Block – 1	
	No	
	2.New Architecture Block – 1 No	
Doin Water	3.Computer Science Block – 1 No	
Kalli Walei	4.Pharmacy Block – 1 No	7 Used to increase the ground water
	5.MS Block – 5 No's	7 To store building run-off only
(KWHS)	6.Ladies Hostel – 3 No's	
	7.New Staff Quarters – 6 No's	
	8.Mens Hostel – 18 No's	
	9.Library Block – 1 No	

Table-5: Source of Water, Location of Storage and Application

<u>7.2: Details of the Water Utilities, Storage, Motor Capacity and Approximate Run</u> <u>Hours:</u>

The following table provides the details of the Water Utilities, Storage, Motor Capacity and Approximate Run Hours available inside the college for regular application.

Table-6: Details of the Water Utilities, Storage, Motor Capacity and Approximate Run

Hours

S.	Teretien	Tank	Motor	line re
No.	Location	Capacity	Capacity	Usage
1.	Main Building (UG Sump)	80 KLD	3 * 7.5 H.P/5 kW	Main Block 3,000 – Litters * 5 No's (Syntax) MBA Block 3,000 – Litters * 2 No's (Syntax) 1 st Year Block
	(Lorry + Open well)	vell)		3,000 – Litters * 4 No's (Syntax) Main Canteen 3,000 – Litters * 2 No's (Syntax)
2.	Science Block	60 KLD		Science Block

	(UG Sump)			3,000 – Litters * 4 No's (Syntax)
	(Lorry + Open well			Pharmacy Block
	+ Bore well)		2 * 7.5 H.P/5	3,000 – Litters * 2 No's (Syntax)
			kW	GM Office
				3,000 – Litters * 2 No's (Syntax)
				Power Room
				3,000 – Litters * 2 No's (Syntax)
				A – Block
		1 100		3,000 – Litters * 7 No's (Syntax)
		KLD	5 *	B – Block
	Mens Hostel - 1	(New	10 H P/7 5	3,000 – Litters * 6 No's (Syntax)
3.	(Lorry + Open well)	Sump	kW + 2 * 7.5	C – Block
		Room)	H.P/5 kW	3,000 – Litters * 9 No's (Syntax)
				D – Block
				3,000 – Litters * 11 No's
				(Syntax)
				Main Block
Mana Hastal 1	40 KLD	0 KLD 1 * 7.5 H.P/5	3,000 – Litters * 10 No's	
4.	(Lorry + Open well)	(Mani Block + Mess)	kW + 3 * 5	(Syntax)
			H.P/3.7 kW	Mess
		WICSS)		3,000 – Litters * 5 No's
				Mosque
		60 KLD	D 2*75HP/5	3,000 – Litters * 2 No's
5	Mens Hostel - 2	(PG	kW + 1 * 5	PG Block
0.	(Open well)	Block)	HP/37kW	3,000 – Litters * 6 No's
			/	Incubation Block
				3,000 – Litters * 4 No's
6	Ladies Hostel	180 KLD	3 * 5 H.P/3.7	Main Block
0.	(Lorry Water)	100 1122	kW	3,000 – Litters * 7 No's
7.	Annuxer Block	30 Ft	1 * 5 H.P/3.7	RCC Tank
	(Open well)		kW	15,000 Litters
	R.O Water			
1	Main Building	Water Fro	om Main Block	Main Block – 3,000 Litter * 1 No
	RO Plant	Syn	tax Tank	MBA Block – 3,000 Litter * 1 No
	Science Block	Water F	rom Science	Science Block+Pharmacy
2.	RO Plant Block		Syntax Tank	Block+Canteen – 3,000 Litters *
				1 No

3.	New Architech RO Plant	Water From New Architech Block UG Sump	New Architech – 3,000 Litters * 1 No
4.	Auditorium RO Plant	Water From New Architech Block UG Sump	Auditorium – 3,000 Litters * 1 No
5.	Old Staff Quaters RO Plant	Water From New Architech Block UG Sump	Old Staff Quarters – 3,000 Litters * 1 No
6.	Chanceller Villa RO Plant	Water From New Architech Block UG Sump	Chanceller Villa – 3,000 Litters * 1 No
7.	N.Staff Quaters RO Plant	Water From New Architech Block UG Sump	N.Staff Quaters – 3,000 Litters * 1 No
8.	MS Block RO Plant	Water From New Architech Block UG Sump	MS Block – 3,000 Litters * 1 No
9.	LS Block RO Plant	Water From LS Block UG Sump	LS Block – 3,000 Litters * 1 No
10.	Mens Hostel RO Plant	Water From New Sump Room	A,B,C,D Block – 3,000 Litters * 4 No's
11.	Mess + Main Block RO Plant	Water From Mess Block Syntax Tank	Mess + Main Block – 3,000 * 2 No's
12.	Ladies Hostel RO Plant	Water From New Block Cement Tank	New Block – 5,000 – RCC Tank

Note:

- Over Head (OH) tanks are made using Syntax.
- The maintenance team ensure to clean the tank for six months once.
- The Bleaching power is mostly used to clean the inside tank.

7.3: Treated Water for Drinking Application:

- The college management is keen on providing uninterrupted, safe and healthy drinking water to all; throughout the year.
- Water dispenser are provided at appropriate places offering the treated water for the students (Both Normal and Hot temperature)
- The overhead tanks storing the well water are cleaned at regular intervals and the water management team has been maintaining a cleaning schedule Utensil Cleaning, Bathing & Cloth Washing.



PVC and Metal Based Taping System for Water Distribution Line

7.4: Water Savings in Foreign Toilets:

• The list of availability of Indian & Foreign style toilets are presented in the below Table-7.

S No	o. Location	Description (Quantity)	
5. NO.		Indian	Foreign
1.	Auditorium Block	29	16
2.	Main Block	24	6
3.	MBA Block (CBS)	11	8
4.	Science Block (CSE)	25	7
5.	Basic Science Block	27	5
6.	Pharmacy Department	19	6

• Table-7: List of Indian & Foreign Style Toilets

7.	Mechanical Science Block	-	89
8.	Life Science Block	-	37
9.	New Architecture Block	-	24
10.	Common Toilet Near Ground	-	10
11.	Arabic College & Hostel	44	-
12.	New Toilet Near MBA Block	-	18
13.	Estate Office	1	3
14.	Common Toilet in Sports Village	-	4
15.	Common Toilet Towards Men's Hostel	2	6
16.	Bio Toilet Near Security Cabin & Near DATA Centre	-	4
17.	CIIC Block	5	40
18.	Firest Year Canteen	-	4
	Total	187	287

• In general, the flush tank capacity may be 8 to 10 Litres (depends on make and model). Water savings also leads to power saving it saves the operating duration of the water pumps directly.



7.5: Rain Water Harvesting (RWH) – from Building Roof Area & Run-off Area:

- The audit team appreciates the effects taken by the management of **B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE AND TECHNOLOGY** for harvesting the rain water almost in all buildings.
- The roof area is so arranged to collect the rainwater and then passed through proper piping system, and then bring back to the RWH pits which are located close to each pit
- The building run off are collected through each pit mostly located in each building. Common area and road run-off are properly collected and routed to nearby water body.



7.6: General Recommendations for Rain Water Harvesting:

- RWH has been fitted with their specifications indicating their i) year of installation, ii) approximate average rainfall and duration in the RWH location and iii) filter cleaning schedule (if any).
- Conduct a GIS based study on the improvement of ground water table especially before the rainy session and after rainy session. Compare the data and ensure that the water table improves due to percolation of rain water.
- Similar study mast be conducted (in future) before installing an RWH and after RWH.
- Increase the no. of RWH pits and may be developed to place at least 2 per building.



Sample Name Board in front a Rain Water Harvesting System

7.7: General Recommendations:

- → It is advisable to replace all the old taps without aerator into aerator-based taps in a phased manner.
- \rightarrow Aerators helps to reduce and regulate water flow and also offer the following benefits;
 - ✓ Lower Water Bills & Improved Water Pressure
 - ✓ Increased Filtration & Minimized Splashing

- All the pump motor must be fitted and controlled by floating sensor and hence the motors are automatically ON and OFF. It avoids the overflow; saves water and electrical energy.
- All the buildings are fitted with water flow meters & hence the water utilization must be properly accounted. Similar to the water flow meter; energy consumption of all pumping motors is recorded using panel board meters.
- Fault and leakage in the water distribution line will be promptly informed by the respective in-charges to the maintenance team and immediately arrested.

7.8: Installation on Fire extinguishers:

- The college has installed Fire extinguishers at all the vulnerable points.
- They are also refilled and in good condition (with adequate pressure indicated in the meter)







Sample Fire Extinguishers & First Aid Kit Placed in the College



8.1: Solid Waste Management System:

Different types of wastes generated inside the college premises are represented in the block diagram given below.



8.2: Process of Waste Management:

The college management practised some methods to treat the waste generated and Table-8 shows the process of treating the solid waste generated inside the college campus.

Table-8:	Process	of Waste	Management
----------	---------	----------	------------

S. No.	Waste Type	Waste Treatment		
	Bio-Degradable Waste Management			
1.	Food and Vegetable Waste	Collected and given to nearby farm		
2.	Garden Wastes and Plant Leaves	• Daily collected and dumped in a yard		
		• Collected and stored in a separate place		
3.	Paper Waste	Sold to ITC for recycling		
		• Daily paper waste stored in a yard		
	Non-Bio-Degradable Waste Management			
		• Banned in the college campus		
1	Plastics	(Welcome step).		
т.		• The chemical/salt storage containers are		
		disposed to third party		
	Construction Wests	• Mostly used by their own construction		
5.	Construction waste	and used for internal land filling		
		• Construction metals or metals from any		
6.	Metals	other sources are stored & sale to third		
		party for recycling		

7.	Transport Oil + Tyres	• Stored in a separate place and sold to third party
8.	DG Engine oil & Coolant	 Stored in a separate place and Mechanical department Workshop use Only
9.	Vehicle & Computer Batteries	 Procuring new batteries with buyback offer (Old battery replacement)
10.	Used edible oil	• Almost zero waste. Mostly used for internal cooking and frying.
11.	E-Waste Management	• Used for sale to third party for recycling

8.3: Standards Followed for Waste Handling & Management:

- 1. Solid Waste Management Rules 2016
- 2. E-Waste Management Rules 2016
- 3. Hazardous Waste Management Rules 2016 (Management & Transboundary)
- 4. Battery Management Rules 2001 (Management & Handling)

8.4: General Note:

- Prepare a flow chart for collection of E-waste from Generation to Disposal and paste it on appropriate places
- An electronic weighing scale (with suitable capacity) must be installed in the storage yard and should be properly calibrated
- One emergency lamp (with UPS supply) must be installed along with suitable fire extinguisher. Ensure proper ventilation in the yard
- Form rule for declaring the waste as E-Waste & Assign the singing authorities
- Identify a third-party vendor to procure the E-waste from the college
- Establish MoU with that party. Disseminate the following information at appropriate places i) E-Waste Policy, ii) Process Methodology, iii) Copy of MoU with third party vendor, iv) Contact persons mobile number and E-mail.
- Identify certain vehicle to carry the waste from generation to storage yard
- Provide training to the man power who are handling the waste
- Maintain separate Delivery Challan, Billing, weighing mechanism for handling the E-Waste
- Update the status of E-waste (through digital circular) to all the concerned management representatives, faculty members and staff at regular intervals (month wise is good)



Solid Waste Management (Collection, Segregation, Storage & Safe Disposal)

8.5: E-Waste Management:

- ⊕ With the proliferation of electronics also comes the challenge of their proper disposal.
 The institute has very efficient mechanism to dispose E wastes generated from various sources.
- ⊕ The major e-waste such as written-off instruments/equipment, old version computers, printers, electronic gadgets/circuits, kits have been written off on regular basis and condemned devices and materials from computer lab are sold to the e-waste management companies/buyers in Coimbatore.
- ⊕ All the miscellaneous e-waste such as CDs, batteries, fluorescent bulbs, PCBs, and electronic items are collected and delivered for safe disposal. Minor repairs are addressed by the lab technician with the support of staff members whereas the major issues are repaired by professionally trained personnel.

