ENERGY AUDIT REPORT

MAR GREGORIOS COLLEGE OF LAW

THIRUVANANTHAPURAM

Executed by

OTTOTRACTIONS
Energy-Engineering-Environment

2021

OTTOTRACTIONS
Energy - Engineering - Environment
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Empanelled Accredited Energy Auditor: EmAEA-33
Bureau of Energy Efficiency,
Government of India.

Empanelled Energy Auditor: EMCEEA-0211F,
EMC (Energy Management Centre-Kerala)

ENERGY AUDIT REPORT

MAR GREGORIOS COLLEGE OF LAW

THIRUVANANTHAPURAM

Energy Audit Report
Mar Gregorios College of Law
Report No: EA 878
2021-December

Empaneled Accredited Energy Auditor, AEA 33
Bureau of Energy Efficiency
Government of India

Empaneled Energy Auditor, EMCEEA-0211F,
Energy Management Centre
Government of Kerala.

Authorized Energy Auditor, GEDA/ENC/EAC: Autho/2014/8/103/2316,
Gujarat Energy Development Agency
Government of Gujarat

Empaneled Energy Auditor, India SME Technology Services Ltd
A joint Venture of SIDBI, SBI, Indian Bank, Oriental Bank of Commerce
& Indian Overseas Bank

About OTTOTRACTIONS

OTTOTRACTIONS established in 2005, is an organization with proven track record and knowledge in the field of energy, engineering, and environmental services. They are the first Accredited Energy Auditor from Kerala for conducting Mandatory Energy Audits in Designated Consumers as per Energy Conservation Act-2001. Government of Kerala recognized and appreciated OTTOTRACTIONS by presenting its prestigious “The Kerala State Energy Conservation Award” for the best performance as an Energy Auditor.

Acknowledgment

We were privileged to work together with the administration and staff of Mar Gregorios College of Law, Thiruvananthapuram for their timely help extended to complete the audit and bringing out this report.

We thank the management of Mar Ivanios College for entrusting Ottotractions to conduct the audits in all its mentee institutes as part of its Paramarsh Scheme.

With gratitude, we acknowledge the diligent effort and commitments of all those who have helped to bring out this report.

We also take this opportunity to thank the bona-fide efforts of audit team for unstinted support in carrying out this audit.

We thank our consultants, engineers and backup staff for their dedication to bring this report.

Thank you.

B V Suresh Babu
Accredited Energy Auditor
AEA 33, Bureau of Energy Efficiency
For OTTOTRACTIONS

OTTOTRACTIONS
Energy | Engineering | Environment

Certification

This is to certify that

The data collection has been carried out diligently and truthfully;

All data monitoring devices are in good working condition and have been calibrated or certified by approved agencies authorised and no tampering of such devices has occurred;

All reasonable professional skill, care and diligence had been taken in preparing the energy audit report and the contents thereof are a true representation of the facts;

Adequate training provided to personnel involved in daily operations after implementation of recommendations; and

The energy audit has been carried out in accordance with the Bureau of Energy Efficiency (Manner and Intervals of Time for the Conduct of Energy Audit) Regulations, 2010.

This Certificate is issued to Mar Gregorios College of Law , Thiruvananthapuram on their request.

Dated this 20th day of December 2021.

SURESH BABU B V
ACCREDITED ENERGY AUDITOR (AEA 33)

OTTOTRACTIONS
AEA- 0033
EMPANELED ACCREDITED ENERGY AUDITOR, BEE

Empaneled Accredited Energy Auditor
Bureau of Energy Efficiency
AEA-33, Government of India.

Empaneled Energy Auditor
Government of Kerala.
EMCEEA-0211F, EMC - Kerala

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Executive Summary					
Consolidated Cost Benefit Analysis of Energy Efficiency Improvement Projects					
Mar Gregorios College of Law, Thiruvananthapuram					
Sl No	Projects	Investment	Cost saving	SPB	Energy saved
		(Lakhs Rs)	(Rs)/Yr	Months	kWh/Yr
1	Energy Saving in Lighting by replacing existing 27 No's T8 (40W) Lamps to 18W LED Tube	0.08	0.030	32.52	352
2	Energy Saving in Lighting by replacing existing 60 No's CFL(15W) Lamps to 9W LED Bulb	0.05	0.014	47.69	160
3	Energy Saving by replacing existing 357 No's in-Efficent ceiling fans with Energy Efficient Five star fans	10.71	0.539	238.47	6340
	Total	11	1	106	6852
(The saving are projected as per the assumed operation time observed based in the discussions with the plant officials. The data of saving percentages are taken from BEE guide books and field measurements.)					
4	Installation of 30kWp Solar Power Plant	22.50	3.26	82.88	38325
5	Installation of 15Kg/day Biogas plant	0.2	0.26	9.39	5647
	Total	22.70	3.51	46.14	43972

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Introduction

A detailed energy audit has been carried out at MAR GREGORIOS COLLEGE, THIRUVANANTHAPURAM by OTTOTRACTIONS in December 2021. During the energy audit energy saving opportunities has been identified to help improving energy efficiency of the facility. OTTOTRACTIONS is an Accredited Energy Auditor of Bureau of Energy Efficiency and Empaneled Energy Auditor of Energy Management Centre, Government of Kerala. The energy audit has identified energy conservation opportunities and recommended projects to improve energy efficiency of the facility.

This energy audit report complies with the clauses in *Energy Conservation Act, 2001* on mandatory energy audit (Form 4 [refer regulation 6(2)] guidelines for preparation of energy audit report) and complies with the G.O (Rt) No.2/2011/PD dated 01.01.2011 issued by Government of Kerala on mandatory energy audit.

1.1. General Building details and descriptions

The Malankara Syrian Catholic Major Archiepiscopal Church has a prominent role in the advancement of education in the State of Kerala especially in the last eight decades; it has established hundreds of primary, secondary and higher secondary schools, industrial training institutes and many professional colleges. Mar Gregorios College of Law (MGCL) was established in 2012 as another milestone in the glorious Mar Ivanios Vidyanagar Campus which was founded in 1949 by the Servant of God Archbishop Geevarghese Mar Ivanios. Mar Ivanios Vidyanagar, the educational campus, emerged from the educational vision of the Malankara Syrian Catholic Major Archiepiscopal Church in the State of Kerala.

The sprawling 43 hectares of verdant campus, abundant in natural beauty is the ideal learning environment. The campus is blessed with 17 centres of excellence in education. The campus has been named "Mar Ivanios Vidyanagar" in fond remembrance of Archbishop Mar Ivanios, the founder of Mar Ivanios College, the first educational institution in the campus. Other Institutions in the campus are, to name a few, Mar Baselios College of Engineering and Technology, Mar Theophilos Training College, Sarvodaya Schools (Both CBSE and ICSE) and Bethany Navajeevan College of Physiotherapy, etc.

The College is administered by the Major Archdiocese of the Malankara Syrian Catholic Major Archiepiscopal Church through the Malankara Catholic Educational Society of the Archdiocese of Trivandrum. Mar Gregorios College of Law was envisioned as a centre of excellence in legal education. The college was instituted in the name of His Grace Most Reverend Archbishop Benedict Mar Gregorios, who was the second Metropolitan Archbishop of the Malankara Syrian Catholic Major Archiepiscopal Church. The college is affiliated to the University of Kerala and recognized by the Bar Council of India.

Occupancy Details			
Particulars	2018-19	2019-20	2020-21
Total Students	812	880	892
Staffs	31	32	31
Total Occupancy of the college	843	912	923

For calculating specific energy consumption, the total built-up area is taken into account.

Energy audit team

The Energy Audit team is listed below. Besides this list various domine experts also participated in this project.

1. Suresh Babu B V, Accredited Energy Auditor, AEA 33
2. B. Zachariah, Chief Technical Consultant
3. Abin Baby, Project Engineer
4. Devan J, Project Engineer
5. Ajay Dev K, Project Engineer
6. Jomon J S, Project Engineer

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Process description

The energy audit has been carried out at Mar Gregorios College of Law, Thiruvananthapuram. The following is the baseline data of this building.

BASELINE DATA SHEET FOR GREEN AUDIT							
1	Name of the Organisation	Mar Gregorios College of Law, Thiruvananthapuram					
2	Address (include telephone, fax & e-mail)	Mar Ivanios Vidyanagar, Nalanchira, Thiruvananthapuram, Kerala, India, 695015 0471-2541120, 8089352686 info@mgcl.ac.in, mgcltvm@gmail.com					
2	Year of Establishment	2012					
3	Name of building and Total No. of Electrical Connections/building	Mar Gregorios College of Law [1]					
4	Total Number of Students	Boys	-	Girls	-	Total	880
5	Total Number of Staff	32					
6	Total Occupancy	912					
7	Total area of green cover	3 acre					
8	Type of Electrical Connection	HT	0	LT	1		
9	Contract Demand (KVA) /Connection	41.8					

10	Average Maximum Demand (KVA)	57					
11	Total built up area of the building (M^2)	7695					
12	Number of Buildings	1					
13	Average system Power Factor	-					
14	Details of capacitors connected	-					
15	Transformer Details (Nos., kVA, Voltage ratio)	TR 1					
15	DG Set Details (kVA,)	DG1	DG2	DG3	DG4	DG5	Remarks
		NA	NA	NA	NA	NA	NA
16	Details of motors	Rating		Nos.		Remarks	
		5 to 10		NA		NA	
		10 to 50		NA		NA	
		Above 50		NA		NA	
17	Brief write-up about the firm and the energy/environmental conservation activities already undertaken.	Installed Solar Power Plant, Biogas Plant , Nature Club					
18	Contact Person & Telephone number	Dr. John P C					
		8089352686					

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Energy and utility system description

3.1.1 Electricity

Electricity is purchased from KSEB under LT 6F 3Phase GENERAL tariff, the details are given below. One 125 kVA Diesel Generator is in operation at this campus

Electricity Connection Details		
Mar Gregorios College of Law, Thiruvananthapuram		
1	Name of the Consumer	Mar Gregorios College of Law, Thiruvananthapuram
		Nalanchira, Thiruvananthapuram
2	Tariff	LT-6F
3	Consumer Numbers	1145184020458
5	Connected Load Total	57kVA
6	Annual Electricity Consumption (kWh)	30096

3.2. Thermal Energy / Transportation

There are no buses operated in college for transportation. LPG is used for cooking in the canteen and diesel is used to operate Diesel Generators.

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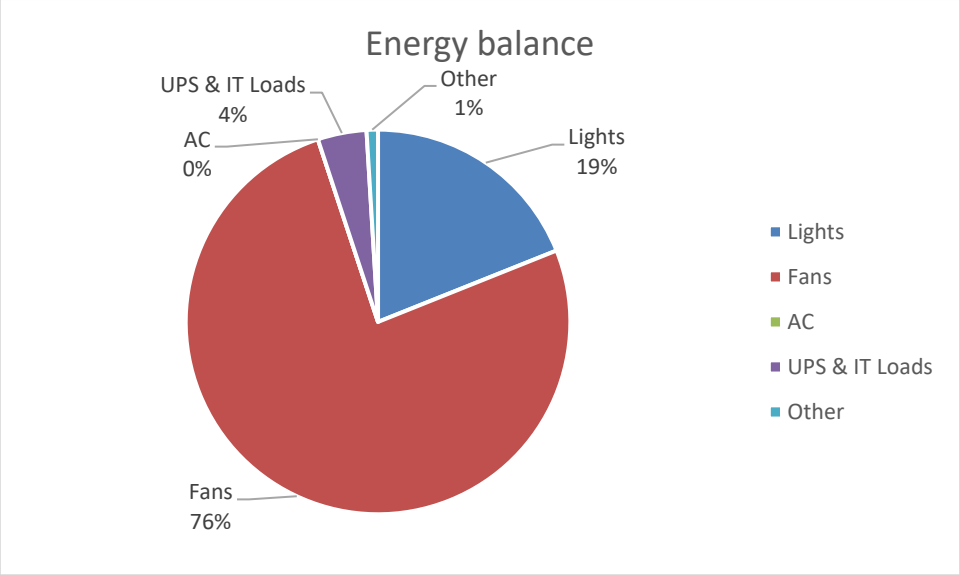
Energy Balance



76 % of the total energy consumed in this facility is used to operate Fans. Lighting uses 19% AC and IT Equipment uses 4%.

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Performance evaluation of major utilities and process equipment's/systems.

5.1. List of equipment and process where performance testing was done.

5.1.1. Electrical System

5.1.2. Lighting &Fans

5.2. Results of performance testing

5.2.1. Electrical System

The average unit cost of electricity is **8.5 Rs/kWh**. This is taken as the basis for the financial analysis of electrical energy efficiency projects. The information on average energy consumption is taken from the historical electricity bill analysis. The electricity is fed from a centralized substation.

Electricity Consumption

Electricity Bill Details										
Name of the Consumer				Mar Gregorious College of Law						
Connected Load (kW)				**57**	Consumer number		**1145184020458**			
Tariff				**LT-6F (Three Phase)**	Section		**Nalanchira**			
Month & Year	Monthly Consumption (kWh)	Average consumption (kWh)	Fixed charge (Rs)	Energy charge (Rs)	Duty (Rs)	Meter rent (Rs)	Extra fixed charge (Rs)	Extra energy charge (Rs)	Adjustment (Rs)	Total amount to be paid (Rs)
Jan-18	2298	2127	5040	20682	2068.2	17.7				28153
Jan-19	2508	2650	5040	22572.1	2257.2	17.7				29887
Jan-20	3570	3334	7980	32130.3	3213	36.7				43359

Observations

- PF shall be improved to unity, so that the maximum demand may be controlled.

Diesel

The campus has one Diesel Generator set in operation. The details of DG are given below.

Fuel Bill		
Year	Amount	Litre
2018-2019	166748	2423.31
2019-2020	133926	1845.98
2020-2021	9900	116.02

Diesel Bill		
Month & Year	Litre	Amount
Feb-18	33.25	2531.98
Jun-18	33.26	2532
Feb-20	28.66	2000

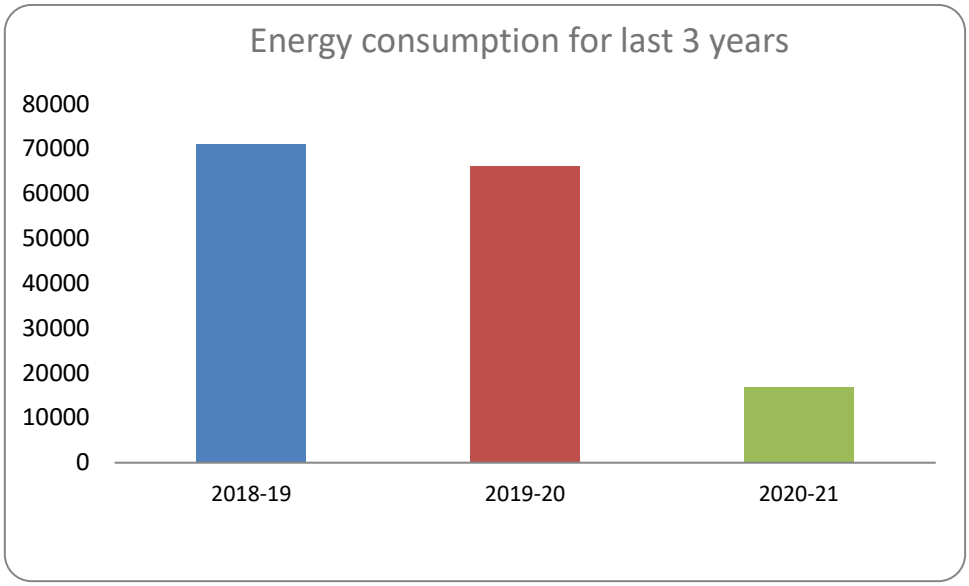
Petrol Bill		
Month & Year	Litre	Amount
May-18	3.31653	250
May-19	42.93	2863

LPG

LPG Consumption Details				
	2017-18	2018-19	2019-20	2020-21
No Cylinders In LAB	11	7	9	4
Laboratory LPG Consumption in kg	209	133	171	76
Canteen LPG Consumption in kg	912	866.4	798	114
Total in kg	1121	999.4	969	190

Base Line Energy Data				
Mar Gregorios College of Law, Thiruvananthapuram				
		2018-19	2019-20	2020-21
1	Electricity KSEB (kWh)	27576.00	30096.00	12852.00
2	Electricity Solar - Off grid (kWh)	0.00	0.00	0.00
3	Electricity (KSEB + Off grid) kWh	27576.00	30096.00	12852.00
4	Electricity Grid Tied (kWh)	0.00	0.00	0.00
5	Diesel (L)	2423.31	1845.98	116.02
6	LPG (kg)	999.40	969.00	190.00
7	Biogas (kg)	-	-	-

Energy Consumption Profile				
Sl No	Fuel	2018-19	2019-20	2020-21
		(kCal)		
1	Electricity	23715360	25882560	11052720
2	Diesel	25444761	19382812	1218212
3	LPG	11992800	11628000	2280000
4	Biogas	-	-	-
Total		61152921	56893372	14550932



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Energy efficiency in utility and process system

The specific energy consumption is normally taken as the ratio of total energy consumed to the total are of building.