			1 1 3 4	111111111111111	
	1 and the second			and all states of the	a the second
	Charles		《行法图】	教授中国主义	
	ROGE	CENI	and the second		
	in cours	and the second s		The second second	1200
	Ann to chico.			and all all all all all all all all all al	D A AND
		Certificate	of De	struction	
			COD	to : VGIN200483	
		CFCB REG No: B-29	016(1881)/1	(Reg) 10/HWMD	
		Company Name M's. B.S.	Abdur Rahma	n Crescent Institute o	f Scienc
		and Tech	nelogy .	These Deeper	
		Vandalur,	ni Estale G.S.	Main Road .	
		Chernei -	600048		
		Company Het GP No: 41	170		
		Date Collected - DE/10/202			
		Date Received : 06/10/202	1		
		G9/FN5 ; VGIN-275	8		
		Date of Destruction : 21/10/202	1		
This furt respons procedu on a sa machan	mentally response ther certified that lible manner, utilities or written instances of specific ical process or n in the form of ret	the manner by Virogreen India Privat, the items identified below had been prop- izing the process and equipment available structions where applicable. This "Certificat activities; including collection, identificat namual means, whereby material elements we materials and is deemed on known fit.	 Dimined, the second and second sec	Channain an environmental y is with the Company ion" is issued based and treatment by d from the 'ITEMS' and d aurops appr	
Further procedu on a su machan for use recycled Further por NIS cvervmit toen sh	mentally respons ther certified that able mannes, utili- inter or written ins eness of specific ical process or n in the form of ra- d wherever possi V rogreen India F ST \$00-86 stand ten by means of weddet or others	the manner by Virogreen India Privat, the items identified below had been prope izing the process and equipment available structions where applicable. This "Certifical activities; indieding collaction, identificat nanual means, whereby material elements we materials and is deemed no longer fit ble. Private Limited, Chennal Acknowledges the tards and all electronic data on the fum a destruction write, all storage devices d wave destructed.	climined , diaposed in in accordance to Of Destruction, separation are destructe for original intr at the data has clionel storage eemed to be r	channal in an environmentally is with the Company ion" is issued based it and treatment by driven the "ITEMS" and driven the "ITEMS" is been destroyed as is been destroyed as is been destroyed as is been functional heve	
Further For Mission For a sain machan for use moyeled Further per MIS cvervmit been sh	mentally respons ther certified that line manner, utili tres or written ins enes of specific ical process or n in the form of ra- d wherever possi V regreen India F ST £00-86 stand ten by means of wedded or othern	the manner by Virogreen India Privat, the items identified below had been prope- izing the process and equipment available structions where applicable. This "Certificat activities; individing collaction, identificat manual means, whereby material elements tw materials and is deemed no longer fit- ble. Private Limited, Chennal Acknowledges the tards and al effortnonic data on the fun- a destruction write, all storage devices di was destructed.	c. Limited ., if y disposed in in accordance to Of Destruction, separation sare destructe for original inte are the data has dispet storage seemed to be r	channal h an environmentally e with the Company ion" is issued based it and treatment by ended purpose, and is been destroyed as indevice have been non-functional have	
Further For Mission For Use For Use For Use For Mission Contents Contents For Mission For	Index	the manner by Virogreen India Privat the items identified below had been proper izing the process and equipment available structions where applicable. This "Certificat activities; individing collaction, identificat manual means, whereby material elements tw materials and is deemed no longer fit- ble. Private Limited, Chennal Acknowledges the lards and al effectionic data on the fun- a destruction write, all storage devices di was destructed. Description	c. Limited ., diaposed in in accordance to Of Destruction, separation sare destructe for original inte ai the data has clonel storage eemed to be r Qt	Channal In an environmentally is with the Company ion" is issued based in and treatment by d'from the 'ITEMS' ended purpose, and is been cestroyed as indevice have been ison- functional have	
Further For Market Further For Use Further For Mills Cverwrit been sh	Index Index	the items identified below had been proper sing the process and equipment available structions where applicable. This "Certificat activities; including collaction, identificat manual means, whereby material elements winaterials and is deemed no longer fit- ble. Private Limited, Chennal Acknowledges the tards and at effortionic data on the fun- ral destruction write, all storage devices d was destroyed. Description taste - System fail set- 302 nos. Printer-	e Limited , di in accordance te Of Destructs for original inte for original inte ai the data has clonel storage eemed to be r	A an environmentally a with the Company ion" is issued based a and treatment by d from the 'ITEMS' ended purpose, and a been cestroyed as a device have been ison- functional have <u>Y</u> <u>Kgs</u> 4270	
Further Further procedu on a su machan for use recycled Further per NIS overwrit been sh	Index Index	the items identified below had been proper ting the process and equipment available structors where applicable. This "Certifical activities; incleding collection, identificat manual means, whereby material elements to maturials and is deemed no longer fit- ble. Private Limited, Chennal Acknowledges the tards and al electronic data on the fun- a destruction write, all storage devices d was destructed. Description taste - System full set- 302 nos. Printer- ces, Scanner-02 nos)	e Limited ., di in accordance te Of Destructs for original inte air the data has clonel storage eemed to be r Nos	An environmentally e with the Company ion" is issued based t and treatment by d from the "ITEMS" anded purpose, and been cestroyed as device have been won- functional have Kgs 4270	
Person Date :	Incharge : Mr. N Incharge : Mr. N	the items identified below had been proper implies the items identified below had been proper ising the process and equipment available structions where applicable. This "Certificat activities; including collaction, identificat manual means, whereby material elements with materials and is deemed no longer fit- ble. Private Limited, Chennal Acknowledges the tards and all effortenic data on the fum- ia destruction write all storage devices d was destroyed. Description taste - System full set- 302 nos. Printer- tas, Scanner- 02 nos. Company (Cartor Control of Control of Control as Manage (Cartor Control of Control of Control Control of Control of Control of Control of Control Control of Control of Control of Control of Control Control of Control of Control of Control of Control of Control Control of Control of Cont	e Limned , de in accordance te Of Destructs on, separation are destructs for original inte at the data has clonel storage semed to be r	A an environmental y is an environmental y is with the Company ion" is issued based in and treatment by d'from the 'ITEMS' ended purpose, and is been destroyed as indevice have been ison- functional heve <u>Y</u> <u>Kgs</u> 4270	
Person Designa Date :	The nearly response ther certified that the manner, utilities or written into an so or written into an so or written into an so or written into an or written in the 'orm of real of soless and the bound of real of the or written of the or written or writ	the liens identified below had been proper sing the process and equipment available structors where applicable. This "Certifical activities; incleding collaction, identificat manual means, whereby material elements wimaterials and is deemed no longer fit- ble. Private Limited, Chennal Acknowledges the tards and all electronic data on the fun- tar destruction write all storage devices d was destructed. Description Tarksponnal setter - System full set- 302 nos. Printer- tar sponnal a standard and storage devices d was destructed. Description arisponnal se Manage	e Limited , te in accordance te Of Destructs for original inte at the data has idonet storage seemed to be r	A an emironmentally to an emironmentally to with the Company on " is sound based in and treatment by d from the "ITEMS" ended surpose, and is been cestroyed as been cestroyed as to device have been hon-functional have Y Kgs 4270	
emmoni This furt respons procedu on a si machan for use recycled Further por fNIS overwrit been sh Designa Date : Pactory : S/NA.2 Cumaid port	The number of the second secon	the litens identified below had been proper sing the process and equipment available structors where applicable. This "Certifical activities; incleding collaction, identificat manual means, whereby material elements wimaterials and is deemed no longer fit- ble. Private Limited, Chennal Acknowledges the tards and all electronic data on the fun- tards and all electronic data on the fun- a destruction write all storage devices d was destroyed. Description Tarksponnal sette - System full set- 302 nos. Printer- tarksponnal a setter full set- 302 nos. Printer- tarksponnal set Manage	e Limited , te in accordance te Of Destructs for original inte at the data has idonet storage seemed to be r	A channa h an emironmentally e with the Company on " is sound based in and treatment by d from the "ITEMS" ended surpose, and is been cestroyed as been cestroyed as hon-functional heve Y Kgs 4270	
Person Designal Date :	The nearly response ther certified that the manner, utilities or written inter- ical process or n in the form of ra- d wherever possi Vrogreen India F ST 800-86 stand ten by means of medded or otherw Incharge : Mr. N ation : Warehout 21/16/2021	the items identified below had been proper ting the process and equipment available structors where applicable. This "Certifical activities; incleding collaction, identificat manual means, whereby material elements wimaterials and is deemed no longer fit- ble. Private Limited, Chennal Acknowledges the tards and all electronic data on the func- a destruction write all storage devices do was destroyed. Description Tarte - System full set- 302 nos. Printer- tarks pomma activities; and storage devices do we destroyed. Description tarksponnes; and all electronic data on the func- a destruction write all storage devices do we destroyed. Description tarksponnes; and all electronic data on the func- tarksponnes; and all storage devices do performance; and all electronic data on the func- tarksponnes; and all electronic data on the func- tarksponnes; and all storage devices; and all electronic data on the func- tarksponnes; and all electronic data on the func- tarksponnes; and all electronic data on the func- tarksponnes; and all electronic data on the func- se Manage; and all electronic data on the func- se Manage; and all electronic data electronic data on the func- data electronic data electronic data on the func- electronic data electronic data on the func- data electronic data on the func- electronic data on the func- data electronic data on the func- data electronic data on the func- electronic data on the func- data electronic data on the func- electronic data on the func- electronic data on the func- data electronic data on the func- data electronic data on the func- electronic data on the func- electronic data electronic data on the func- electronic data on the func	e Limited , te in accordance te Of Destructs for original inte at the data has idoned storage seemed to be n Qt Nos	A channa h an ernironmennally e with the Company on " is ssued based in and treatment by d from the "ITEMS" ended surpose, and is been cestroyed as been cestroyed as hon-functional heve Y Kgs 4270 A 270 Kgs Kgs Kgs Kgs Kgs Kgs Kgs Kgs	
Buggy Battery PO-262.jpg

Date: 02.11.2022

PO No: BSACIST/VEH/PO/2022-23/262 Our Ref. No. 05/160

То

19 PM

M/S. SHARUKH POWER SOLUTIONS, No.2/382, Byepass Road, Jawaharlal Nagar, Redhills, Chennai - 600 052.

Contact: 9841045593

Dear Sir,

Sub: Supply of Batteries for Battery Vehicle (Buggy) at B.S. Abdur Rahman Crescent Institute of Science & Technology.

with reference to the above, we are pleased to place with your that the place of Batteries for many Martha Di (8.igg/) at B.S.Abdur Rahman Crescent Institute of Science & Sectorality

I SI NO	Item Description	UOM	Qty .	Rate	Amount
51.00	Exide Express 100 AH	Nos	3	8500.00	25,500.00
	Old Battery Exchange	Nos	3	1500.00	(-) 4500.00
	Total Amount		1	+	21,000.00

Terms& Conditions;

1

1.	Payment	3.1 0.145
2	Taxes	Included
3.	Delivery	. Immediate
4.	Transport	Free.

Thanks and Regards For B.S.Abdur Rahman Crescent Institute of Science & Technology.

VNA. V.N.A. Jalal Director (Planning & Devel- pment)

Seethakathi Estate, G.S.T. Road, Vandalui, Chennal – 600 048. India. Tel : +91 (44) 2275 1347, 1348, 1350, Fax : +91 (44) 2275 0520 G.S.T.NO:33AABTB5026G128 Gmail : purchase@ciescent.education

Sample Bill for Battery Byback

New York



Sample Certificate for Paper Waste

		GJ Multiclave (Biomedical Waste Manag New No. 37, Old No. 20, Teachers Colony, M Phone : D44 - 2445 1683, E- Website : www	(India) Pvt. ement & Handling Servic Gamavater Avenue, Adyor, Channal mail chrennaictf@hotmail.com gioutlictave.com	Ltd. e) 600 020.
Custome	Details / Recipient	TAX INVOICE	Invoice Details	11-16-51-51
Customer I B.S. ABD	D: B176	ECENT INSTITUTE OF SCIENCE AND	Date: 31/01/2022	
TECHNOL	OGY - VANDALUR	COLIN MUSTICIE OF SCIENCE AND	INVINO GAGITISSTATA	Colle and
SEETHAK	THI ESTATE. GST RO	DAD.	Collection Exe: M.SHANMUGAI	м
Contact Per	300. SODOL		Email: accounts@gjmulticlave.c	om Cell: 90031339
			customerrelation@gimulticlave.e	com +91-98403369
Email: ABBI	OCARELAB@GMAIL (COM	Service Incharge Details : NA	
Phone;		Cell: 9800542004	Category of Customer: Service /	SAC: 999421
E.&O.E Rupee In Wo Invoice Rema PO Reference Other Referen Payment Rem	rds: EIGHT THOUSAN rks: Excemption as per s: N/A ree arks: Kindly send the p	ID ONLY notification No.12/2017 - Central Tax(Rate) &	Round Off Total No.9/2017 Integrated Tax(Rate)	0 8000.
Bank Details : VC No : 6027 SSTIN : 33AAI	Bank : ICICI BANK C D5040717 IFSC Code BCG0954H12X PAN	e (INDIA) PVT ETD hennai Anna Nagar : ICIC0006027 : AABCG0954H CIN NO : U24110TN1999PT(For GJ MULTICLAVE (IN P.Jeluer	DIA) PVT LTD
in the second se	•		Authorised Sign	atory

Sample Certificate for Bio Medical Waste



9.1: Campus Greenery:

The college is completely covered with mature trees grown for more than 20 years. The total number of mature trees available in the college campus is **<u>2,538</u>** *with many varieties of* **trees**.

S. No.	Location	Name of the Tree	Quantity
1.0	Entire Campus Location	Variety of Mature Trees	2,538 Nos

Table-9: List of Mature Trees available in the College Campus





Campus Greenery Initiatives Taken by the College Management

9.2: Green Energy Generation (Roof Top Solar PV System):

The college has installed solar PV plants with a capacity of **640 kW**, generate and feed power to the respective panel boards (with reverse power relay protection) and are utilized by the campus load. The details of the roof top solar PV system is represented in the Table-10.

Total Capacity (kWp)	640 KW			
Location of SPV Plant & Panel Orientation	Main Building : 100 kW			
	MBA & 1 st Year Block : 150 kW			
	Aeronatical Block : 80 kW			
	Auditorium : 80 kW			
	Science Block : 130 kW			

Table-10:	Description	of the	Roof-Top	Solar H	PV System
-----------	-------------	--------	-----------------	---------	------------------

	Architecture Block : 50 kW
	CIIC Block : 50 kW
Number of DC & Inverter Earthing	16 No's
Average Units Generated per Day	4 to 5 Units /Day



Energy saving from Solar PV system is <u>6,63,189</u> <u>kWh</u> (for the year 2022-23) which reduces <u>543.8 Tons of CO₂ Emission.</u>



9.4: Recommendations to Grow Indoor Plants as Natural Air Purifier:

- Indoor plants not only do plants look good while bringing life to our living space, they also help purify the air, according to a NASA study that explains that even a small plant inside the workspace can help remove at least three household toxins (think benzene, formaldehyde, and trichloroethylene, which are carcinogenic chemicals commonly found in stagnant indoor environments).
- Here are the list of the indoor plants acts as a natural air purifier one can try with indoor area to remove toxins and improve air quality.



TULSI: Generates more oxygen



Aloe Vera:

- Removes benzene and formaldehyde
- Eliminate harmful microorganism and absorb dust



Snake Plant:

• Removes Xylene, Benzene, Formaldehyde, Trichloroethylene



Spider Plant:

- Removes CO and Formaldehyde
- Absorbs Nicotine



Money Plant (Devil IVY):

- Best air purifying plant
- Remove benzene & Formaldehyde



Bosten Fern:

- High humidity application
- Remove xylene & Formaldehyde



Chrysanthemum: • Removes Ammonia, Xylene, Benzene & Formaldehyde



Kimberly Queen Fern:

- Works well in carriage
- Absorb vehicular exhaust

9.5: Recommendations for Miyawaki Forest:

Miyawaki is a technique (also called *Potted Seedling Method*) as that helps build dense, native, multi-layered forests. The approach is supposed to ensure that plant growth is 10 times faster and the resulting plantation is 30 times denser than usual. It involves planting dozens of native species in the same area, and becomes maintenance-free after the first three years. The overall density of the forest is beneficial in lowering temperature, making soil nutritious, supporting local wildlife and sequestration of carbon.



9.6: One Student - One Tree:

This is an Initiative of AICTE to increase the green coverage inside the campus and committed to reduce the Urban Heat Island Effect (UHIE), through NSS volunteers (or any other Green club); One Student: One Tree scheme. Through this scheme, college may plan to plant nearly 2,000 trees in future, make the entire campus with complete green cover and maintain a excellent bio-diversity.

<u>9.7: Bio-Diversity in the Campus:</u>

- Biodiversity is all the different kinds of life you'll find in one area—the variety of animals, plants, fungi, and even microorganisms like bacteria that make up our natural world.
- Each of these species and organisms work together in ecosystems, like an intricate web, to maintain balance and support life.