OTTOTRACTIONS- ENERGY AUDIT				
Mar Gregorios College of Law, Thiruvananthapuram				
Energy Performance Index (EPI)				
Sl No	Particulars	2018-19	2019-20	2020-21
1	Total building area (m^2)	7695	7695	7695
2	Annual Energy Consumption (kCal)	61152921	56893372	14550932
3	Annual Energy Consumption (kWh)	71108.0	66155.1	16919.688
4	Total Energy in Toe	6.12	5.69	1.46
5	Specific Energy Consumption kWh/m^2	9.24	8.60	2.20

The Energy Performance Index (EPI)is

8.60kWh/m^2

This may be due to the lesser occupancy during pandemic shut downs, so the benchmark year may be taken as 2019-20. All the proposals for energy savings are prepared based on the data during 2019-20.

7

Evaluation of energy management system

Energy management policy

There is no written energy policy available, but environment policy is available which includes energy conservation also. A draft energy management policy is given below. The management may constitute an energy management policy and display the same in the plant to motivate the staff.

Mar Gregorios College of Law

ENERGY POLICY

(Draft)

We are committed to optimally utilize various forms of energy in a cost-effective manner to effect conservation of energy resources. We are committed to conserve the energy which is a scarce resource with the requisite consistency in the efficiency, effectiveness in the cost involved in the operations and ensuring that production quality and quantity, environment, safety, health of people are maintained. We are also committed to increase the renewable energy share of the total energy we use.

We are also committed to monitor continuously the saving achieved and reduce its specific energy consumption by minimum of 2% every year.

7.1. Energy management monitoring system

- **Energy Management Cell** has to be constituted with an objective to revise action plan for energy conservation thereby reducing the production cost.
- Energy conservation tips/ posters are displayed in crucial points.
- Use of renewable energy has to be encouraged.

7.2. Training to staff responsible for operational and Documentation.

- The staff and students need to be made more aware of the importance of energy saving and management.
- Log books shall be maintained to record Electricity Consumption and Diesel consumption.
- Meter reading shall be taken and compared with KSEB regularly.
- Better operating practices regarding appliances and fixtures should be taught to the staff.

7.3. Best Practices

- Have solid waste management program
- Conducted Green Audit.
- Have different social and environmental clubs
- Installed LED bulbs
- Conducted Energy Conservation Training Programs

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Energy Conservation Measures and Recommendations

OTTOTRACTIONS- ENERGY AUDIT						
Mar Gregorios College of Law, Thiruvananthapuram						
Greenhouse Gas Mitigation through Major Energy Efficiency Projects						
Sl No	Projects	Energy saved(Yearly)		Sustainability (Years)	First year ton of CO2 mitigated	Expected Tons of CO2 mitigated through out life
		(kWh)	MWh	Years		
1	Energy Saving in Lighting by replacing existing 27 No's T8 (40W) Lamps to 18W LED Tube	352	0.35	10	0.26	2.57
2	Energy Saving in Lighting by replacing existing 60 No's CFL(15W) Lamps to 9W LED Bulb	160	0.16	10	0.12	1.17
3	Energy Saving by replacing existing 357 No's in-efficient ceiling fans with Energy Efficient Five-star fans	6340	6.34	10	4.63	46.28
Total		6852	6.9	30.0	5.0	50.0

OTTOTRACTIONS- ENERGY AUDIT						
Mar Gregorios College of Law, Thiruvananthapuram						
Greenhouse Gas Mitigation through Renewable Energy Projects						
Sl No	Projects	Energy saved(Yearly)		Sustainability (Years)	First year ton of CO2 mitigated	Expected Tons of CO2 mitigated through out life cycle
		(kWh)	MWh	Years		
1	Installation of 30kWp Solar Power Plant	38325	38.33	25	27.98	699.43
2	Installation of 15Kg/day Biogas plant	5647	5.65	26	4.12	107.18
Total		43972	44	51	32	807

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 878.01	
Energy Saving in Lighting by replacing existing 27 No's T8 (40W) Lamps to 18W LED Tube	
Existing Scenario	
27 numbers of T8(40 W) lamps were identified during the energy audit field survey in the facility. During discussion with officers it is observed that the average utility of these fittings are of 30%.	
Proposed System	
The existing T8 may be replaced to LED Tube of 18W in phased manner and the savings will be of 55% (inclusive of improved light output and reduced energy consumption)	
Financial Analysis	
Annual working hours (hr)	1480
No of fittings	27
Total load (kW)	1.08
Annual Energy Consumption (kWh)	639
Expected Annual Energy saving for replacing all fittings (kWh)	352
Cost of Power	8.50
Annual saving in Lakhs Rs (1st year)	0.03
Investment required for complete replacements [@Rs 300 per fittings] (Lakhs Rs)	0.08
Simple Pay Back (in Months)	32.52

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 878.02	
Energy Saving in Lighting by replacing existing 60 No's CFL(15W) Lamps to 9W LED Bulb	
Existing Scenario	
36 numbers of CFL (15W) lamps were identified during the energy audit field survey in the facility. During discussion with officers it is observed that the average utility of these fittings are of 30%.	
Proposed System	
The existing CFL may be replaced to LED Bulb of 9W in phased manner and the savings will be of 40% (inclusive of improved light output and reduced energy consumption)	
Financial Analysis	
Annual working hours (hr)	1480
No of fittings	60
Total load (kW)	0.90
Annual Energy Consumption (kWh)	400
Expected Annual Energy saving for replacing all fittings (kWh)	160
Cost of Power	8.50
Annual saving in Lakhs Rs (1st year)	0.01
Investment required for complete replacements [@Rs 90 per fittings](Lakhs Rs)	0.05
Simple Pay Back (in Months)	47.69

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code 878.03	
Energy Saving by replacing existing 357 No's in-efficent ceiling fans with Energy Efficient Five star fans	
Existing Scenario	
There are 357 numbers of ceiling fans installed in the facilty with minimum 8 hrs a day operation. All are conventional type and most of them are very old.	
Proposed System	
There is an energy saving opportunity in replace the existing fans with new five star labelled fans.The five star labelled fans give a savings up to 30% with higher service value (air delivery/watt).	
Financial Analysis	
Annual working hours (hrs)	1480
Total numbers of ordinary fans	357
Total load (kW)	28.56
Annual Energy Consumption (kWh)	21134
Expected Annual Energy saving, for total replacement(kWh)	6340
Cost of Power (Rs)	8.50
Annual saving in Lakhs Rs (1st year)	0.54
Investment required for a total replacement (Lakhs Rs)[@3000 Rs per Fan with 50W at full speed]	10.71
Simple Pay Back (in Months)	238.47

Energy Saving Proposal Code 878.04	
Installation of 30kWp Solar Power Plant	
Existing Scenario	
There is a good potential of solar power electricity generation. The availability of sunlight is very high. There are some canopies available in the proposed site, but by having proper trimming of trees this may be avoided. If the SPVs are place in the roof top it will help improving RTTV (Roof Thermal Transmit Value) of the building.	
Proposed System	
It is proposed to have a Solar Power Plant of 30kW at the beginning stage. The state and central government is pushing and giving good assistance to the installation. It can be installed as an internal grid connected system which is much cheaper than off grid system. Now days the technology provides trouble free grid interactive and connected system. The installation will provide 25yrs trouble free generation with only 20% efficiency loss at the 25th year.	
Financial Analysis	
Proposed Solar installed Capacity (kW)	30
Total average kWh per day expected (3.5kWh/day average)	105.00
Total annual Generating Capacity (kWh)	38325
Cost of energy generated annually Lakhs Rs	3.26
Investment required (INR lakh)(Approx)	22.50
Simple Pay Back (in Months)	82.88
Life cycle in Yrs	25
Total Saving in Life Cycle (Approx) RS lakh	81.44

Sl.no	Installation of 15Kg/day Biogas plant	
1	Capacity of Bio gas plant(Kg/day)	15
2	Average Calorific Value of biogas (kCal/m3)	3500
3	Annual Generation of Biogas Plant	1387.5
4	Daily production of biogas (kCal)	26250
5	LPG Saving in a day (kg)	2.1875
6	Annual LPG Saving (Kg)	405
7	Investment required (in Lakhs)	0.2
8	Annual Cost saving (in Lakhs)	0.26
9	Expected Annual Energy saving (kWh)	5647
10	Simple Pay Back (In Months)	9.39

Technical Supplements

Mar Gregorios College of Law, Thiruvananthapuram																		
Sl. No	Location	LIGHTS								FAN				IT			AC		
		T5	T8	T12	ICL	CFL	LED T	LED B	SPOT LIGHT	CF	EF	WF	PC	Printer	Scanner	Projector	1	1.5	2
1	Office 1						2			2			2						
2	Office 2					10	2			9			6						
3	Corridor					1													
4	Library						16			11			15			1			
5	class						3			2									
6	class1					2	5			2								1	
7	206		4							6						1			
8	class		2							2			4						
9	207					7				7									
10	class		3							8									
11	uo									2									
12	u1						5			6									
13	11 classroom (Floor 1)						50			66									
14	11 classroom (Floor 2)						55			66									
15	11 classroom (Floor 3)						53			66									
TOTAL		0	27	0	0	60	247	0	0	357	0	0	81	0	0	6	0	3	0

Electricity Bill Details										
Name of the Consumer				Mar Gregorious College of Law						
Connected Load (kW)				**57**	Consumer number		**1145184020458**			
Tariff				**LT-6F (Three Phase)**	Section		**Nalanchira**			
Month & Year	Monthly Consumption (kWh)	Average consumption (kWh)	Fixed charge (Rs)	Energy charge (Rs)	Duty (Rs)	Meter rent (Rs)	Extra fixed charge (Rs)	Extra energy charge (Rs)	Adjustment (Rs)	Total amount to be paid (Rs)
Jan-18	2298	2127	5040	20682	2068.2	17.7				28153
Jan-19	2508	2650	5040	22572.1	2257.2	17.7				29887
Jan-20	3570	3334	7980	32130.3	3213	36.7				43359

KERALA STATE ELECTRICITY BOARD LIMITED

DEMAND CUM DISCONNECTION NOTICE

(As per Regulation 122 & 123 of Kerala Electricity Supply Code 2014)

Section	**[4518]-Electrical Section Nalanchira**	**Phone#**	0471-2531686	**Customer Care**	1912
Consumer#	**1145184020458**	Reg. Mob# **854xxxx262**		**Regular CC Bill**	**KSEBL GSTIN: 32AAECK2277NBZ1**

Name & Mailing Address

THE DIRECTOR

MAR GREGORIUS COLLEGE OF LAW

TC 11/2394(3)

For redressing complaints/grievance approach the concerned CGRF

South: Chairperson,CGRF(South),KSEB Ltd, Vydythi Bhavanam,Kottarakkara-691506, Ph:0474-2060220

Central: Chairperson,CGRF(Central),KSEB Ltd, Power House Building Ernakulam-682018, Ph:0484-2394288

North: Chairperson,CGRF(North),KSEB Ltd,Gandhi Road,Kozhikode-32, Ph:0495-2367820

State Electricity Ombudsman, Pallikkavil Building,Mamangalam, Edappally, Kochi-682024 Ph:0484-2346488

Bill#	**4518220100110**	**Bill Area**	M01/1	**DTR**	JAI MATHA
Billing Period	**1/2022**[Monthly]	**Tariff/Phase**	LT-6F/Three	**Pole#**	JM-28/5
Bill Date	**01-01-2022**	**Due Date**	**11-01-2022**	**DC Date**	**28-01-2022**
Contract Demand	**(Nil)** VA [75% : 0KV, 130% : 0KV]	**Connected Load**	57000 Watts	**Security Deposit**	Rs.57000.00

Meter#	GOE000050004337180	**Average consumption(Monthly)**	
Meter Digits	6.2	**Power Unit/Zone**	**CUMULATIVE**
Meter Type/Owner	TOD/KSEB	KWH	3750

Last Billed Rdg. Date	**Prev. Rdg. Date**	**Prev. Meter Rdg. Status**	**Prst. Rdg. Date**	**Prst. Meter Rdg. Status**
01-12-2021	**01-12-2021**	**Working**	**01-01-2022**	**Working**

Power Unit	**Zone**	**Trading**	**Initial Reading(IR)**	**Final Reading(FR)**	**OMF**	**Units***
KWH	Cumulative	Import	2278.00	2409.00	30	3930

Remarks :

Last Paid Amount - Rs.47516.00

Last Payment Date - 06-12-2021

			[INR] Amount(Rs.)
Bill Details			
a)	Fixed Charges	Fixed Charge[FC]	7980.00
		Sub Total	**7980.00**
b)	Energy Charges	Energy Charge[EC]	35370.00
		Sub Total	**35370.00**
c)	Other Charges	Electricity Duty[ED]	3537.00
		Meter Rent[MR]	30.00
		Sub Total	**3567.00**
d)	GST	MR-CGST	2.70
		MR-SGST	2.70
		Sub Total	**5.40**
e)	Round Off		-0.40
e)	**Total Amt.(Bill#4518220100110)** *(a+b+c+d+e)*		**46922.00**
f)	Surcharge		0.00
g)	Reconnection Fee		0.00
h)	Interim Bills		0.00
i)	Arrears		0.00
j)	Less paid/adj.		-0.00
k)	Less Advance		-0.00
	Net Payable*(e+f+g+h+i-j-k)*		**46922.00**

Demand for 1/2022 is Rupees Forty Six Thousand Nine Hundred and Twenty Two Only

E&OE ***Payment Options:*** *Cash,Cheque,DD,MO.* ***Online: www.kseb.in (Debit/Credit Cards,Net Banking)****. Other Platforms: BBPS,Friends,Akshaya,CSC,NACH*

Senior Superintendent

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GREEN AUDIT REPORT

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MAR GREGORIOS COLLEGE OF LAW

THIRUVANANTHAPURAM

2021

Executed by

OTTOTRACTIONS
Energy-Engineering-Environment

GREEN AUDIT REPORT

MAR GREGORIOS COLLEGE OF LAW

THIRUVANANTHAPURAM

Green Audit Report

Mar Gregorios College of Law

Report No: EA 877

2021-December

About OTTOTRACTIONS

OTTOTRACTIONS established in 2005, is an organization with proven track record and knowledge in the field of energy, engineering, and environmental services. They are the first Accredited Energy Auditor from Kerala for conducting Mandatory Energy Audits in Designated Consumers as per Energy Conservation Act-2001. Government of Kerala recognized and appreciated **OTTOTRACTIONS** by presenting its prestigious **"The Kerala State Energy Conservation Award 2009"** for the best performance as an Energy Auditor.

Acknowledgment

We were privileged to work together with the administration and staff of MAR GREGORIOS COLLEGE OF LAW for their timely help extended to complete the audit and bringing out this report.

We thank the management of Mar Ivanios College for entrusting Ottotractions to conduct the audits in all its mentee institutes as part of its Paramarsh Scheme.

With gratitude, we acknowledge the diligent effort and commitments of all those who have helped to bring out this report.

We also take this opportunity to thank the bona-fide efforts of audit team for unstinted support in carrying out this audit.

We thank our consultants, engineers and backup staff for their dedication to bring this report.

Thank you.

B V Suresh Babu
Accredited Energy Auditor
AEA 33, Bureau of Energy Efficiency

Preface

Educational institutions always had an important leadership role in society in demonstrating types of changes that used to occur with respect to the prime issues of the time. All around the world, educational institutions are taking steps to declare themselves the next carbon neutral school as a part of the global trend of becoming sustainable. In 2007, Victoria University School of Architecture and Design declared themselves the first carbon neutral campus in the world through the purchase of carbon credits. This concept is not a sustainable model as it does not guarantee the capture of carbon forever and also it is expensive.

The potential for any academic institution- (may be a school in a remote village or a university in an urban setting) - to become the driver for change is huge. Its role of practicing leadership in its community can be utilized to encourage and influence carbon neutral living.

The biggest factors that contribute towards emission are Energy, Transportation and Waste. Any reduction in the carbon emission by the above sectors, starts with the behavioral changes (Low cost) and/or technological investments (High cost). In order to make these changes, the students are to be educated properly on the concept of carbon neutral campuses and methods to reduce it.

In India, the concept of carbon neutral campuses is gaining momentum. Green Audit in Campuses measures the amount of Green House Gases (GHG) emissions produced as a result of its operations through an accounting like inventory of all the sources of GHGs and carbon sequestration in the school campus. Based on this, the total carbon footprint is estimated. Measures are recommended to bring down the carbon footprint of the campus and to make it a carbon neutral campus.

B Zachariah

Director, OTTOTRACTIONS

Contents

OTTOTRACTIONS
Energy Engineering Environment

1

Introduction

Background

All across the developed countries, educational institutions are now moving to a sustainable future by becoming carbon neutral and greener spaces. They are taking responsibility for their environmental impact and are working to neutralize those effects. To become carbon neutral, institutions are working to reduce their emissions of greenhouse gases, cut their use of energy, use energy efficient equipment, use more renewable energy, plant and protect green cover and emphasize the importance of sustainable energy sources. Institutions that have committed to becoming carbon neutral have recognized the threat of global warming and are therefore committing to reverse the trend. Studies on this line has not struck roots in most of the developing countries- especially among students.