9.8: Recommendations to maintain Bio-Diversity:

• **Bird Sighting and Survey:** Conduct a dedicated bird sighting and identify the list of birds both residing birds and migratory birds available in the college campus

- Prepare the list of birds with their local name, scientific name, their average life time, nesting facility created by the bird and photo of the bird. Show case the result to all the stake holder and inculcate a habit of friendly environment
- Discuss with the ornithologists and facilitate the environment with more birds coming to the campus and especially migratory birds.
- **Reptile & Amphibian survey:** Similar to bird survey; conduct a survey to list the amphibians available in the campus
- Amphibian and reptile surveys are often performed as part of the Green Audit process or terrestrial survey. These surveys are effective at detecting the presence of even the most elusive species.

9.9: Formation of Green Energy Team (GET):

• It is essential and the right time to form an Energy Management Team comprising of the following members with their roles and responsibilities as shown in Table-11:

S. No	Members	Roles	Responsibilities
1.	Management Commitment	Overall Monitoring	 Encourage members to carry out the activities Propose possible think tank ideas to be implemented in the college campus
2.	Head of the Institution	Team Head	Monitoring all energy related activitiesReport to the Management
3.	Heads of various Departments	Team Manager	 Assessing the energy target Monitoring the energy performance Revising the target based on performance Monitoring projects/activities/implementation
4.	Faculty members from various department	Team Members	 Identify the viable energy saving projects Prepare the detailed work plan/time frame Project guides for energy related projects Pre and post project implement study Rework if there is any deviation
5.	Student volunteers	Energy Ambassadors	 Responsible of identified areas Floor in-charge for energy utilities Development energy saving projects Testing and Implementation

Table-11: Roles of Responsibilities of Green Energy Team (GET)



I. Water Conservation & Management:

- Utilize more amount of treated water; since most of the approving agencies like AICTE, UGC etc., are now requesting to utilize the treated water
- To check the quantity of water utilized by each building by connecting digital water flow meter and optimize the water usage
- Prepare and maintain a Single Line Diagram (SLD) for water distribution network.
- Try to reduce water tapped from the ground water source since it is not environmentally friendly
- Paste water and energy saving slogans at appropriate places
- Generate your own power and water for regular activities and move towards Net Zero Energy and Net Zero Water Building
- Retrofit aerator-based water taps for good water savings. For hand washing applications, all the pipes must be fitted with aerators
- Captures almost 100 % rain water harvesting through i) Recharging pits and ii) Open well type storage pits
- Properly follow scientific method of handling chemicals/Acids/Salts and safe disposal through 3rd party
- Water treatment log must be maintained indicating the water inlet, treated and outlet water quantity
- Install **sensor-based water controller** in each Over Head Tanks and reduce the water waste and power required to operate the pump
- With the advent of smart technologies, it is possible to have centralized monitoring in realtime using Internet of Things (IoT), Geographic Information System (GIS) software, etc. as per **Jal Jeevan Mission**, Department of Drinking Water & Sanitation **Ministry of Jal Shakti**
- Awareness campus must be conducted to all the stakeholders at regular interval. Through this initiative; Painting, Photography, Slogan and Poster making contest are conducted to create consciousness among the students and faculties

II. Impart Training to Faculty and Technical Staffs:

- Energy Conservation and Management
- * Environmental impact and assessment
- Fire and Safety (Operation and Handling)
- * Electrical maintenance, AC, Battery Maintenance & Safety
- Emergency Preparedness
- * E-Waste, Chemicals Handling & Solid Waste Management
- ***** Training for Transport employees
- * Training for Faculty and Students on Vehicle Operation
- * Training for Kitchen Employees
- * General Medical Camps for Employees
- Training on Stress Management and Yoga

III. Way Forward towards Energy & Environmental Sustainability:

- Prepare an exclusive **Environment Policy** based on the energy and environment practices followed in the campus. This must reflect the i) Present energy consumption & generation, ii) Projection of energy need, iii) Commitment by the college to conserve energy (in terms of percentage), iv) Road map to achieve the commitment, v) Facilities needed to achieve the same, vi) Roles and responsibilities of all stake holders, vii) Interim and final review mechanism, viii) Corrective measures, if the results deviates from the committed value and ix) Benchmarking, Case study preparation, Knowledge sharing and rewards
- Practice appropriate ISO standards for System Management. The audit team highly recommend to follow i) ISO-9001 (Quality Management System), ISO-14001 (Environmental Management System) and ISO-50001 (Energy Management System)
- Working towards Net Zero Energy and Net Zero Water Campus and achieve Platinum rated Global Leadership campus (as per IGBC rating) and/or 5-star rated campus (as per GRIHA rating) and/or GEM-5 rated campus (as per ASSOCHEM GEM rating)

COMPLETION OF THE REPORT

This report is prepared as a part of the **Environment and Green Audit** process conducted at **M/s. B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE AND TECHNOLOGY,** Seethakathi Estate, GST Road, Vandalur, Chennai – 600 048, Tamilnadu, India. by **RAM-KALAM CENTRE FOR ENERGY CONSULTANCY AND TRAINING,** Coimbatore-641 062, Tamil Nadu, India.





CERTIFICATE

The Certification Body of TÜV SÜD South Asia Private Limited

certifies that



M/S RAMKALAM CENTRE FOR ENERGY CONSULTANCY & TRAINING No.8, VPK Garden, Velanaipatti, Coimbatore – 641 062, India

has implemented Quality Management System

in accordance with ISO 9001:2015

for the scope of

Providing Energy, Environment, Green audits to industry, Academic institutions and organizations

The certificate is valid from 2023-11-22 until 2026-11-21 Subject to successful completion of annual periodic audits The present status of this certificate can be obtained through TUV SUD website by scanning below QR code and by entering the certificate number (without spaces) on web page. Further clarifications regarding the status & scope of this certificate may be obtained by consulting the certification body at <u>info.in@tuvsud.com</u>

Certificate Registration No. 99 100 23573

Date of Initial certification: 2023-11-22

Issue Date: 2023-11-22 Rev. 00



Rahul Kale Head of Certification Body of TÜV SÜD South Asia Private Limited, **Mumbai** Member of TÜV SÜD Group



TÜV SÜD South Asia Pvt. Ltd. ● TÜV SÜD House ● Saki Naka ● Andheri (East) ● Mumbai – 400072 ● Maharashtra ● India TÜV®

◆ CEPTNΦNKAT ◆ CERTIFICAD0 ◆ CERTIFICAT

認証証書

ZERTIFIKAT

CERTIFICATE

2000 Reg No.: EA-27299 Certificate No.: 9645/19 **National Productivity Council** (National Certifying Agency) **PROVISIONAL CERTIFICATE** This is to certify that Mr./Mrs./Ms.....SIVARASU SULUR RATHINAVELU son / daughter of Mr.... PRATHINAVELUhas passed the National certification Examination for Energy Auditors held in September 2018, 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. $\it He$ / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment the function of the the fulfillment the transformation of transformation of transformation of transformation of the transformation of transfo of qualifications for Accredited Energy Auditor and issuance of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act. This certificate is valid till the Bureau of Energy Efficiency issues an official certificate. Digitally Signed by:K V R RAJU Mon Apr 22 16:22:42 IST 2019 Place : Chennai, India Controller of Examination, NPC AIP Chennai Date : 22nd April, 2019 Controller of Examination acb TAV NORI ISO 14001:2015 Lead Auditor (Environmental Management Systems) **Training course** it is hereby certified that Dr. S. R. Sivarasu has successfully completed the above mentioned course and examination 08th - 12th December 2017 Coimbatore, India Certificate No. 3521 2982 02 Delegate No. 71968 NORD CERT GmbH Essen, 2018-01-11 Course 18125 is certified by CQI/IRCA and meets the training requirements for those seeking certification under the IRCA EMS auditor certification scheme. TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.com CERTIFIED COURSE APPROVED TRAINING PARTNER





ENERGY AUDIT REPORT

JAN-2024



Crescent Institute of Science & Technology, GST Road, Vandalur, Chennai,

Tamil Nādu - 600 048.

CONDUCTED BY



SLR INDUSTRIAL SOLUTIONS (BEE Approved Energy Audit Firm) No.15, 4th Street, VIP Nagar, Thirukachur Post, Singaperumal Koil, Chengalpattu District, Tamil Nadu – 603 204 (Mob: 9600500542, Email: <u>slrischennai@gmail.com</u>) CRESCENT Vendor Code-13271399





ACKNOWLEDGEMENT

SLR Industrial Solutions (SLRIS) conveys their gratitude and thanks to the management of **M/s Crescent Institute of Science & Technology – Chennai,** for giving us an opportunity to study their College & equipment's for the Energy Audit, which was conducted in **Jan - 2024**

We render our sincere thanks to Mr.V.N.A. JALAL, Director (Planning & Development) and Dr. Kaliluthin, Asso Professor/Civil & Deputy Director (Campus Development & Maintenance) for their keen interest, proactive support for providing whole hearted support, helps and guidance during the course of study of the campus.

We are indeed touched by the helpful attitude and co-operation **Mr. Ramkumar, AP/EEE & Executive Engineer (Electrical) and Mr. E. Manivannan, Junior Engineer** & all technical staff, who rendered their valuable assistance and co-operation during the course of study.

The Audit and report making team constituted of the following Auditors from SLRIS.

Name of SLRIS Team Members

Mr. M. Srinivasan, Accredited Energy Auditor, BEE
 Mrs. S. Hemavathi, Energy Analyst

M. Lice.

M. Srinivasan BEE Accredited Energy Auditor, AEA 0324

SLR INDUSTRIAL SOLUTIONS No.15, Phase-I, 4th Street, VIP Nagar, Thirukatchur Post, Singaperumal Koil - 603 204. Chenglapattu Dist, Tamil Nadu

SLR Industrial Solutions-Chennai





Table of Contents

SLR Industrial Solutions-Chennai	3
Chiller Pumps	25
7.1 Introduction	25
7. Chiller	25
6.2 Study of AC	25
6.1 Introduction	24
6. AIR CONDTIONERS	24
5. LIGHTING SYSTEM	23
4.6 Month vs. Power Factor Analysis	22
4.5 Month vs. Demand Analysis	22
4.4 Month vs. Total Cost Analysis	21
4.3 Month Vs. Energy Consumption Analysis	21
4.2 Energy Consumption Month wise	20
4.1 Analysis of Electricity Bill	19
4. REVIEW OF ELECTRICITY BILL	19
3.3 Motor Loading	18
3.2 Transformer Loading	18
3.1.6 Apparent Power (kVA) Analysis (800 kVA Transformer-3)	17
3.1.5 Apparent Power (kVA) Analysis (800 kVA Transformer-2)	17
3.1.4 Current Analysis (800 kVA Transformer-3)	17
3.1.3 Current Analysis (800 kVA Transformer-2)	17
3.1.2 Voltage Analysis (800 kVA Transformer-3)	16
3.1.1 Voltage Analysis (800 kVA Transformer-2)	16
3.1 Transformer	15
3. TRANSFORMER AND ELECTRICAL DISTRIBUTION SYSTEM	15
2.1 Energy and Production	13
2. BASELINE DATA FOR ENERGY AUDIT	13
1.5 List of Instruments Used	12
1.4 Methodology	11
1.3 Scope of Work	10
1.2 Objective	10
1.1 Preamble	10
	10
CAMPUS ENERGY SAVINGS IDENTIFIED	8
	5
	2





7.2 Study of Chiller and Pumps	26
8. FANS	27
8.1 Introduction	27
9. RENEWABLE ENERGY	27
10 DIESEL GENERATORS	28
11. Pumps and Blower	29
11.1 Introduction	29
11.2 Study of Pumps and blower	29
12. ENERGY CONSERVATION MEASURES	29
ECM1: Replace FTL Lamps with Energy Efficient LED Lamps	29
ECM 2 Rectify Solar water heater at ladies hostel and reduce power consumption	31
ECM 3 Replace STP blower with new energy efficient blower & save power consumption	32
ECM 4 Rectify solar roof top panel and reduce EB power consumption	33
ECM 5: Provide Demand Controller and avoid Penalty	35
ECM 6 Replace conventional fans with EE BLDC fans	36
ECM -7: Replace old AC's with Energy efficient 5 star rated split AC and reduce power consumption	37
ECM 8 Replace domestic Water pumps with new pumps and reduce power consumption	38
ECM -09: Replace Street light with Solar powered light and reduce power consumption	40
ECM 10 Explore the possibility of Roof Top Solar PV to generate electrical energy	41
13. Recommendation and Conclusions	42
14. ANNEXURE	43





DETAILS OF CONSUMER

1.	Name of the Consumer	: Crescent Institute of Science & technology, Chennai				
2.	Name of the Contact Person	: Mr. Ramkumar, AP/EEE & Executive Engineer				
	GST Road, Vandalur,					
		Chennai, Tamilnadu – 600 048.				
3.	Website	: www. Crescent.education.com				
4.	Nature of Business	: Education				
5.	No of Shifts	: General Shifts				

https://www.google.com/maps/place/B.+S.+Abdur+Rahman+Crescent+Institute+Of+Science+ And+Technology/@12.8753317,80.0847235,353m/data=!3m1!1e3!4m6!3m5!1s0x3a52f60e8ef70d ad:0x1b7886934a452db8!8m2!3d12.8753945!4d80.0837794!16zL20vMDRicjc2?entry=ttu&g_ep= EgoyMDI0MTEwNi4wIKXMDSoASAFQAw%3D%3D



Location Map

SLR Industrial Solutions-Chennai





	EXECUTIVE SUMMARY -Crescent						
ECM.	CM. Energy Conservation Measures		l Savings	Investment	Payback		
No			Rs.	Rs.	Months		
Short-Term Payback							
1	Replace FTL Lamps with LED and reduce power consumption	19,200	180,480	120,000	8		
2	Rectify solar water heater in ladies hostel and reduce power consumption	20,930	196,744	180,000	11		
3	Replace existing STP blower with new energy efficient blower	25,810	242,615	250,000	12		
	Medium-Term Payback	K					
4	Rectify Solar roof top panel problem and increase power generation	8,040	61,506	100,000	20		
5	Install Demand Controller to avoid demand penalty charges		21,120	40,000	23		
	Long-Term Payback						
6	Replace conventional ceiling fans with BLDC fans	37,800	355,320	1,050,000	35		
7	Replace old AC with Energy Efficient 5 star rated split AC	45,000	423,000	1,500,000	43		
8	Replace main block water pump with new one and reduce power consumption	1,320	12,408	50,000	48		
9	Replace street light with solar power light and reduce power consumption	1,314	12,352	60,000	58		
10	Explore roof top solar PV possibility to generate electrical energy	327,600	2,506,140	12,600,000	60		





Summary of Savings						
Annual	Total Savings & Investment and Average Payback	487,014	4,011,685	15,950,000	48	
	Total kWh Savings in Percentage	10				
	Total Cost Savings in Percentage	9				
	Total CO₂ reduction in Tons	385				





CAMPUS ENERGY SAVINGS IDENTIFIED

1. Annual Energy Savings

Annual Energy Savings : 4, 87,014 kWh.

2. Annual Cost Savings

Annual Cost Savings	: Rs. 40, 11,685.
3. Proposed Investment	: Rs. 1, 59, 50, 000

4. Overall Payback period	: 38 Months.
---------------------------	--------------



Figure 1 : Annual Cost Savings







Figure 2 : Annual Energy Savings (%)



Figure 3: Savings (%)





1. INTRODUCTION

1.1 Preamble

B.S. Abdur Rahman Crescent Institute of Science and Technology is a renowned Quality Leadership Institution located at the greenest spot of Chennai near Tambaram since 1984. Through our long history of 38 years of excellence, the Institution has offered access to a wide range of academic opportunities. With 54 programmes, grouped under 12 different Schools, 31 Undergraduate programmes, 23 Postgraduate programmes, and Ph.D. (in all the departments), this institution is a rising stalwart in higher education with promising Quality, Security and Placement. We welcome students from all countries and our educational programmes are designed to equip the learners with virtual knowledge that helps them to achieve what they want to be and go where they want to go in the ladder of success.

This institution is an intellectual destination that challenges conventional thinking and stimulates passion to redefine learning. The distinctive teaching at this institution makes the students and scholars to compete with themselves and each other. Apart from providing top-notch education, our green campus and well-planned student life are solely dedicated to making students utilize the ambiance to the fullest. Through our wide array of educational programmes and unique clubs to foster student development activities, we provide opportunities and experiences that build community, help you grow personally and professionally, and create a place that you can call home now and throughout your life.

1.2 Objective

The energy audit is being conducted to identify areas of energy saving, both without and with investment.

This energy audit will also identify priorities for energy saving depending on saving potentials skills and time frame for execution, investment cost and payback etc.

1.3 Scope of Work

1 **Review of Electricity Bills, Contract Demand and Power Factor:** For the last one year, in which possibility will be explored for further reduction of contract demand and improvement of P.F.





- 2 Electrical System Network: Detailed study of all the Transformer operations of various Ratings / Capacities, their Operational Pattern, Loading, Power Factor Measurement on the Main Power Distribution Boards and scope for improvement if any. The study would also cover possible improvements in energy metering systems for better control and monitoring.
- 3 **Electrical Motors,** study of above 5 HP motors in terms of measurement of Voltage (V), Current (I), Power (kW) and P.F. in a complete cycle, and thereby suggesting measures for energy saving.
- 4 **Air Conditioning System:** The audit would involve analysis of various types of AC and usage. Further, various measures would be suggested to improve its performance.
- 5 **Illumination System:** Study of the illumination system, LUX level in various areas etc. and suggest measures for improvements and energy conservation opportunity wherever feasible.
- 6 **DG Sets:** Study the operations of DG Sets to evaluate their average cost of Power Generation, Specific Energy Generation and subsequently identify areas wherein energy savings could be achieved after analyzing the operational practices of the DG Sets.
- 7 **Pumping System:** Detailed Study of Pumps Measurement Analysis involves Pump Performance Study, the following parameters like Hydraulic Power, Pump Shaft Power, and Pump Efficiency are determined.

1.4 Methodology

SLRIS deputed senior Auditor for conducting the study and he worked in close association with the staff and officers of Crescent – Chennai.

SLRIS submitted an execution plan for assignment which was mutually agreed and relevant data support was provided by Crescent – Chennai.

The audit was started with an orientation meeting with Management / Operations / Maintenance personals.

SLRIS team conducted all necessary field trials and collected various data for analysis.





All the instruments support was provided by SLRIS for conducting the field study where in following instruments were used

1.5 List of Instruments Used

S. No	Instrument name	Specification
	Power Analyser	
	a. ACV (True RMS)	Up to 830V
1	b. ACA (True RMS)	Up to 6500 A
	c. Frequency	40 to 70 Hz
	d. Accuracy	+/- 0.5%
	Clamp on Meter	
	a. ACV (True RMS)	10 to 600V
2	b. ACA (True RMS)	10 to 1500 A
	c. Frequency	50 or 60 Hz
	d. Accuracy	+/- 0.5%
	Lux Meter	
3	a. Range	0 to 9999 lux
	b. Accuracy	+/- 4% of reading
	Anemo Meter	
4	a. Range	1 to 25 m/s
	b. Accuracy	+/- 3% of reading
	Thermo Meter	
5	a. Range	-50°C to 750°C
	b. Accuracy	+/- 1% of reading

Bouquets to CRESCENT-Chennai:

The following energy savings are already implemented in CRESCENT-Chennai:

- 1. LED lightings
- 2. Occupancy Sensor
- 3. 5 star rated and VRF AC's
- 4. BLDC Fans
- 5. Solar Water Heater
- 6. Solar Roof Top Power
- 7. Solar Street Light
- 8. Bio-gas Plant





2. BASELINE DATA FOR ENERGY AUDIT

2.1 Energy and Production

Energy (1 year data) details of CRESCENT – Chennai is given below:

1.	Name of Electricity office	: TANGEDCO
2.	Tariff	: HT IIB
3.	Annual Energy Consumption	
	Total EB Consumption	: 40, 83,312 kWh/ Annum
	Total Solar Generation	: 6, 63,189 kWh/ Annum
	Total DG Generation	: 87, 994 kWh/Annum
4.7	Annual Energy bill	
	Total Electricity bill paid to EB	: Rs. 4, 26, 70,284 /Annum
	Total DG cost	: Rs. 27, 23,650/ Annum
5. I	Unit Rate (EB+DG)	: 9.4 Rs/kWh

% Source of Electricity



Figure 4: % Source of Electricity





% Load share of Utilities:



Figure 5: % Load of Utilities

Air Conditioners are the major power consumption followed by Fans.

% Load share of Utilities					
SL.No Particular		kWh/day	Consumption(%)		
1	AC	8748	54		
2	Fans	2279	14		
3	Lights	1334	8		
4	Pumps	200	1		
5	Others	3554	22		
	Total	16115	100		





% Load share-Feeder wise:

		Actual Details				
Sl.No.	Description	Voltage	Current	Active Power	Apparent Power	% share
		V	Ι	kW	kVA	
1	Chiller	400	130	81	90	11
2	MBA	400	70	44	48	6
3	Life science block	400	70	44	48	6
4	Men's Hostel	400	240	150	166	20
5	Ladies Hostel	400	60	37	42	5
6	Staff Quarters	400	70	44	48	6
7	Architecture	400	40	25	28	3
8	Science building	400	210	131	145	18
9	CIC	400	240	150	166	20
10	Arabic	400	60	37	42	5
	Total		1190	742	824	100

It is recommended to provide energy meter for the all feeders

3. TRANSFORMER AND ELECTRICAL DISTRIBUTION SYSTEM

3.1 Transformer

At Presently CRESCENT- Chennai Receives Power from TANGEDCO at 11 kV and steps it down to 433 Volt using Distribution Transformer.





Distribution Transformer						
Description Unit Transformer-1 Transformer-2				Transformer-3		
Make		Kirloskar	Universal	Universal		
Туре		Outdoor	Outdoor	Outdoor		
Capacity	kVA	500	800	800		
Valtaga	HV	11000	11000	11000		
voltage	LV	433	433	433		
Cumont	HV		42	42		
Current	LV	666.7	1066.66	1066.66		
Dhasas	HV	3	3	3		
Phases	LV	3	3	3		
Frequency	Hz	50	50	50		
Type of Cooling		ONAN	ONAN	ONAN		
Year		1999	2006	2006		
Status		Not in service	Working	Working		

The Following Table showing the Design Details of the Transformer:

3.1.1 Voltage Analysis (800 kVA Transformer-2)

The Voltage (V) analysis for 800 kVA Transformer is given in following table

Parameter	Maximum	Minimum	Average
Line12 Voltage (Vrms)	402	396	399
Line 23 Voltage (Vrms)	405	400	403
Line 31 Voltage (Vrms)	401	399	400

3.1.2 Voltage Analysis (800 kVA Transformer-3)

The Voltage (V) analysis for 800 kVA Transformer is given in following table

Parameter	Maximum	Minimum	Average
Line12 Voltage (Vrms)	405	395	400
Line 23 Voltage (Vrms)	406	398	402
Line 31 Voltage (Vrms)	404	394	399





3.1.3 Current Analysis (800 kVA Transformer-2)

The Current (A) analysis for 800 kVA Transformer is given in following table.

Parameter	Maximum	Minimum	Average
Line1 Current (A)	625	575	600
Line 2 Current (A)	600	580	590
Line 3 Current (A)	610	590	600

3.1.4 Current Analysis (800 kVA Transformer-3)

The Current (A) analysis for 800 kVA Transformer is given in following table.

Parameter	Maximum	Minimum	Average
Line1 Current (A)	550	500	525
Line 2 Current (A)	600	500	550
Line 3 Current (A)	620	540	590

3.1.5 Apparent Power (kVA) Analysis (800 kVA Transformer-2)

The Apparent Power (kVA) analysis for 800 kVA Transformer is given in following table.

Parameter	Maximum	Minimum	Average	
Line1 Power (kVA)	144	133	139	
Line 2 Power (kVA)	139	134	136	
Line 3 Power (kVA)	141	137	139	

3.1.6 Apparent Power (kVA) Analysis (800 kVA Transformer-3)

The Apparent Power (kVA) analysis for 800 kVA Transformer is given in following table.

Parameter	Maximum	Minimum	Average
Line1 Power (kVA)	127	116	121
Line 2 Power (kVA)	139	116	127
Line 3 Power (kVA)	143	125	134





3.2 Transformer Loading

Transformer is a static device. Hence the losses of transformer are very low thus giving very high efficiency.

CRESCENT – Chennai has 2 Transformer (2*800 KVA) for energizing the Campus and one 500 kVA which is not in use.

For backup power supply, like emergency and critical loads, 2 DG sets of 750 KVA and 500 KVA capacities are put into operation during grid power failure.

The following table will give the Loading percentage of Transformer during audit.

Decemination	Rated	L	oading kVA		Loading %		
Description	Capacity(kVA)	Minimum	Maximum	Average	Minimum	Maximum	Average
Transformer-2	800	404	619	511	51	77	64
Transformer-3	800	357	600	479	45	75	60

Note:

Transformer is loading around 50 to 75%.

3.3 Motor Loading

Sl.No.	Description	Rated Power (kW)	Rated Efficiency	Voltage	Current	Power Factor	Active Power	Motor Loading
				V	Ι	COS Φ	kW	%
1	Chiller-1	75	93.2	405	102.0	0.85	61.0	75.8
2	Chilled water pump	7.5	89.0	405	13.6	0.92	8.8	104.4
3	AHU-1	3.7	89.0	407	7.6	0.73	3.9	93.8
4	AHU-2	4	89.0	407	6.6	0.75	3.5	84.2
5	AHU-3	4	89.0	407	7.0	0.80	4.0	96.2
6	AHU-4	3.7	89.0	407	6.7	0.80	4.0	96.2
7	AHU-5	2.2	89.0	407	2.7	0.60	1.1	44.5
8	AHU-6	2.2	89.0	407	3.7	0.70	1.7	68.8

Majority of Motor are loading above 50% which is OK




4. REVIEW OF ELECTRICITY BILL

4.1 Analysis of Electricity Bill

Following data has been taken from electricity bill:

Contract Demand	:	1200 kVA
Maximum Demand recorded	:	1219 kVA (May 2023)
Demand Charges	:	Rs. 562/ kVA
Power Factor	:	0.97
Total Units Consumed	:	40, 83,312 kWh
Total Electricity Bill	:	Rs. 4, 26, 70,284
Unit Rate	:	Rs. 9.0/kWh





4.2 Energy Consumption Month wise

Average Unit cost is around Rs 9.0 for EB and Rs 9.4 for EB and DG. For savings calculation, unit cost is taken as Rs 9.4.

No	Months	Contract Demand (kVA)	Actual Recorded Demand (kVA)	Demand Cost (Rs.)	EB units	Solar units	DG Units	Total Energy Consumption, kWh	Power Factor	Diesel ltrs	Demand Penalty	EB Amount (Rs)	DG Cost (Rs)	Total Amount- EB+DG (Rs)	Unit Cost- EB (Rs)	Unit Cost- EB+DG (Rs)
1	Jan-23	1200	744	594,000	245,496	58,407	2,952	306,855	0.98	780		2,699,431	73,320	2,772,751	8.9	9.0
2	Feb-23	1200	816	594,000	269,466	62,748	2,142	334,356	0.98	850		2,899,939	79,900	2,979,839	8.7	8.9
3	Mar-23	1200	1070	594,000	371,754	58,141	1,322	431,217	0.97	600		3,758,154	56,400	3,814,554	8.7	8.8
4	Apr-23	1200	1107	609,180	325,014	69,058	6,008	400,080	0.98	2,050		3,380,131	192,700	3,572,831	8.6	8.9
5	May-23	1200	1219	670,560	431,052	59,994	16,699	507,745	0.97	5,990	21,120	4,357,011	563,060	4,920,071	8.9	9.7
6	Jun-23	1200	1134	623,700	339,420	58,915	8,587	406,922	0.97	3,040		3,516,185	285,760	3,801,945	8.8	9.3
7	Jul-23	1200	1026	606,960	283,956	51,732	4,275	339,963	0.97	1,745		3,076,449	164,030	3,240,479	9.2	9.5
8	Aug-23	1200	1161	652,819	405,990	57,044	16,075	479,109	0.97	5,520		4,176,032	518,880	4,694,912	9.0	9.8
9	Sep-23	1200	1196	672,376	388,764	56,507	8,217	453,488	0.96	1,890		4,050,470	177,660	4,228,130	9.1	9.3
10	Oct-23	1200	1134	637,308	382,566	42,397	5,853	430,816	0.97	1,950		3,963,549	183,300	4,146,849	9.3	9.6
11	Nov-23	1200	1095	615,727	365,388	45,151	4,046	414,585	0.97	1,190		3,792,730	111,860	3,904,590	9.2	9.4
12	Dec-23	1200	828	606,960	274,446	43,095	11,768	329,309	0.99	3,370		3,000,203	316,780	3,316,983	9.4	10.1
	Total	1,200	1,044	7,477,590	4,083,312	663,189	87,944	4,834,445	0.97	28,975	21,120	42,670,284	2,723,650	45,393,934	9.0	9.4





4.3 Month Vs. Energy Consumption Analysis



Figure 3: Month Vs. Energy Consumption Analysis

Power consumption is varied in months due to season variation.