The Sustainable Development Goals (SDGs), launched by the United Nations in 2015, are an excellent vehicle for driving this change. They represent an action plan for the planet and society to thrive by 2030. The SDGs provide a window of opportunity for creating multidimensional operational approaches for climate change adaptation. They address poverty, hunger and climate change, among other issues central to human progress and sustainable development, such as gender equality, clean water and sanitation, and responsible consumption and production.

The Green Audit of Mar Gregorios College of Law, Thiruvananthapuram aims to assist campus to reduce their carbon footprint and educate tomorrow's leaders about strategies for carbon mitigation using their campus as a model. Also, this audit covers institutes

responses towards SDGs by covering SDG 3,6,7,11,13,15. The green audit also aims to educate students and teachers on the concept of carbon footprint and to enable the students to collect data pertaining to the carbon emissions and carbon sequestration in their campus and to calculate the specific carbon footprint of the campus.

The project also suggests plans to make the campus carbon neutral or even carbon negative by implementing carbon mitigation strategies in areas such as,

a. Energy
b. Transportation
c. Waste minimisation
d. Carbon Sequestration etc.

The major objectives of the audit are:

- To make aware students and teachers on the concept of carbon footprint.
- To calculate the specific carbon footprint of the campus and classify it as carbon negative, neutral or positive.
- To create carbon mitigation plans to reduce their footprint based on the data generated.

Mar Gregorios College of Law

The Malankara Syrian Catholic Major Archiepiscopal Church has a prominent role in the advancement of education in the State of Kerala especially in the last eight decades; it has established hundreds of primary, secondary and higher secondary schools, industrial training institutes and many professional colleges. Mar Gregorios College of Law (MGCL) was established in 2012 as another milestone in the glorious Mar Ivanios Vidyanagar Campus which was founded in 1949 by the Servant of God Archbishop Geevarghese Mar Ivanios. Mar Ivanios Vidyanagar, the educational campus, emerged from the educational vision of the Malankara Syrian Catholic Major Archiepiscopal Church in the State of Kerala. The sprawling 43 hectares of verdant campus, abundant in natural beauty is the ideal learning environment. The campus is blessed with 17 centres of excellence in education. The campus has been named “Mar Ivanios Vidyanagar” in fond remembrance of Archbishop Mar Ivanios, the founder of Mar Ivanios College, the first educational institution in the campus. Other Institutions in the campus are, to name a few, Mar Baselios College of Engineering and Technology, Mar Theophilos Training College, Sarvodaya Schools (Both CBSE and ICSE) and Bethany Navajeevan College of Physiotherapy, etc.

The College is administered by the Major Archdiocese of the Malankara Syrian Catholic Major Archiepiscopal Church through the Malankara Catholic Educational Society of the Archdiocese of Trivandrum. Mar Gregorios College of Law was envisioned as a centre of excellence in legal education. The college was instituted in the name of His Grace Most Reverend Archbishop Benedict Mar Gregorios, who was the second Metropolitan Archbishop of the Malankara Syrian Catholic Major Archiepiscopal Church. The college is affiliated to the University of Kerala and recognized by the Bar Council of India.

Occupancy Details			
Particulars	2018-19	2019-20	2020-21
Total Students	812	880	892
Staffs	31	32	31
Total Occupancy of the college	843	912	923

For calculating per capita carbon emission estimation, only the student strength is taken into account.

BASELINE DATA SHEET FOR GREEN AUDIT											
1	Name of the Organisation	Mar Gregorios College of Law, Thiruvananthapuram									
2	Address (include telephone, fax & e-mail)	Mar Ivanios Vidyanagar, Nalanchira, Thiruvananthapuram, Kerala, India, 695015 0471-2541120, 8089352686 info@mgcl.ac.in, mgcltvm@gmail.com									
2	Year of Establishment	2012									
3	Name of building and Total No. of Electrical Connections/building	Mar Gregorios College of Law [1]									
4	Total Number of Students	Boys	-	Girls	-	Total	880				
5	Total Number of Staff	32									
6	Total Occupancy	912									
7	Total area of green cover	3 acre									
8	Type of Electrical Connection	HT	0	LT	1						
9	Contract Demand (KVA) /Connection	41.8									
10	Average Maximum Demand (KVA)	57									
11	Total built up area of the building (M^2)	7695									
12	Number of Buildings	1									
13	Average system Power Factor	-									
14	Details of capacitors connected	-									
15	Transformer Details (Nos., kVA, Voltage ratio)	TR 1	NA								
		NA	NA								
15	DG Set Details (kVA,)	DG1	DG2	DG3	DG4	DG5	Remarks				
		125	NA	NA	NA	NA	NA				
16	Details of motors	Rating		Nos.		Remarks					
		5 to 10		NA		NA					
		10 to 50		NA		NA					
		Above 50		NA		NA					
17	Brief write-up about the firm and the energy/environmental conservation activities already undertaken.	Installed Solar Power Plant , Biogas Plant , Nature Club									
18	Contact Person & Telephone number	Dr. John P C									
		8089352686									

2

METHODOLOGY

2.1. Sensitisation

Low Carbon campus initiatives are successful when everyone in the campus is engaged including students, teachers and staff. A team of students, teachers and staff were formed to participate in the audit. A sensitisation among students and teachers on the concept of carbon footprint was conducted.

During the audit the students and staffs were sensitised on the project and trained to be a part of the data collection team. This helped in conducting the survey in a participatory mode so that the awareness will penetrate to the grass root level. During the data collection field visited was stressed that the team will spread these ideas to their homes and friends. This will help in a horizontal and vertical spread of the message to a wider group. It is assumed that through 1375 occupants of this campuses will reach same number of households. This message will spread to at least 5500 individuals approximately.

2.2 Estimation of carbon footprint

A carbon footprint is the amount of greenhouse gases—primarily carbon dioxide—released into the atmosphere by a particular human activity. A carbon footprint can be a broad measure or be applied to the actions of an individual, a family, an event, an organization, or even entire nation. It is usually measured as tons of CO_2 emitted per year, a number that can be supplemented by tons of CO_2-equivalent gases, including methane, nitrous oxide, and other greenhouse gases.

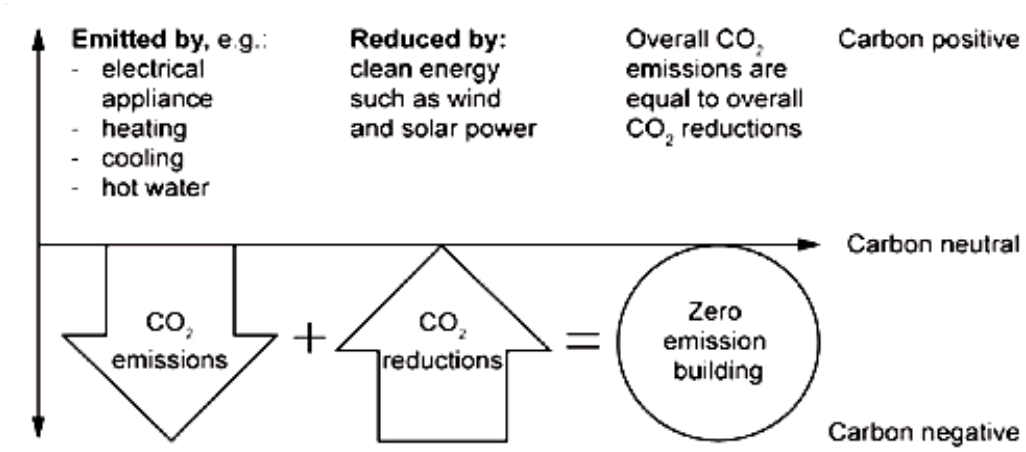
Global Warming Potential (GWP) is a measure of how much heat a greenhouse gas traps in the atmosphere up to a specific time horizon, relative to carbon dioxide. The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of one ton of a gas will absorb over a given period of time, relative to the emissions of one ton of carbon dioxide (CO_2).