4.4 Month vs. Total Cost Analysis



Figure 4: Month Vs. Total Cost Analysis

May Month EB cost is more due to more consumption.







4.5 Month vs. Demand Analysis

Figure 5: Month Vs. Demand Analysis

Max demand reached is 1219 kVA and contract demand is 1200 kVA. Suggested to provide Demand Controller to avoid demand penalty cost-Refer ECM 5.



4.6 Month vs. Power Factor Analysis

Figure 6: Month Vs. PF Analysis

Power Factor is maintained at 0.97 on average which is OK





5. LIGHTING SYSTEM

Lighting is a very significant aspect of utility. The efficiency, comfort factors and the quality of lighting should not be compromised.

70% lamps are replaced with LED lamps to reduce energy consumption.

SL NO	BUILDING	QTY	TOTAL WATTS	Operating Hours/day	kWh/day
1	AUDITORIUM	206	4487	8	36
2	SCIENCE BLOCK	435	5684	12	68
3	AERO BLOCK	573	6964	12	84
4	MAIN BLOCK	382	6252	12	75
5	MBA BLOCK	123	2597	12	31
6	FIRST YEAR BLOCK	217	4305	12	52
7	LIFE SCIENCE BLOCK	108	2828	12	34
8	NEW STAFF QUARTERS	383	5135	12	62
9	LADIES HOSTEL	664	8359	12	100
10	CAMPUS STREET LIGHT	286	8570	12	103
11	MEDICAL	35	589	12	7
12	PHARMACY	143	2575	12	31
13	GM OFFICE	47	910	8	7
14	MAIN CANTEEN	45	1042	12	13
15	VC OFFICE	100	620	8	5
16	VC VILLA	51	571	12	7
17	GUEST HOUSE	37	680	12	8
18	DRIVERS CABIN	8	120	12	1
19	OLD STAFF QUARTERS	53	1005	12	12
20	SPORTS LIGHTING	64	12800	8	102
21	HR OFFICE	27	500	8	4
22	PARANTS WAITING HALL	12	166	8	1
24	NEW ARCHITECTURE BLOCK	614	10808	12	130
25	CIVIL YARD CLASS ROOMS	40	650	12	8





SL NO	BUILDING	QTY	TOTAL WATTS	Operating Hours/day	kWh/day
26	CSB ROOM MENS HOSTEL	47	780	12	9
27	ROBOTICS LAB	22	280	12	3
28	RESEARCH SCHOLAR ROOM CHEMISTRY	4	144	12	2
29	FOOD WASTE MANAGEMENT PLANT	26	640	12	8
30	SOLAR STREET LIGHT	10	250	12	3
31	MENS HOSTEL	1007	13219	12	159
32	MBA PHASE 1	49	595	12	7
33	MBA PHASE 2	170	3108	12	37
34	COMPUTER SCIENCE LAB	51	690	12	8
35	PURCHASE OFFICE (EO)	2	30	8	0
36	CIIC BLOCK	328	5479	12	66
37	CIIC 2ND FLOOR STUDIO	13	225	12	3
38	DRAWING HALLS & LABS(MECH)	60	709	12	9
39	CANTEENS	119	1984	12	24
40	40 OUTDOOR LIGHTING		1306	12	16
	TOTAL	6624	117,656		1,334

It is suggested to replace FTL with LED at Men's hostel, Canteen and Drivers cabin to reduce power consumption. (Refer ECM- 1)

It is recommended to install additional Solar street lights in road to reduce power consumption (Refer ECM-9)

6. AIR CONDTIONERS

6.1 Introduction

.

In CRESCENT – Chennai using Split and Cassette type AC for comfort cooling. AC load is major one and around 1400 TR load is connected.





6.2 Study of AC

Set temperature of AC's are checked at various location. It is suggested to maintain AC temperature above 24°C. Old window AC's are available in campus. It is suggested to replace the AC with 5 star AC to reduce power consumption. (Refer ECM-7). Refer Annexure at the end of report for AC details.

7. Chiller

7.1 Introduction

In CRESCENT – Chennai using Chiller for Auditorium cooling. The following table gives the rated parameters

of Chiller.

Description	Unit	Chiller-1	Chiller-2
Make		Blue Star	Blue Star
Туре		Air Cooled	Air Cooled
Model		LCA1-090x54	LCA1-090x54
Cooling Capacity	TR	92	92
Chiller input power	kW	107	107
SEC	kW/TR	1.16	1.16
Refrigerant		R134a	R134a
Year		2012	2012

Chiller Pumps

				Rated P	aramete		
S.No	Description	Pump Make	Pump MakeDesign flow		Rated Power	Motor Make	Rated Motor Efficiency
			m3/h	m	kW		%
1	CH water pump- 1	Kirloskar	50.4	30	7.5	Kirloskar	89.0
2	CH water pump- 2	Kirloskar	50.4	30	7.5	Kirloskar	89.0
3	CH water pump- 3	Kirloskar	50.4	30	7.5	Kirloskar	89.0





7.2 Study of Chiller and Pumps

Old Air cooled Chillers have been replaced with new Chillers based on previous audit report. Normally 1 chiller with 1 chilled water circulation pump is in operation. 2nd Chiller and pump will ON based on occupancy in auditorium. 3rd pump is kept as standby.

During audit, 1 chiller and pumps parameters are measured. The measured parameters are as follows:

	Description	Units	Chiller-1	
	Chilled water temperature	Inlet	°C	14.5
	chined water temperature	Outlet	°C	13.0
	Chilled water program	Inlet	bar	2.2
	chined water pressure	Outlet	bar	2.1
	Refrigerant Suction pressure		psi	44
	Refrigerant Saturated suction	temperature	°C	9.3
	Evaporator Approach	°C	3.7	
	Measured pressure drop acro	Meter	1.0	
Evaporator	Chiller evaporator designed w	m³/h	55	
	Chiller designed pressure dro	Meter	0.4	
	Estimated chilled water flow the chiller based on pressure drop	m³/h	87	
	Calculated chiller load		TR	43
	Measured compressor input p	oower-R phase	kW	61
	Measured compressor input p	oower-Y phase	kW	62
	Measured compressor input p	oower-B phase	kW	62
	Average Compressor input po	ower	kW	62
	Chiller Specific Energy Cons	sumption	ikW/TR	1.43

*Chiller design SEC is 1.16 and actual is 1.43 kW/TR which is high due to part load running





Chilled Water Pumps:

*Water is pumped to circulate chilled water through AHU for cooling. The measured parameters are as follows:

		Meas	ured Par	ameters	Calculated Parameters			
S.No	Description	Flow	Head	Power Measured	Hydraulic Power	Motor Input Power	Pump Efficiency	
		m3/h	m	kW	kW	kW	%	
1	CH water pump- 1	87	18	8.8	3.16	7.83	40	

8. FANS

8.1 Introduction

In CRESCENT – Chennai using Ceiling fans at office and hostel room. Some fans are replaced with BLDC type and suggested to replace other fans with BLDC-Refer ECM 6.

9. RENEWABLE ENERGY

*6 no's Solar Water heater available in ladies hostel is not working and suggested to rectify to reduce heater power consumption-Refer ECM 2

*650 kWp Solar roof top panels were installed in the campus. Solar energy generation is low as compared with previous year. Also found that some panels are removed due to problem. It suggested to

rectify the problem-Refer ECM 4

*Solar street lights are available in campus and suggested to provide additional lights–Refer ECM 9.

*Explore the possibility of installing solar panels in other locations-Refer ECM-10





10 DIESEL GENERATORS

At CRESCENT – Chennai, 2 Diesel Generator sets of 750 kVA and 500 kVA capacities are used for power back-up during power failure. The specification of the DG's are listed in the below table.

Month wise power generation and Diesel consumption were recorded in log book by Campus. and the details are as follows:

		DG				
No	Months	Power generation (kW)	Diesel Consumption (Litres)	SEC		
1	Jan-23	2,952	780	3.8		
2	Feb-23	2,142	850	2.5		
3	Mar-23	1,322	600	2.2		
4	Apr-23	6,008	2,050	2.9		
5	May-23	16,699	5,990	2.8		
6	Jun-23	8,587	3,040	2.8		
7	Jul-23	4,275	1,745	2.4		
8	Aug-23	16,075	5,520	2.9		
9	Sep-23	8,217	1,890	4.3		
10	Oct-23	5,853	1,950	3.0		
11	Nov-23	4,046	1,190	3.4		
12	Dec-23	11,768	3,370	3.5		
	Total	87,944	28,975	3.0		

SEC has to be maintained above 3 kWh/Liter.





11. Pumps and Blower

11.1 Introduction

CRESCENT Chennai using pumps for domestic water pumping and Blowers for aeration. The following table gives the rated parameters of Pumps.

Description	Main l	block Pump	o room	Science Block
•	Pump: 1	Pump: 2	Pump: 3	Pump: 2
Pump Make	Beacon	Kirloskar	Crompton	Kirloskar
Total Head	35 m		36 m	
Rate of Flow			12 LPS	
Motor Make	Beacon	Kirloskar	Crompton	Kirloskar
Rated Power	5.5 kW	5.5 kW	5.5 kW	5.5 kW

11.2 Study of Pumps and blower

Pumps are old one and efficiency was low. Suggested to replace with new one -Refer ECM 8.

STP Blowers are running 24 hours for aeration purpose. Twin lobe blowers are used and suggested to replace with Tri-lobe blowers to reduce power consumption-Refer ECM 3

12. ENERGY CONSERVATION MEASURES

ECM1: Replace FTL Lamps with Energy Efficient LED Lamps

PRESENT SYSTEM

- Fluorescent tube lamps (FTL) are used at different locations in Campus
- Lamp efficacy is about 60-80 lumens/Watt
- FTLs have lamp life of < 8000 burning hours only
- Lumen depreciation Will be > 30% till end of life, leading to frequent maintenance & replacements
- Minimum voltage required is 180 V to ignite lamp







1x40 W Fluorescent Tube Lamp

PROPOSAL

- Replace all remaining FTL lamps with Energy Efficient LED lamps-Men's hostel, Canteen and Drivers cabin
- Longer lamp life than conventional lamps
- 50% reduction in energy consumption with constant luminous flux compared with conventional lamps

ESTIMATED BENEFITS

Recurring annual cost savings	: Rs 1, 80,480
Investment Cost	: Rs 1, 20,000
Payback period	: 8 Months

BACK-UP CALCULATION

Description	Units	Value
Power Consumption of FTL lamps	W	40
Power consumption of LED	W	20
Total no of Lamps	No	400
Lamps Glowing Hours	Hours/day	8
Operating Days(Approx.)	Days/ Annum	300
Expected Energy Savings	kWh/Annum	19,200
Energy Cost	Rs/kWh	9.4
Monetary Savings	Rs./ Annum	180,480
Investment Cost	Rs	120,000
Payback period	Months	8





ECM 2 Rectify Solar water heater at ladies hostel and reduce power consumption

PRESENT SYSTEM

- Solar water heaters (500 LPH) are available for ladies hostel hot water requirement
- 6 no's of Heater are not working and electric heater is used for bathing
- High power consumption



SOLAR WATER HEATER NOT IN SERVICE

PROPOSAL

- Rectify Solar water heaters or replace new one
- Heat the water from ambient temperature to 50°C
- This will save heater power consumption

ESTIMATED BENEFITS

Recurring annual cost savings	: Rs 1, 96,744
Investment Cost	: Rs 1, 80,000
Payback period	: 11 Months





BACK-UP CALCULATION

Description	Units	Value
Solar Water Capacity	Litre	500
No of heaters not working	No	6
Ambient temp	٥C	30
Hot water temperature from Solar heater	٥C	50
Equivalent Heat	kcal/day	60,000
Electricity saved	kWh/day	69.8
No. of days considered	Days	300
Annual electricity saving	kWh	20,930
Present Electricity cost	Rs./kWh	9
Recurring annual cost savings	Rs	196,744
Implementation cost	Rs	180,000
Payback period	months	11

ECM 3 Replace STP blower with new energy efficient blower & save power consumption

PRESENT SYSTEM

- 7.5 kW Twin lobe Blowers 2 no's are available for aeration air supply
- Blower efficiency is low
- It leads to high power consumption



Blower Twin lobe





PROPOSAL

- Replace existing Twin lobe blowers with Tri-lobe blowers
- Blower efficiency is high
- This will reduce power consumption.

ESTIMATED BENEFITS

Recurring annual cost savings	: Rs 2, 42,615
Investment Cost	: Rs 2, 50,000
Payback period	: 12 months

BACK-UP CALCULATION

Description	Units	Value
Measured air flow	m³/s	0.06
Measured static pressure	mmWc	4000
Measured input power	kW	6.6
Expected new Blower efficiency	%	70
Expected new Blower power consumption	kW	3.7
Power savings	kW	2.9
Annual operating hours	h	8760
Annual energy savings	kWh	25,810
Electricity cost	Rs/kWh	9.40
Recurring annual savings	Rs.	242,615
One time cost of implementation	Rs.	250,000
Payback period	Months	12

ECM 4 Rectify solar roof top panel and reduce EB power consumption

PRESENT SYSTEM

- Solar roof top panel of 650 kWp was installed in Campus.
- Presently 30 kWp is not working and power was not generated
- Power generation was low as compared to previous year
- EB power consumption is more.







SOLAR PANEL NOT AVAILABLE

PROPOSAL

- Rectify the panel problem by replacing new panel
- Solar additional power can be generated daily.
- This will save EB energy cost.

ESTIMATED BENEFITS

Recurring annual cost savings	: Rs 61,506
Investment Cost	: Rs 1, 00,000
Payback period	: 20 Months

BACK-UP CALCULATION

Description	Units	Value
Solar plant capacity	kW	650
Actual power generation by the Campus year 2023	kwh/Annum	663,189
Power generation by the Campus year 2021	kwh/Annum	671,229
Additional power to be generated	kwh/Annum	8,040
Unit Cost saving	Rs./kWh	7.65
Annual Cost Savings	Rs	61,506
Investment cost	Rs	100,000
Payback Period	Months	20





ECM 5: Provide Demand Controller and avoid Penalty

PRESENT SYSTEM

- Present contract demand with TNEB is 1200 kVA. Demand charges are Rs.562/kVA
- Demand charges are billed for actual demand reached or 90% of contract demand (1080 kVA), whichever is higher
- During May 2023, the demand was exceeded and reached to 1219 kVA

PROPOSAL

- Provide Demand Controller in Incomer panel
- This will give alarm when demand reached to set limit.
- Non-essential load can be switched OFF during excess time
- Or Enhance the contract demand by taking up with TNEB

ESTIMATED BENEFITS

Recurring annual cost savings	: Rs 21,120
Investment Cost	: Rs 40,000
Payback period	: 23 months

BACK-UP CALCULATION

Description	Units	Value
Present contract demand	kVA	1200
Maximum recorded demand (May 2023)	kVA	1219
Present penalty paid	Rs.	21,120
Recurring annual cost savings	Rs.	21,120
One time cost of implementation	Rs.	40,000
Payback period	months	23





ECM 6 Replace conventional fans with EE BLDC fans

PRESENT SYSTEM

- Ceiling fans are used at Campus and hostel areas.
- Conventional types are available.
- This leads to high power consumption



Ceiling Fan-Conventional

PROPOSAL

- Replace conventional fans into energy efficient BLDC fans-Men's hostel, Staff Quarters, Ladies hostel and Aero block
- BLDC fans consumes less energy
- This will reduce power consumption.