Global Warming Potentials (IPCC Second Assessment Report)					
Species	Chemical formula	Lifetime (years)	Global Warming		
			20 years	100 years	500 years
Carbon dioxide	CO2	variable §	1	1	1
Methane *	CH4	12±3	56	21	6.5
Nitrous oxide	N2O	120	280	310	170
HFC-23	CHF3	264	9100	11700	9800
HFC-32	CH2F2	5.6	2100	650	200
HFC-41	CH3F	3.7	490	150	45
HFC-43-10mee	C5H2F10	17.1	3000	1300	400
HFC-125	C2HF5	32.6	4600	2800	920
HFC-134	C2H2F4	10.6	2900	1000	310
HFC-134a	CH2FCF3	14.6	3400	1300	420
HFC-152a	C2H4F2	1.5	460	140	42
HFC-143	C2H3F3	3.8	1000	300	94
HFC-143a	C2H3F3	48.3	5000	3800	1400
HFC-227ea	C3HF7	36.5	4300	2900	950
HFC-236fa	C3H2F6	209	5100	6300	4700
HFC-245ca	C3H3F5	6.6	1800	560	170
Sulphur hexafluoride	SF6	3200	16300	23900	34900
Perfluoromethane	CF4	50000	4400	6500	10000
Perfluoroethane	C2F6	10000	6200	9200	14000
Perfluoropropane	C3F8	2600	4800	7000	10100
Perfluorobutane	C4F10	2600	4800	7000	10100
Perfluorocyclobutane	c-C4F8	3200	6000	8700	12700
Perfluoropentane	C5F12	4100	5100	7500	11000
Perfluorohexane	C6F14	3200	5000	7400	10700

The methodology for carbon footprint calculations are still evolving and it is emerging as an important tool for green house management. In the present study carbon emission data from the campus is estimated under four categories viz.

a. Energy
b. Transportation
c. Waste minimisation
d. Carbon Sequestration

Carbon neutrality refers to achieving net zero GHG emission by balancing the measured amount of carbon released into atmosphere due to human activities, with an equal amount sequestrated in carbon sinks. It is crucial to restrict atmospheric concentrations of GHGs released from various socio-economic, developmental and life style activities using biological or natural processes. It is recognized that addressing climate change is not as simple as switching to renewable energy or offsetting GHG emissions. Rather, providing an opportunity for innovation in new developmental activities for viable and effective approach to address the problem.



Energy

In the campus carbon emission from energy consumption is categorised under two headings viz. energy from Electrical and Thermal. Energy used for transportation is calculated under transportation sector.

A detailed energy audit is conducted to understand the energy consumption of the campus. Information on total connected loads, their duration of usage and documents like electricity bills are evaluated. Connected loads are calculated by conducting a survey on electrical equipment on each location. Duration of usage was found out by surveying the users. The survey of equipment was conducted in a participatory mode.

The fuel consumption for cooking, like LPG was studied by analysing the annual fuel bills and usage schedules during the study. Discussions were carried out with the concerned individuals who actually operate the cooking system.

Transportation

There is no vehicles operates from campus for its logistics.

Carbon emission from transportations be calculated by using the following formula:

Carbon Emission = Number of each type of vehicles × Avg. fuel consumed per year ×

Emission factors (based on the fuel used by the vehicle)

Waste Minimisation

The waste generated from the campus is also responsible for the greenhouse gas emission. So, in order to calculate the total carbon foot print of the campus it is necessary to estimate the greenhouse gas emission from the waste generated in the campus by the activity of the students, teachers and staffs.

The calculation of the waste generated has been conducted by keeping measuring buckets for collecting the waste generated in a day. This waste so generated was calculated by weighing it.

Carbon Sequestration

Carbon sequestration is the process involved in the long-term storage of atmospheric carbon dioxide. Trees remove carbon dioxide from the atmosphere through the natural process of photosynthesis and store the carbon in their leaves, branches, stems, bark, and roots.

Carbon sequestrated by a tree can be found out by using different methods. Since this study is employed the volumetric approach, the calculation consists of five processes.

- Determining the total weight of the tree
- Determining the dry weight of the tree
- Determining the weight of carbon in the tree
- Determining the weight of CO_2 sequestrated in the tree
- Determining the weight of CO_2 sequestrated in the tree per year

Detailed calculations and results are given in the technical supplements of this document.

3

RESULTS & DISCUSSIONS

3.1 CARBON FOOTPRINT ESTIMATION

3.1.1 ENERGY

a. Electricity

Electricity is purchased from KSEB under 1 LT Connections, the details are given below.

Electricity Connection Details		
Mar Gregorios College of Law, Thiruvananthapuram		
1	Name of the Consumer	Mar Gregorios College of Law, Thiruvananthapuram Nalanchira, Thiruvananthapuram
2	Tariff	LT-6F
3	Consumer Numbers	1145184020458
5	Connected Load Total	57kW
6	Annual Electricity Consumption (kWh)	30096

Electricity Bill Analysis (from 2018 to 2020)

Electricity Bill Details							
Name of the Consumer				Mar Gregorious College of Law			
Connected Load (kW)				**57**	Consumer number		
Tariff				**LT-6F (Three Phase)**	Section		
Month & Year	Monthly Consumption (kWh)	Average consumption (kWh)	Fixed charge (Rs)	Energy charge (Rs)	Duty (Rs)	Meter rent (Rs)	Total amount to be paid (Rs)
Jan-18	2298	2127	5040	20682	2068.2	17.7	28153
Jan-19	2508	2650	5040	22572.1	2257.2	17.7	29887
Jan-20	3570	3334	7980	32130.3	3213	36.7	43359

b. Diesel

Diesel Bill		
Month & Year	Litre	Amount
Feb-18	33.25	2531.98
Jun-18	33.26	2532
Feb-20	28.66	2000

c. Petrol

Petrol Bill		
Month & Year	Litre	Amount
May-18	3.31653	250
May-19	42.93	2863

Fuel Bill		
Year	Amount	Litre
2018-2019	166748	2423.31
2019-2020	133926	1845.98
2020-2021	9900	116.02

d. LPG

LPG Consumption Details				
	2017-2018	2018-19	2019-20	2020-21
No Cylinders In LAB	11	7	9	4
Laboratory LPG Consumption in kg	209	133	171	76
Canteen LPG Consumption in kg	912	866.4	798	114
Total in kg	1121	999.4	969	190

Base Line Energy Data				
Mar Gregorios College of Law, Thiruvananthapuram				
		2018-19	2019-20	2020-21
1	Electricity KSEB (kWh)	27576.00	30096.00	42840.00
2	Electricity Solar - Off grid (kWh)	0.00	0.00	0.00
3	Electricity (KSEB + Off grid) kWh	27576.00	30096.00	42840.00
4	Electricity Grid Tied (kWh)	0.00	0.00	0.00
5	Diesel (L)	2423.31	1845.98	116.02
6	LPG (kg)	999.40	969.00	190.00
7	Biogas (kg)	-	-	-

Energy Consumption Profile				
Sl No	Fuel	2018-19	2019-20	2020-21
		(kCal)		
1	Electricity	23715360	25882560	36842400
2	Diesel	25444761	19382812	1218212
3	LPG	11992800	11628000	2280000
4	Biogas	-	-	-
Total		61152921	56893372	40340612

Thermal Fuel Consumption			
Mar Gregorios College of Law, Thiruvananthapuram			
	2018-19	2019-20	2020-21
Annual LPG consumption in kg	999.4	969	190
Annual Diesel consumption in L	2423.31	1845.98	116.02
Annual petrol consumption in L	3.3	42.9	0
Annual Biogas consumption in m3	-	-	-

Diesel consumption	
Year	Cost
2018-19	166748
2019-20	133926
2020-21	9900

Specific Energy Consumption

OTTOTRACTIONS- ENERGY AUDIT				
Mar Gregorios College of Law, Thiruvananthapuram				
Energy Performance Index (EPI)				
Sl No	**Particulars**	2018-19	2019-20	2020-21
1	Total building area (m^2)	7695	7695	7695
2	Annual Energy Consumption (kCal)	61152921	56893372	40340612
3	Annual Energy Consumption (kWh)	71108.0	66155.1	46907.688
4	Total Energy in Toe	6.12	5.69	4.03
5	Specific Energy Consumption kWh/m^2	9.24	8.60	6.10

In 2020-21 the energy consumption was less due to lock down based on covid 19 pandemic. So the specific energy consumption in 2019-20 may be taken as benchmark.

3.3. Waste Generation total

The major concern of waste management will be focused on the solid waste produced by the campus. Solid wastes produced in the campus are mainly of three types, food waste, paper waste, and plastic waste. Food wastes produced in the campus are mainly by two means. The vegetable wastes produced in the kitchen during the food preparation. The food waste produced by the students and staffs of the campus after the consumption of meals.

Degradable Waste

Degradable Waste Generation			
Mar Gregorios College of Law, Thiruvananthapuram			
	2018-19	2019-20	2020-21
Total Occupancy	843	912	923
Waste generated in kg /day	16.24	17.6	17.84
Waste generated in kg /Yr	2143.68	2323.2	2354.88

Non-Degradable waste

Solid non degradable Waste Generation			
Mar Gregorios College of Law, Thiruvananthapuram			
	2018-19	2019-20	2020-21
Total Occupancy	843	912	923
Waste paper generated in kg /day	0.1624	0.176	0.1784
Waste plastic generated in kg /day	0.2436	0.264	0.2676
Waste paper generated in kg /Yr	35.728	38.72	39.248
Waste plastic generated in kg /Yr	42.87	46.46	47.10

3.4. Transportation

There is no bus operating from the college.

Carbon Emission Profile (2020-21)

Carbon emissions in the campus due to the day-to-day activities are calculated and are discussed below. The emission factors considered for estimation and its units are given.

Emission Factors		
Item	Factor	Unit
Electricity	0.00082	tCo_2e/kWh
LPG	0.0015	tCo_2e/kg
Diesel	0.0032	tCo_2e/kg
Petrol	0.0031	tCo_2e/kg
Food Waste	0.00063	tCo_2e/kg
Paper Waste	0.00056	tCo_2e/kg
Plastic Waste	0.00034	tCo_2e/kg

Carbon Foot Print 2018-21

Carbon Foot Print							
Sl. No.	Particulars	2018-19	tCO2e	2019-20	tCO2e	2020-21	tCO2e
1	Electricity (kWh)	27576	22.61	30096	24.68	12852	10.54
2	Diesel (L)	2423.31	7.75	1845.98	5.91	116.02	0.37
3	LPG (kg)	999.40	1.50	969.00	1.45	190.00	0.29
4	Biogas (m3)	-	-	-	-	-	-
5	Degradable Waste in kg/yr.	2225.52	1.40	2407.68	1.52	2436.72	1.54
6	Paper Waste in kg/yr	37.09	0.02	40.13	0.02	40.61	0.02
7	Plastic Waste in kg/yr	44.51	0.02	48.15	0.02	48.73	0.02
Total Carbon Foot Print tCO2e/yr			33.30		33.60		12.77

3.5. CARBON SEQUESTRATION

All the activities including energy consumption and waste management have their equivalent carbon emission and they positively contribute to the carbon footprint of the campus. Carbon sequestration is the reverse process, at which the emitted carbon dioxide will get sequestrated according to the type of carbon sequestration employed. Even though there are many natural sequestration processes are involved in a campus, the major type of sequestration among them is the carbon sequestration by trees.

Carbon Sequestration			
Particulars	2018-19	2019-20	2020-21
Total number of trees	29	35	37
Carbon sequestrated by trees in the campus (tCO2e)	0.98	1.04	1.15

Trees sequestrate carbon dioxide through the biochemical process of photosynthesis and it is stored as carbon in their trunk, branches, leaves and roots. The amount of carbon sequestrated by a tree can be calculated by different methods. In this study, the volumetric approach was taken into account, thus the details including CBH (Circumference at Breast Height), height, average age, and total number of the trees, are required. Details of the trees in the campus compound are given in the Table 3.18. Detailed table is included in the technical supplement.

Carbon sequestrated by a tree can be found out by using different methods. Since this study is employed the volumetric approach, the calculation consists of five processes.

- Determining the total weight of the tree
- Determining the dry weight of the tree
- Determining the weight of carbon in the tree
- Determining the weight of CO_2 sequestrated in the tree
- Determining the weight of CO_2 sequestrated in the tree per year

Carbon sequestrated by each species of trees in the campus compound is given in the Table.3.19 Detailed calculation results are listed out in the tables provided in the technical supplements of 'Carbon sequestration'.

CARBON FOOTPRINT OF THE CAMPUS (2019-20)

Various carbon emitting activities such as consumption of energy, transportation and waste generation leads to the total emission of **33.60 tCO_2e** per year by the campus. The total carbon sequestration by trees in the campus compound is **1.04 tCO_2e**.

Thus, the current carbon footprint of the campus will be the difference of total carbon emission and total carbon sequestration/mitigation. The following table shows the carbon footprint level of 2020-21.

Specific CO2 Footprint

Amount of Carbon to be mitigated for Low Carbon Campus				
Sl No	Particulars	2018-19	2019-20	2020-21
1	Total carbon emission tCO2e	33.30	33.60	12.77
2	Total carbon sequestration tCO2e	0.98	1.04	1.15
3	Amount of carbon mitigated through renewable energy tCO2e	0.00	0.00	0.00
4	To be mitigated tCO2e	32.33	32.56	11.62
5	Total No of Students	812	880	892
6	Specific Carbon Footprint kg CO2e/Student/Yr	39.81	37	13.03

The total specific carbon emission is estimated as **37** kg of CO_2e per student for the year 2019-20 and **13.03** kg of CO_2e per student for the year 2020-21. (The reduction in CO2 foot print is due to the impact of pandemic year)

4

Carbon Mitigation Plans

The total emission of the carbon dioxide per student is 37 kg per year (2019-2020). Emission reduction plans were prepared to bring the existing per capita carbon footprint to zero or below so as to bring the campus a carbon neutral or carbon negative campus.

This can be achieved in many ways but, every alternate plan must be in such a way that, it must fulfill the actual purpose of each activity that is considered.

Here, three major methods are taken in to account as the plans for reducing the carbon emission of the campus.

- Resource optimisation
- Energy efficiency
- Renewable energy

RESOURCE OPTIMISATION

The effective use of resources can limit its unnecessary wastage. Optimal usage of the resources (such as fuels) can save the fuel and can also reduce the carbon emission due to its consumption. This technique can be effectively implemented in the 'transportation' and 'waste' sectors of the campus.

WASTE MINIMISATION

Optimal utilisation of paper and plastic stationaries can reduce the frequency of purchase of items. This can reduce the unnecessary wastage of money as well as the excess production of waste. In the case of food, proper food habits and housekeeping practices can optimise its usage.

Currently, the campusis taking an appreciable effort to reduce the unnecessary production of wastes. But the campus still has opportunities to reduce the generation of waste and can improve much more. Resource optimisation can be effectively implemented in all type of waste generated in the campus and the campus can expect about 50% reduction the total waste produced.

ENERGY EFFICIENCY

Energy efficiency is the practice of reducing the energy requirements while achieving the required energy output. Energy efficiency can be effectively implemented in all the sectors of the campus.

FUELS FOR COOKING

The campus uses commercial LPG cylinders for its cooking purpose. The campus can install a biogas plant to treat food waste and the biogas thus generated can be used in kitchen. Installation of a solar water heater to rise the water temperature to a much higher level, then it has to consume only very less amount of thermal energy for preparing the same amount of food is another method. This can make a positive benefit to the campus by saving money, energy and can reduce the carbon emission of the campus due to thermal energy consumed for cooking.

TRANSPORTATION

Energy efficiency of the transportation sector is mainly depended on the fuel efficiency of the vehicles used. Here mileage of the vehicle (kmpl - Kilometres per Litre) is calculated to assess the fuel efficiency of the vehicle.

Percentage of closeness is the ratio of actual mileage of the vehicle to its expected mileage. If the percentage of closeness of mileages of each vehicle is greater than that of its average, then the efficiency status of the vehicle is considered as 'Above average' and else, it is considered as 'Below average'

Carbon Mitigation Proposals

After analyzing the historical and measured data the following projects are proposed to make the campus carbon neutral. The projects are from energy efficiency and renewable energy. The further additions in the green cover increase will also give positive impact in the carbon mitigation.