ESTIMATED BENEFITS

Recurring annual cost savings	: Rs 3, 55,320
Investment Cost	: Rs 10, 50,000
Payback period	: 35 Months





BACK-UP CALCULATION

Description	Units	Value
Total No of Fans identified for replacement	No	300
Present Power consumption of fan	W	70
Proposed EE fan power consumption	W	35
Savings	W	35
Annual Operating Hours	h	3,600
Annual Energy Savings	kWh	37,800
Electricity cost	Rs./kWh	9.4
Annual cost Savings	Rs	355,320
One time cost of implementation	Rs	1,050,000
Payback	Months	35

ECM -7: Replace old AC's with Energy efficient 5 star rated split AC and reduce power consumption

PRESENT SYSTEM

- Windows AC of 2 TR capacities are running at Library, Conference, LAB and seminar hall.
- Old AC SEC is high
- It leads to more power consumption.

PROPOSAL

- Replace existing window AC with 5 star rated split AC
- 5 Star rated ACs SEC is low
- This will reduce power consumption.

ESTIMATED BENEFITS

Recurring annual cost savings	: Rs 4, 23,000
Investment Cost	: Rs. 15, 00,000
Payback period	: 43 Months





BACK-UP CALCULATION

Description	Units	Value
Number of air conditioners	No	25
Installed cooling capacity	TR	2
Specific power consumption of present AC	kW/TR	1.3
Power consumption of present AC	kW	2.6
Specific power consumption of proposed AC	kW/TR	1
Expected power consumption with new AC	kW	2
Power savings	kW	0.6
Annual operating hours	h	3,000
Annual energy savings	kWh	45,000
Unit power cost	Rs./kWh	9.4
Annual cost savings	Rs.	423,000
One time cost of Implementation	Rs.	1,500,000
Payback period	Months	43

ECM 8 Replace domestic Water pumps with new pumps and reduce power consumption

PRESENT SYSTEM

- 5.5 kW rated capacity Water pumps are available in main block and science block for pumping water from sump to OH tank
- Pumps are old one and efficiency is low
- This leads to more power consumption.







OLD WATER PUMPS

PROPOSAL

- Replace main block and science block pumps with energy efficient pump.
- Provide water level controller
- This will reduce power consumption.

ESTIMATED BENEFITS

Recurring annual cost savings	: Rs 12,408
Investment Cost	: Rs 50,000
Payback period	: 48 Months





BACK-UP CALCULATION

Description	Units	Main block	Science	Total
Power consumption of existing pump	kWh	3.4	3.5	6.9
Power consumption of new pump	kWh	2.9	2.9	5.8
Expected Energy Savings	kWh	0.5	0.6	1.1
Run hours	Hours	4	4	
Working Days	Days	300	300	
Annual Energy Savings	kWh	600	720	1,320
Energy Cost	Rs/kWh	9.4	9.4	
Annual Cost Savings	Rs	5,640	6,768	12,408
Investment Cost	Rs	25,000	25,000	50,000
Payback Period	Months	53	44	48

ECM -09: Replace Street light with Solar powered light and reduce power consumption

PRESENT SYSTEM

- Presently Street lights are available in Campus for lighting purpose
- 30W LED lamps are used
- It leads to electricity power consumption.

PROPOSAL

- Provide additional Solar Street light in front of the roads.
- Install 10 no's of lights.
- This will reduce power consumption.

ESTIMATED BENEFITS

Recurring annual cost savings	: Rs 12,352
Investment Cost	: Rs 60,000
Payback period	: 58 Months





BACK-UP CALCULATION

Description	Units	Value
Power Consumption of Street lamps	W	30
No of lamps for replacement	No	10
Usage Hours	Hours/day	12
Present Power Consumption	kW/day	3.6
Proposed Power Consumption	kW/day	0
Savings	kWh/day	3.6
Operating Days(Approx.)	Days/ Annum	365
Expected Energy Savings	kWh/Annum	1,314
Energy Cost	Rs/kWh	9.4
Monetary Savings	Rs./ Annum	12,352
Investment Cost	Rs	60,000
Payback period	Months	58

ECM 10 Explore the possibility of Roof Top Solar PV to generate electrical energy

PRESENT SYSTEM

- 650 kWp Solar roof top panel was installed in Campus
- Presently Architecture block, Science block, Main block, Aerodynamic block, MBA block, Auditorium & CIIC area. Are having solar panels

PROPOSAL

- Explore the possibility to Install Solar Roof Top panel in identified areas- Substation, FM Lab etc.
- Possibility of generation of 300 kW power
- This will save EB cost.

ESTIMATED BENEFITS

Recurring annual cost savings	: Rs 25, 06, 140
Investment Cost	: Rs 1, 26, 00,000
Payback period	: 60 Months





BACK-UP CALCULATION

Description	Units	Value
Available roof-top area	m ²	3,000
Installable capacity of SPV generation	kWp	300
Proposed average power generation	kW/day	1260
No. of days considered	Days	260
Annual Electricity generation from solar PV	kWh	327,600
Present electricity unit cost	Rs./kWh	7.65
Recurring annual cost savings	Rs	2,506,140
One-time cost of implementation	Rs	12,600,000
Payback period	months	60

13. Recommendation and Conclusions

- On an energy bill of Rs 4, 53, 93, 934, around 9% of savings can be achieved by implementing all schemes.
- The annual savings potential is Rs 40, 11,685 which can be gained by investing Rs 1, 59, 50, 500 with an average payback period of 48 months.
- It is recommended to install dedicated energy meters and energy monitoring system before implementing the schemes. This is required for establishing the baseline as well as for measurement and verification of savings upon implementation of each scheme.
- CRESCENT CHENNAI to reconfirm the investments by obtaining site-specific offers covering performance guarantee for savings.
- The implementation of the evaluated schemes needs to be taken up for implementation in a time bound manner with in a period of two years.





14. ANNEXURE

14.1 AC Data

No.	Location	Make/Type	Star rating	TR Capacity	Quantity	Total TR	kWh/ day
1.	GROUND FLOOR	OG/VRF		14	1	14	56
2.	GROUND FLOOR	OG/SPLIT		1	2	2	16
3.	GROUND FLOOR	OG/SPLIT		2	2	4	32
4.	GROUND FLOOR	SANYO/SPLIT		2	1	2	16
5.	GROUND FLOOR	OG/CASSETTE		3	1	3	24
6.	GROUND FLOOR	OG/WINDOW		2	2	4	32
7.	GROUND FLOOR	DAIKIN/SPLIT	2	2	1	2	16
8.	GREEN ROOM	DAIKIN/CASSETTE	2	2	2	4	32
9.	1 ST FLOOR	OG/SPLIT AC	2	2	1	2	16
10.	1 ST FLOOR	DAIKIN SPLIT	5	1	1	1	8
11.	1 ST FLOOR	SANYO SPLIT		1	1	1	8
12.	1 ST FLOOR	OG CASSETTE		2	1	2	16
13.	1 ST FLOOR	SANYO SPLIT		2	5	10	80
14.	1 ST FLOOR	VESTAR SPLIT	3	2	1	2	16
15.	1 ST FLOOR	OG WINDOW		2	2	4	32
16.	2 ND FLOOR	BLUE STARCHILLER		100	2	200	800
17.	APPLE LAB	SPLIT AC		1.5	4	6	48
18.	SEMINAR HALL 1	OG VRF		10	2	20	80
19.	SEMINAR HALL 2	OGVRF		14	1	14	56
20.	SEMINAR HALL3	OG CASSETTE		3	6	18	72
21.	PLACEMENT OFF	OG SPLIT		1	6	6	48
22.	PLACEMENT OFF	OG CASSETTE		1	1	1	8
23.	PLACEMENT OFF	OG SPLIT		2	1	2	16
24.	MAIN BLOCK GF	DAIKIN SPLIT	3	1.5	4	6	48
25.	ACCOUNTS OFFICE	OG SPLIT		1	2	2	16
26.	DEAN OFFICE	OG SPLIT		2	1	2	16
27.	DEAN OFFICE	DAIKIN SPLIT	3	1.5	1	1.5	12
28.	CDOE	OG SPLIT		2	1	2	16





No.	Location	Make/Type	Star rating	TR Capacity	Quantity	Total TR	kWh/ day
29.	DEAN OFFICE	VESTAR SPLIT	3	2	1	2	16
30.	DEAN OFFICE	OG SPLIT		2	1	2	16
31.	OFFICE OF DEAN	OG WINDOW		2	1	2	16
32.	PG& RESE LAB	OG SPLIT		2	1	2	16
33.	DEEN OFFICE	OG SPLIT		2	1	2	16
34.	DR KAJA OFFICE	OG SPLIT		2	1	2	16
35.	KUTTI RANI	ONIDA SPLIT		1.5	1	1.5	12
36.		OG SPLIT		2	1	2	16
37.	1F/COM/LAB	OG/SPLIT		2	2	4	32
38.	CONFERENEE	OG/WINDOW		1.5	3	4.5	36
39.	SEMINER HALL	OG/SPLIT		2	2	4	32
40.	EEE HOD CABIN	DAIKIN/SPLIT	3	2	1	2	16
41.	Departm,library	OG/WINDOW		1.5	1	1.5	12
42.		OG/WINDOW		1.5	1	1.5	12
43.	2F, Process, comt, lab	OG/WINDOW		2	4	8	64
44.		OG/WINDOW		1.5	1	1.5	12
45.		Daikan/split		2	1	2	16
46.	EIE HOD	OG/SPLIT		2	1	2	16
47.	DEAN	OG/SPLIT		2	1	2	16
48.	SEMINER HALL	OG/SPLIT		2	2	4	32
49.	Computer,LAB	OG/WINDOW		2	2	4	32
50.	Computer,Hall	OG/WINDOW		2	2	4	32
51.	MIS	Vestar/split	3	2	3	6	48
52.	COE	OG/SPLIT		2	1	2	16
53.	COE/STRONG	OG/SPLIT		2	1	2	16
54.	ACOE	OG/Slit	3	2	1	2	16
55.	DCOE	OG/SPLIT		2	1	2	16
56.	3,F,Dept of civil eng	SANYO/SPLIT		2	2	4	32
57.	Power electr lab	OG/SPLIT	5	2	2	4	32
58.	Power electr lab	SANYO/SPLIT		2	1	2	16
59.	Automation lab	OG/SPLIT		2	2	4	32
60.	PG civil lab	SANYO/SPLIT		2	2	4	32





No.	Location	Make/Type	Star rating	TR Capacity	Quantity	Total TR	kWh/ day
61.	LSG cili lab	SANYO/SPLIT		2	3	6	48
62.	G,floor,ATM	Voltas/split		1.5	2	3	72
63.	BOOK STOR	DAIKAN/Split		1.5	2	3	24
64.	Telephon exch	OG/Split		2	1	2	48
65.	VC/OFFICS	DAIKAN/Split		2	1	2	16
66.	VC/OFFICS	OG/Casset		3	2	6	48
67.	VC/OFFICS	OG/Casset		2	2	4	32
68.	VC/OFFICS	OG/Casset	3	3	1	3	24
69.	VC/OFFICS	OG/Casset		1.5	2	3	24
70.	VC/OFFICS	Daikan/split	3	1.5	1	1.5	12
71.	VC/OFFICS	OG/split	3	1.5	1	1.5	12
72.	VC/OFFICS	OG/Split		1	1	1	8
73.	Mba/G/F metal, lab	OG/window		2	2	4	32
74.	Mechatronics, lab	OG/window		2	2	4	32
75.	Metrology lab	OG/window		2	2	4	32
76.	CIM LAB	OG/window		2	3	6	48
77.	Cad LAB	Onida/window		2	2	4	32
78.	Room122	Votes/window		2	1	2	16
79.	Polmer/lab	Votes/window		2	2	4	32
80.	Rescapch lab	OG/Split		1	1	1	4
81.	Sescapch lab	OG/Split		1	1	1	4
82.	Seminar hall	OG/window		2	2	4	16
83.	1,F,Class room101	OG/Split	3	2	5	10	80
84.	Libray	Daikan/split		2	2	4	32
85.	Seminar hall,offic	Og/vrv 1outdoor		10	1	10	80
86.	Computer lab	Og/vrv 1outdoor		10	1	10	80
87.	Lectur lab	Og/vrv 1outdoor		9	1	9	36
88.	Calss room 102	Daikin /split	5	2	5	10	80
89.	Sm104	OG/split	3	2	1	2	16
90.	Wideanglexpey	Sanyo /split		1.5	2	3	24
91.	Maths /Hot	Vestar/split	3	2	1	2	16
92.	Dean	Lancer/window		1.5	1	1.5	12
93.	Computer lab	OG/window		2	2	4	32





No.	Location	Make/Type	Star rating	TR Capacity	Quantity	Total TR	kWh/ day
94.	Calss room	Sanyo /split		1.5	2	3	24
95.	Calss room	OG/window		2	2	4	32
96.	Seminar hall	OG/vrv/1outdoor		14	1	14	112
97.	Seminar hall	Daikin/split/ducta	ble	5	1	5	40
98.	Depart of com	Daikin/split	4	1.5	1	1.5	12
99.	Life sci 5fl ass pro	OG/Split		2	2	4	32
100.	6f amimal lab2	OG/Split	3	1.5	2	3	24
101.	6f amimal lab1	Vrv/Daikin		1.5	2	3	24
102.	7Floor/Dean	OG/split		2	1	2	16
103.	LAB	Vrv/Daikin		16	1	16	128
104.	1year/G/F/HOD	Onida/split	3	1.5	1	1.5	12
105.	paysics	OG/Split		1.5	3	4.5	36
106.	Chemist HOD	OG/Split	3	2	1	2	16
107.	1Floor eng HOD	Sanyo/split		1.5	1	1.5	12
108.	2Floor/com/lab	OG/window		1.5	1	1.5	12
109.	Aero/G/Foor	OG/Split		2	1	2	16
110.	1floor	Daikin vrv		9	1	9	72
111.	Robo lab	Bluestar/ductabl		8.5	1	8.5	68
112.	2floor/cfd lab	Daikin/casset		3	2	6	48
113.	Conferen hall	Daikin/split	5	1.5	1	1.5	6
114.	Hod	Daikin/split	5	1.5	1	1.5	12
115.	3floor conferen hall	OG/split		2	1	2	16
116.	Hod	Daikin/split	5	1.5		0	0
117.	5floor	Vrv /daikin		12	1	12	96
118.	Comput/sc/G/F,it lab	OG/WINDOW		2	9	18	144
119.	IT HOD	OG/split		2	1	2	16
120.	SPPC LAB	OG/WINDOW		2	2	4	32
121.	Confenren hall	OG/split	5	2	2	4	32
122.	ісс	OG/split		1.5	1	1.5	12
123.	library	Sanyo /split		1.5	1	1.5	12
124.	1floor library	OG/split		2	4	8	64
125.	library	OG/split	3	1.5	1	1.5	12
126.	Lab 2	OG/WINDOW		2	5	10	80





No.	Location	Make/Type	Star rating	TR Capacity	Quantity	Total TR	kWh/ day
127.	Lab &ups	OG/WINDOW		2	2	4	32
128.	Boart room	Sanyo /split		1.5	1	1.5	6
129.	Dean room	Sanyo /split		1.5	1	1.5	12
130.	Scimc office dean	OG/WINDOW		2	3	6	48
131.	Cse semina hall	OG/split		2	2	4	32
132.	Csc Hod hall	OG/split		2	2	4	32
133.	Al&ml lab	OG/split	5	2	4	8	64
134.	Programming lab	OG/split	5	1.5	2	3	24
135.	Cybersecubity lab	OG/split	5	1.5	3	4.5	36
136.	Notworicng lab	OG/split	5	1.5	2	3	24
137.	Staff room	OG/window		1.5	1	1.5	12
138.	Ece hod	OG/window		2	1	2	16
139.	Seminar hall	OG/window		2	3	6	24
140.	Seminar hall	OG/window		1.5	2	3	12
141.	Seminar hall	Votes /window		1.5	1	1.5	6
142.	Computer cente	OG/window		2	2	4	32
143.	Computer cente	Vrf/vester		12	1	12	96
144.	Web lab	OG/casset		2	2	4	16
145.	Staff room	OG/split		2	1	2	16
146.	Lab	OG/casset		2	4	8	64
147.	Ca /nod	OG/Split	3	1	1	1	8
148.	Ca/ HOD	OG/window		2	1	2	16
149.	Seminar hall	Panasonic/casset		3	1	3	12
150.	Ca /lab-3	OG/window		2	2	4	32
151.	Ca /lab-2	OG/window		2	2	4	32
152.	CA/4	OG/window		2	4	8	64
153.	3floor computer lab	OG/vrv		10	1	10	80
154.	Embedded lab	OG/Split	3	2	3	6	48
155.	Embedded lab	Daikin/ductble		8.5	2	17	136
156.	Embedded lab	OG/casset		3	2	6	48
157.	Embedded lab	OG/Split		2	2	4	32
158.	Aivalok lab	OG/Split	5	2	1	2	16
159.	Vlsi lab	OG/Split	5	2	2	4	32





No.	Location	Make/Type	Star rating	TR Capacity	Quantity	Total TR	kWh/ day
160.	Lab view	OG/Split		2	4	8	64
161.	Hod	Sansua/window		1.5	1	1.5	12
162.	1,floor,Data center	OG/split		2	2	4	96
163.	Ground Data center	OG/split	3	2	1	2	48
164.	Data center	Emerson		6	2	12	288
165.	Main canteen D hall	NON-INVER		2	2	4	16
166.	Dining hall	OG/split		1.5	1	1.5	6
167.	Offices	OG/window		2	1	2	16
168.	Archist 2f st room	OG/split		2	1	2	16
169.	Dean office	Daikin /casset		3	1	3	24
170.	2floor,Cadlab	Bluestar /casset		8.5	1	8.5	68
171.	Csb block 4floor	Daikin/split	3	2	2	4	32
172.	Csb block 4floor	Daikin/split	3	2	1	2	16
173.	Csb block 4floor	Daikin /casset		8.5	5	42.5	340
174.	VC Villa	OG/split		1	4	4	16
175.	VC Villa	OG/split		2	7	14	56
176.	Con/materks&lab	OG/split		2	1	2	8
177.	Materil stor room	Sanyo/split		2	1	2	16
178.	Structures lab	Vestar/split	3	1.5	1	1.5	12
179.	Mens hostel A,block	Vrv /Daikin		14	2	28	112
180.	Mens hostel A,block	Vrv /Daikin		10	2	20	80
181.	B,block Gro floor	Sanyo/split		2	2	4	16
182.	B,block Gro floor	OG/split		1.5	2	3	12
183.	1,floor	Daikin/split	3	2	8	16	64
184.	2,floor	Daikin/split	3	2	5	10	40
185.	2,floor	Daikin/split	3	2	2	4	16
186.	2,floor	OG/split		2	6	12	48
187.	2,floor	OG/split		2	1	2	8
188.	PG block,3floor	OG/split		2	12	24	96
189.	Offices room	Daikin/split	3	1.5	1	1.5	6
190.	Offices room	OG/split	3	1.5	1	1.5	6
191.	3,floorT1&T2	OG/split	3	1.5	24	36	144
192.	PG,block CIIC,G,f	Vester/split		1.5	13	19.5	78





No.	Location	Make/Type	Star rating	TR Capacity	Quantity	Total TR	kWh/ day
193.	PG,block CIIC,G,f	LG/split	3	1.5	1	1.5	6
194.	PG,block CIIC,G,f	Daikin/split	3	1.5	2	3	12
195.	1 floor	Vester/split		1.5	14	21	168
196.	Est,off,res lab	Daikin/split	3	2	2	4	32
197.	PED	OG/split		1	1	1	8
198.	Ground floor	Daikin/split	2	1.5	1	1.5	12
199.	Ground floor	OG/split		2	1	2	16
200.	Ground floor	OG/split		1.5	3	4.5	36
201.	Ground floor	OG/split		2	2	4	32
202.	Ground floor	OG/split		1	1	1	4
203.	1,Floor	OG/split		2	5	10	40
204.	2,Floor	OG/split		2	1	2	8
205.	2,Floor	OG/window		1.5	2	3	24
206.	Pharmacy 1floo hod	Samsung/window		1.5	1	1.5	12
207.	2floor	OG/split		1.5	1	1.5	12
208.	men hos cold room	RE-techcold room		1.5	1	1.5	6
209.	Ladies host mi gr	Daikin/split		1.5	2	3	12
210.	Ground floor	OG/split		2	1	2	8
211.	Ground floor	Daikin/split,4star	4	1.5	1	1.5	6
212.	Ground floor	Daikin/split,2star	4	1.5	1	1.5	6
213.	2floor competr	OG/window		2	2	4	16
214.	3 floor	OG/split,3star	3	1.5	8	12	48
215.	Annex block G floor	Sanyo/split		2	3	6	24
216.	1 floor	OG/window		2	2	4	16
217.	2 floor	OG/split	3	1.5	13	19.5	78
218.	3 floor	OG/split	3	1.5	9	13.5	54
219.	3 floor	OG/split		2	4	8	32
220.	New block Gro floor	OG/split	3	1.5	1	1.5	6
221.	1floor	Daikin/split	3	1.5	1	1.5	6
222.	4 TO 8,Floor	Daikin/vrv		12	2	24	96
223.	3 Floor	OG/split	3	1.5	3	4.5	18
224.	4 ,Floor	OG/split	3	1.5	4	6	24
225.	5,Floor	OG/split	3	1.5	3	4.5	18





No.	Location	Make/Type	Star rating	TR Capacity	Quantity	Total TR	kWh/ day
226.	6,Floor	OG/split	3	1.5	4	6	24
227.	7,Floor	OG/split	3	1.5	3	4.5	18
228.	8,Floor	OG/split	3	1.5	4	6	24
	Total					1378	8748



Measurement at Panels

End of the Report



7.1: Source of Water, Storage and Distribution:

Table-5 shows the source of water, location of storage along with their application.

Type of Water	Source	Application		
Fresh Water	RO Water	Drinking application		
Bore Water	1. Science Block – 300 Ft			
	1. Ladies Hostel – 30 Ft			
Open Well	2. Mens Hostel – 40 Ft	Utensil Cleaning, Bathing, Cloth		
	3. Near Main Canteen – 30 Ft	Washing & Gardening		
Lorry Woter	1.150 Tankers/Month			
Lorry water	(10,000/Tank)			
	1.College/Life Science Block – 1			
	No			
	2.New Architecture Block – 1 No			
Doin Water	3.Computer Science Block – 1 No			
Kalli Walei	4.Pharmacy Block – 1 No	➔ Used to increase the ground water		
	5.MS Block – 5 No's	オ To store building run-off only		
(КШПЭ)	6.Ladies Hostel – 3 No's			
	7.New Staff Quarters – 6 No's			
	8.Mens Hostel – 18 No's			
	9.Library Block – 1 No			

Table-5: Source of Water, Location of Storage and Application

<u>7.2: Details of the Water Utilities, Storage, Motor Capacity and Approximate Run</u> <u>Hours:</u>

The following table provides the details of the Water Utilities, Storage, Motor Capacity and Approximate Run Hours available inside the college for regular application.

Table-6: Details of the Water Utilities, Storage, Motor Capacity and Approximate Run

Hours

S.	Loootion	Tank	Motor	II	
No.	Location	Capacity	Capacity	Usage	
1.	Main Building (UG Sump) (Lorry + Open well)	80 KLD	3 * 7.5 H.P/5 kW	Main Block 3,000 – Litters * 5 No's (Syntax) MBA Block 3,000 – Litters * 2 No's (Syntax) 1 st Year Block	
				3,000 – Litters * 4 No's (Syntax) Main Canteen 3,000 – Litters * 2 No's (Syntax)	
2.	Science Block	60 KLD		Science Block	

	(UG Sump)			3,000 – Litters * 4 No's (Syntax)	
	(Lorry + Open well			Pharmacy Block	
	+ Bore well)		2 * 7.5 H.P/5	3,000 – Litters * 2 No's (Syntax)	
			kW	GM Office	
				3,000 – Litters * 2 No's (Syntax)	
				Power Room	
				3,000 – Litters * 2 No's (Syntax)	
				A – Block	
	Mens Hostel 1	1,100 KLD (New Sump Room)	5 *	3,000 – Litters * 7 No's (Syntax)	
				B – Block	
			10 H P/7 5	3,000 – Litters * 6 No's (Syntax)	
3.	(Lorry + Open well)		kW + 2 * 7.5	C – Block	
				3,000 – Litters * 9 No's (Syntax)	
				D – Block	
				3,000 – Litters * 11 No's	
				(Syntax)	
	Mens Hostel - 1 (Lorry + Open well)	40 KLD (Main Block + Mess)	1 * 7.5 H.P/5	Main Block	
				3,000 – Litters * 10 No's	
4.			kW + 3 * 5	(Syntax)	
			H.P/3.7 kW	Mess	
		WICSS)		3,000 – Litters * 5 No's	
	Mens Hostel - 2 (Open well)		2 * 7.5 H.P/5 kW + 1 * 5 H.P/3.7 kW	Mosque	
		60 KLD (PG Block)		3,000 – Litters * 2 No's	
5				PG Block	
0.				3,000 – Litters * 6 No's	
				Incubation Block	
				3,000 – Litters * 4 No's	
6	Ladies Hostel	180 KI D	3 * 5 H.P/3.7	Main Block	
0.	(Lorry Water)	100 1122	kW	3,000 – Litters * 7 No's	
7.	Annuxer Block	30 Ft	1 * 5 H.P/3.7	RCC Tank	
	(Open well)		kW	15,000 Litters	
R.O Water					
1.	Main Building	Main Building Water Fro		Main Block – 3,000 Litter * 1 No	
	RO Plant	Syn	tax Tank	MBA Block – 3,000 Litter * 1 No	
2.	Science Block	Water From Science Block Syntax Tank		Science Block+Pharmacy	
	RO Plant			Block+Canteen – 3,000 Litters *	
				1 No	

3.	New Architech RO Plant	Water From New Architech Block UG Sump	New Architech – 3,000 Litters * 1 No
4.	Auditorium RO Plant	Water From New Architech Block UG Sump	Auditorium – 3,000 Litters * 1 No
5.	Old Staff Quaters RO Plant	Water From New Architech Block UG Sump	Old Staff Quarters – 3,000 Litters * 1 No
6.	Chanceller Villa RO Plant	Water From New Architech Block UG Sump	Chanceller Villa – 3,000 Litters * 1 No
7.	N.Staff Quaters RO Plant	Water From New Architech Block UG Sump	N.Staff Quaters – 3,000 Litters * 1 No
8.	MS Block RO Plant	Water From New Architech Block UG Sump	MS Block – 3,000 Litters * 1 No
9.	LS Block RO Plant	Water From LS Block UG Sump	LS Block – 3,000 Litters * 1 No
10.	Mens Hostel RO Plant	Water From New Sump Room	A,B,C,D Block – 3,000 Litters * 4 No's
11.	Mess + Main Block RO Plant	Water From Mess Block Syntax Tank	Mess + Main Block – 3,000 * 2 No's
12.	Ladies Hostel RO Plant	Water From New Block Cement Tank	New Block – 5,000 – RCC Tank

Note:

- Over Head (OH) tanks are made using Syntax.
- The maintenance team ensure to clean the tank for six months once.
- The Bleaching power is mostly used to clean the inside tank.

7.3: Treated Water for Drinking Application:

- The college management is keen on providing uninterrupted, safe and healthy drinking water to all; throughout the year.
- Water dispenser are provided at appropriate places offering the treated water for the students (Both Normal and Hot temperature)
- The overhead tanks storing the well water are cleaned at regular intervals and the water management team has been maintaining a cleaning schedule Utensil Cleaning, Bathing & Cloth Washing.


PVC and Metal Based Taping System for Water Distribution Line

7.4: Water Savings in Foreign Toilets:

• The list of availability of Indian & Foreign style toilets are presented in the below Table-7.

S. No.	Location	Description (Quantity)	
		Indian	Foreign
1.	Auditorium Block	29	16
2.	Main Block	24	6
3.	MBA Block (CBS)	11	8
4.	Science Block (CSE)	25	7
5.	Basic Science Block	27	5
6.	Pharmacy Department	19	6

• Table-7: List of Indian & Foreign Style Toilets

7.	Mechanical Science Block	-	89
8.	Life Science Block	-	37
9.	New Architecture Block	-	24
10.	Common Toilet Near Ground	-	10
11.	Arabic College & Hostel	44	-
12.	New Toilet Near MBA Block	-	18
13.	Estate Office	1	3
14.	Common Toilet in Sports Village	-	4
15.	Common Toilet Towards Men's Hostel	2	6
16.	Bio Toilet Near Security Cabin & Near DATA Centre	-	4
17.	CIIC Block	5	40
18.	Firest Year Canteen	-	4
Total		187	287

• In general, the flush tank capacity may be 8 to 10 Litres (depends on make and model). Water savings also leads to power saving it saves the operating duration of the water pumps directly.



7.5: Rain Water Harvesting (RWH) – from Building Roof Area & Run-off Area:

- The audit team appreciates the effects taken by the management of **B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE AND TECHNOLOGY** for harvesting the rain water almost in all buildings.
- The roof area is so arranged to collect the rainwater and then passed through proper piping system, and then bring back to the RWH pits which are located close to each pit
- The building run off are collected through each pit mostly located in each building. Common area and road run-off are properly collected and routed to nearby water body.



7.6: General Recommendations for Rain Water Harvesting:

- RWH has been fitted with their specifications indicating their i) year of installation, ii) approximate average rainfall and duration in the RWH location and iii) filter cleaning schedule (if any).
- Conduct a GIS based study on the improvement of ground water table especially before the rainy session and after rainy session. Compare the data and ensure that the water table improves due to percolation of rain water.
- Similar study mast be conducted (in future) before installing an RWH and after RWH.
- Increase the no. of RWH pits and may be developed to place at least 2 per building.



Sample Name Board in front a Rain Water Harvesting System

7.7: General Recommendations:

- → It is advisable to replace all the old taps without aerator into aerator-based taps in a phased manner.
- \rightarrow Aerators helps to reduce and regulate water flow and also offer the following benefits;
 - ✓ Lower Water Bills & Improved Water Pressure
 - ✓ Increased Filtration & Minimized Splashing

- All the pump motor must be fitted and controlled by floating sensor and hence the motors are automatically ON and OFF. It avoids the overflow; saves water and electrical energy.
- All the buildings are fitted with water flow meters & hence the water utilization must be properly accounted. Similar to the water flow meter; energy consumption of all pumping motors is recorded using panel board meters.
- Fault and leakage in the water distribution line will be promptly informed by the respective in-charges to the maintenance team and immediately arrested.

7.8: Installation on Fire extinguishers:

- The college has installed Fire extinguishers at all the vulnerable points.
- They are also refilled and in good condition (with adequate pressure indicated in the meter)







Sample Fire Extinguishers & First Aid Kit Placed in the College



GREEN CAMPUS RECOGNITIONS / AWARDS





Certificate

Certi No: AS/OCT/P1/23-18

District Eco-SDG Champion 2023

This is to certify and grade that B.S.Abdur Rahman Crescent Institute of Science and Technology is hereby recognized as District Eco-SDG Champion 2023 with Outstanding Performance Grade 'S' for Kanchipuram District District, Tamilnadu. The Institution has successfully demonstrated its support to Sustainable Development Goals and Social Responsibility by conducting and showcasing several Eco-SDG and Skill Development activities, thereby contributing to national development.

P.Gopal Rao COO- APEX SDG



APEX SDG (and its Consortium for District Eco-SDG Championship 2023 is a Facilitator for implementing Sustainable Development Goals (SDGs) in Higher Education Institutions, Industries, Corporates and Enterprises, and is registered under Ministry of Micro, Small and Medium Enterprises (MSME).

Sustainability in Industries/Corporates/Educational Institutions/Business Fraternities

Skilling through Internships APEX SDG



IGEN Board of Executives, pleased to elevate Dr. R. Zahira as Organizer for IGEN ENERGATHON 2023. You have to coordinate with your assigned Mentor for further execution of Volunteer work. Proud to be a part of IGEN ENERGATHON 2023 IGEN ENERGATHON 2023 is an EarthDay Indexed - Non Stop Sixteen Hour Marathon on Energy for Sustainability in Analysis and Recommendations for SDG7 and related UN Goals, scheduled on 27th May 2023. More action at https://Inkd.in/dstABgef





BEYOND THE CAMPUS ENVIROMENTAL PROMOTIONAL ACTIVITIES

Empowering Communities: Sustainable Technologies and Environmental Stewardship

In today's world, energy efficiency and clean energy practices are crucial for sustainable development and combating climate change. Local community outreach plays a vital role in educating residents on the importance of these concepts, equipping them with the knowledge and tools necessary to reduce their energy consumption and transition towards cleaner energy sources. Through targeted programs, communities can foster a sense of responsibility and agency in addressing energy issues, ultimately leading to a more sustainable future.

One of the primary objectives of local outreach programs is to raise awareness about energy efficiency. This involves organizing workshops, seminars, and information sessions that highlight the benefits of energy-saving techniques. Participants learn about simple yet effective measures, such as using energy-efficient appliances, implementing smart thermostats, and embracing renewable energy solutions like solar panels. By demystifying these concepts and presenting them in an accessible manner, outreach initiatives empower community members to take actionable steps toward reducing their energy consumption.

Moreover, hands-on training and demonstrations are effective strategies for engaging residents and promoting energy efficiency. Programs can include home energy audits, where trained volunteers assist families in identifying energy-wasting practices and suggest improvements. Furthermore, community energy challenges can stimulate friendly competition among residents, encouraging them to adopt energy-saving habits while fostering a sense of camaraderie. These interactive approaches not only educate participants but also create a supportive environment that motivates individuals to make lasting changes.

Lastly, collaboration with local governments, non-profit organizations, and businesses is crucial for the success of outreach initiatives. By leveraging resources and expertise, these partnerships can enhance the scope and impact of energy efficiency programs. Providing incentives, such as rebates for energy-efficient appliances, or organizing community events that promote local clean energy projects can further encourage participation. Ultimately, local community outreach for energy efficiency serves as a foundation for cultivating informed, engaged citizens committed to creating a sustainable future for their neighborhoods and beyond.

Activities:

- A. The Crescent Energy Club's Outreach Initiatives "Energy 99 An initiative to practice
 9 Energy Mantras" designed to reduce energy consumption and lower electricity costs
- B. Guest Lecture on "Sustainable Construction Technologies A Way Forward" Organized by Department of Civil Engineering
- C. Community Empowerment Through Tree Plantation Initiatives "Green Tamil Nadu" NSS, BSACIST jointly organized with the Government of Tamil Nadu
- D. "MeriLiFE Massive Tree Plantation Drive 2023 One Student One Tree" jointly organized with All India Council for Technical Education (AICTE)

A. Energy 99: Empowering Communities Through the 9 Energy Mantras – An Initiative"

The Crescent Energy Club, as outlined in the magazine, is dedicated to fostering a culture of sustainability and energy efficiency within the local community. Through various initiatives and events, the club aims to educate residents about the significance of energy conservation and the adoption of clean energy practices. By engaging with the community, the club not only raises awareness but also empowers individuals to make informed choices that contribute to a sustainable future.



Figure VII (4.1) – 1 : Crescent Energy Club – ECOGENZ Magazine

Educational Programs and Initiatives

One of the key programs highlighted is the "Energy 99" initiative, which focuses on educating local households in Mannivakkam village about energy conservation. The club's team visited over 100 homes, introducing residents to practical tips and the "9 Energy Mantras" designed to reduce energy consumption and lower electricity costs. This hands-on approach not only informs the community about energy efficiency but also encourages them to implement these practices in their daily lives, thereby fostering a sense of responsibility towards environmental stewardship.



Figure VII (4.1) – 2 : Crescent Energy Club – 9 Energy Mantras designed to reduce energy consumption and lower electricity costs

Community Engagement and Participation

The club's outreach efforts extend beyond mere education; they actively involve community members in various activities. This interactive approach not only raises awareness but also builds a network of individuals committed to environmental conservation, demonstrating the club's dedication to creating a collaborative community focused on energy efficiency.



Figure VII (4.1) – 3 : Crescent Energy Club – 9 Energy Mantras – Distribution of posters – Creating a collaborative community focused on energy efficiency

Impact and Future Directions

The outcomes of these outreach programs are significant, as they lead to increased knowledge and awareness of clean energy practices among community members. The Crescent Energy Club's initiatives have inspired many to adopt energy-efficient habits, contributing to a broader movement towards sustainability. Looking ahead, the club plans to continue its efforts by organizing more educational events and workshops, ensuring that the local community remains engaged and informed about the importance of energy efficiency and clean energy solutions. Through these ongoing initiatives, the Crescent Energy Club aims to create lasting change and promote a culture of sustainability within the community.

B. Community Empowerment through Sustainable Construction Technology Awareness

B.S. Abdur Rahman Crescent Institute of Science and Technology demonstrates a robust approach to local community outreach for energy efficiency through strategic educational initiatives. The institute organized a significant guest lecture on "Sustainable Construction Technologies – A Way Forward" delivered by Dr. Shweta Goyal from Thapar Institute of Engineering & Technology, highlighting the critical importance of sustainable development and energy-efficient practices. This event exemplifies the institution's commitment to spreading awareness about environmental conservation and innovative construction methodologies that minimize carbon emissions.

The lecture comprehensively addressed key sustainability challenges, emphasizing the concept of zero carbon and zero waste through practical strategies like reduce, reuse, and recycle. Dr. Goyal elaborated on critical aspects of carbon emission reduction, including the importance of energy-efficient infrastructure, utilization of low-carbon alternatives, material reuse, and waste minimization. By introducing advanced concepts such as Life Cycle Assessment (LCA) and highlighting emerging technologies like fiber-reinforced concrete and 3D printed buildings, the program provided local community members with cutting-edge insights into sustainable construction practices and their environmental implications.

The outreach program's primary objective was to educate participants about sustainable development that meets present needs without compromising future generations' capabilities. By focusing on practical solutions and innovative technologies, the institute created an interactive platform for knowledge dissemination, encouraging community members to understand and adopt energy-efficient practices. The lecture not only shared theoretical knowledge but also provided actionable strategies for reducing carbon emissions, thereby empowering local residents to contribute meaningfully to environmental conservation and sustainable urban development.



Figure VII (4.1) – 4 : Invitation for the Guest Lecture – Sustainable Construction Technologies – A way forward

The guest lecture on 'Sustainable Construction Technology – A way forward' was delivered by the guest speaker by Dr. Shweta Goyal, Professor, Department of Civil Engineering from Thapar Institute of Engineering & Technology, Patiala, Punjab, which was organised by Department of Civil Engineering, School of Infrastructure, and held on 27th July 2023 at Seminar hall, Department of Management Studies. The event was coordinated by Dr. Nisha Khanam Assistant Professor (SI. Gr), Department of Civil Engineering. The speaker initiated the talk by stating the contribution she has done in the construction industry pertaining to the sustainability through her research work and publications.



Figure VII (4.1) – 5 : Engaging Minds: A Workshop on Sustainable Technologies

The speaker highlighted about the sustainable development which is nothing but the development that meets the needs of the present, without compromising the ability of future generations to meet their own needs. In order to attain sustainability first the challenges faced by the industry must be studied. The challenges faced are cost, quality and time taken for the raw materials to be transformed to the final product.

The speaker further mentioned the importance of zero carbon and zero waste by the process of reduce, reuse, and recycle. Zero carbon emission can be divided into embodied and operational carbon. Embodied carbon emission is emitted during the construction and transportation process whereas operational carbon is emitted aftermath the construction.

To reduce the embodied carbon which contributes 49% of carbon the following steps are emphasized

- Energy efficient infrastructure
- Use low carbon alternatives
- Reuse materials
- Minimise waste

In order to understand the carbon emission, she briefed about LCA – Life Cycle Assessment which is a flow chart of carbon at different levels.

- Cradle to cradle from manufacturing till recycle
- Cradle to grave till demolition
- · Cradle to handover till building is hand overed
- To construction site carbon emission taking place till construction
- To gate carbon reduction at industry level

The steps that can be taken to initiate zero carbon and zero waste are by using supplementary cementitious materials, high performance material, utilization of waste for construction, extending the usable life of a structure. Further she briefed about fibre reinforced concrete, textile reinforced concrete and some new generation technology such as 3D printed buildings which can be implemented in future for sustainable development.

C. Community Engagement for Energy Efficiency and Environmental Sustainability – Collaboration with State Government

B.S. Abdur Rahman Crescent Institute of Science and Technology is committed to fostering a sustainable and energy-conscious community through various outreach programs focused on energy efficiency and clean energy solutions. In addition to educational initiatives, the institute actively participates in community service events, such as the recent tree plantation drive during N.S.S. Day celebrations. The N.S.S. unit planted 200 trees as part of the "Green Tamil Nadu" program, organized by the Tamil Nadu Government. This event, attended by over 300 volunteers and dignitaries including Chief Minister Thiru. M. K. Stalin, showcased the institute's commitment to environmental stewardship. Such activities not only promote awareness about energy efficiency and clean energy but also engage the local community in practical actions that contribute to sustainability and ecological balance. Through these combined efforts, B.S. Abdur Rahman Crescent Institute aims to empower residents with knowledge and inspire collective action towards a greener future.



Figure VII (4.1) – 6 : Community Empowerment Through Tree Plantation Initiatives – BSACIST Students

D. Community Outreach for Energy Efficiency Through Tree Plantation Drive – A Collaborative initiative with All India Council for Technical Education (AICTE)

B.S. Abdur Rahman Crescent Institute of Science and Technology actively participates in local community outreach aimed at promoting energy efficiency and clean energy practices. A notable initiative is the "MeriLiFE - Massive Tree Plantation Drive 2023," which encompasses the theme "One Student - One Tree." This program, organized by the All India Council for Technical Education (AICTE), encourages students to engage in tree planting as a means of fostering environmental stewardship and raising awareness about sustainable practices.

The tree plantation drive not only contributes to enhancing green cover but also serves as an educational opportunity for participants to learn about the significance of trees in reducing carbon footprints and improving air quality. The event saw enthusiastic participation from students and faculty, who gathered to plant trees and further the cause of sustainability. By combining the efforts of these outreach programs with hands-on activities like tree planting, the institute effectively promotes the importance of energy efficiency and clean energy within the community, encouraging a shift towards more sustainable living practices.



Figure VII (4.1) – 7 : MeriLiFE: Cultivating a Greener Future Through Student Engagement – One Student-One Tree