OTTOTRACTIONS- ENERGY AUDIT						
Mar Gregorios College of Law, Thiruvananthapuram						
Greenhouse Gas Mitigation through Major Energy Efficiency Projects						
Sl No	Projects	Energy saved(Yearly)		Sustainability (Years)	First year ton of CO2 mitigated	Expected Tons of CO2 mitigated throughout life cycle
		(kWh)	MWh	Years		
1	Energy Saving in Lighting by replacing existing 27 No's T8 (40W) Lamps to 18W LED Tube	352	0.35	10	0.26	2.57
2	Energy Saving in Lighting by replacing existing 60 No's CFL(15W) Lamps to 9W LED Bulb	160	0.16	10	0.12	1.17
3	Energy Saving by replacing existing 357 No's in-efficient ceiling fans with Energy Efficient Five-star fans	6340	6.34	10	4.63	46.28
Total		6852	6.9	30.0	5.0	50.0

OTTOTRACTIONS- ENERGY AUDIT						
Mar Gregorios College of Law, Thiruvananthapuram						
Greenhouse Gas Mitigation through Renewable Energy Projects						
Sl No	Projects	Energy saved(Yearly)		Sustainability (Years)	First year ton of CO2 mitigated	Expected Tons of CO2 mitigated throughout life cycle
		(kWh)	MWh	Years		
1	Installation of 30kWp Solar Power Plant	38325	38.33	25	27.98	699.43
2	Installation of 15Kg/day Biogas plant	5647	5.65	26	4.12	107.18
Total		43972	44	51	32	807

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 877.01	
Energy Saving in Lighting by replacing existing 27 No's T8 (40W) Lamps to 18W LED Tube	
Existing Scenario	
27 numbers of T8(40 W) lamps were identified during the energy audit field survey in the facility. During discussion with officers it is observed that the average utility of these fittings are of 30%.	
Proposed System	
The existing T8 may be replaced to LED Tube of 18W in phased manner and the savings will be of 55% (inclusive of improved light output and reduced energy consumption)	
Financial Analysis	
Annual working hours (hr)	1480
No of fittings	27
Total load (kW)	1.08
Annual Energy Consumption (kWh)	639
Expected Annual Energy saving for replacing all fittings (kWh)	352
Cost of Power	8.50
Annual saving in Lakhs Rs (1st year)	0.03
Investment required for complete replacements [@Rs 300 per fittings](Lakhs Rs)	0.08
Simple Pay Back (in Months)	32.52

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 877.02	
Energy Saving in Lighting by replacing existing 60 No's CFL(15W) Lamps to 9W LED Bulb	
Existing Scenario	
36 numbers of CFL (15W) lamps were identified during the energy audit field survey in the facility. During discussion with officers it is observed that the average utility of these fittings are of 30%.	
Proposed System	
The existing CFL may be replaced to LED Bulb of 9W in phased manner and the savings will be of 40% (inclusive of improved light output and reduced energy consumption)	
Financial Analysis	
Annual working hours (hr)	1480
No of fittings	60
Total load (kW)	0.90
Annual Energy Consumption (kWh)	400
Expected Annual Energy saving for replacing all fittings (kWh)	160
Cost of Power	8.50
Annual saving in Lakhs Rs (1st year)	0.01
Investment required for complete replacements [@Rs 90 per fittings](Lakhs Rs)	0.05
Simple Pay Back (in Months)	47.69

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code 877.03	
Energy Saving by replacing existing 357 No's in-efficient ceiling fans with Energy Efficient Five-star fans	
Existing Scenario	
There are 357 numbers of ceiling fans installed in the facility with minimum 8 hrs a day operation. All are conventional type and most of them are very old.	
Proposed System	
There is an energy saving opportunity in replace the existing fans with new five star labelled fans. The five star labelled fans give a savings up to 30% with higher service value (air delivery/watt).	
Financial Analysis	
Annual working hours (hrs)	1480
Total numbers of ordinary fans	357
Total load (kW)	28.56
Annual Energy Consumption (kWh)	21134
Expected Annual Energy saving, for total replacement(kWh)	6340
Cost of Power (Rs)	8.50
Annual saving in Lakhs Rs (1st year)	0.54
Investment required for a total replacement (Lakhs Rs)[@3000 Rs per Fan with 50W at full speed]	10.71
Simple Pay Back (in Months)	238.47

Energy Saving Proposal Code 877.04	
Installation of 30kWp Solar Power Plant	
Existing Scenario	
There is a good potential of solar power electricity generation. The availability of sunlight is very high. There are some canopies available in the proposed site, but by having proper trimming of trees this may be avoided. If the SPVs are place in the roof top it will help improving RTTV (Roof Thermal Transmit Value) of the building.	
Proposed System	
It is proposed to have a Solar Power Plant of 30kW at the beginning stage. The state and central government is pushing and giving good assistance to the installation. It can be installed as an internal grid connected system which is much cheaper than off grid system. Now days the technology provides trouble free grid interactive and connected system. The installation will provide 25yrs trouble free generation with only 20% efficiency loss at the 25th year.	
Financial Analysis	
Proposed Solar installed Capacity (kW)	30
Total average kWh per day expected (3.5kWh/day average)	105.00
Total annual Generating Capacity (kWh)	38325
Cost of energy generated annually Lakhs Rs	3.26
Investment required (INR lakh)(Approx.)	22.50
Simple Pay Back (in Months)	82.88
Life cycle in Yrs.	25
Total Saving in Life Cycle (Approx.) RS lakh	81.44

Sl.no	Installation of 15Kg/day Biogas plant	
1	Capacity of Bio gas plant(Kg/day)	15
2	Average Calorific Value of biogas (kCal/m3)	3500
3	Annual Generation of Biogas Plant	1387.5
4	Daily production of biogas (kCal)	26250
5	LPG Saving in a day (kg)	2.1875
6	Annual LPG Saving (Kg)	405
7	Investment required (in Lakhs)	0.2
8	Annual Cost saving (in Lakhs)	0.26
9	Expected Annual Energy saving (kWh)	5647
10	Simple Pay Back (In Months)	9.39

Executive Summary					
Consolidated Cost Benefit Analysis of Energy Efficiency Improvement Projects					
Mar Gregorios College of Law, Thiruvananthapuram					
Sl No	Projects	Investment	Cost saving	SPB	Energy saved
		(Lakhs Rs)	(Rs)/Yr	Months	kWh/Yr
1	Energy Saving in Lighting by replacing existing 27 No's T8 (40W) Lamps to 18W LED Tube	0.08	0.030	32.52	352
2	Energy Saving in Lighting by replacing existing 60 No's CFL(15W) Lamps to 9W LED Bulb	0.05	0.014	47.69	160
3	Energy Saving by replacing existing 357 No's in-efficient ceiling fans with Energy Efficient Five-star fans	10.71	0.539	238.47	6340
	Total	11	1	106	6852
(The saving is projected as per the assumed operation time observed based in the discussions with the plant officials. The data of saving percentages are taken from BEE guide books and field measurements.)					
4	Installation of 30kWp Solar Power Plant	22.50	3.26	82.88	38325
5	Installation of 15Kg/day Biogas plant	0.2	0.26	9.39	5647
	Total	22.70	3.51	46.14	43972

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CONCLUSION

The carbon emission from different sectors namely, Energy, Transportation and wastes were calculated using standard procedures. Carbon sequestration by the trees present in the campus was also estimated. From these the total carbon footprint of the campus was arrived at.

Net Carbon Emission after implementing Energy Efficiency projects and Renewable Energy Projects Proposed		
1	Total Carbon Foot Print tCO2e/yr	33.60
2	Carbon Sequrested tCO2e/yr	1.15
3	Carbon mitigated by Renewable Energy tCO2e/yr	27.98
4	Carbon mitigated by Renewable Energy(Biogas) tCO2e/yr	4.12
5	Carbon mitigated by Energy Efficiency (Proposed) tCO2e/yr	5.00
6	Effective Carbon footprint tCO2e/yr	-0.54
7	Total No of Students	880.00
8	Specific Carbon Footprint kg CO2e/Student/Yr	-0.61

From this study it was found that carbon footprint of the campus to be -0.67 $kgCO_2e$/ Student/ Year in place of current footprint i.e.,33.60 $kgCO_2e$/ student/ Year. This will be achieved after implementing energy efficiency projects and implementation of 30kWp solar power plant. And to achieve this an investment of 33.55 lakhs Rs is required through energy efficiency and renewable energy projects proposed. It will be around 3811.9 Rs per student to make the campus the carbon negative.

Cost to make the campus Carbon Negative		
1	Cost of implementation in Energy Efficiency Lakhs Rs	10.85
2	Cost of implementation in Renewable Energy Lakhs Rs	22.70
3	Total Lakhs Rs	33.55
4	Total number of students	880
5	Cost per student to make the campus carbon negative Rs/ Student	3811.9

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Website

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6

TECHNICAL SUPPLEMENT

Mar Gregorios College of Law, Thiruvananthapuram																				
Sl. No	**Location**	**LIGHTS**								**FAN**			**IT**					**AC**		
		T5	**T8**	**T12**	**ICL**	**CFL**	**LEDT**	**LEDB**	**SPOT LIGHT**	**CF**	**EF**	**WF**	**PC**	**Printer**	**Scanner**	**Projector**	**1**	**1.5**	**2**
1	Office 1						2			2			2						
2	Office 2					10	2			9			6						
3	Corridor					1													
4	Library						16			11			15			1			
5	class						3			2									
6	class1					2	5			2								1	
7	206		4							6						1			
8	class		2							2			4						
9	207					7				7									
10	class		3							8									
11	u0									2									
12	u1						5			6									
13	11 classroom (Floor 1)						50			66									
	11 classroom (Floor 2)						55			66									
13	11 classroom (Floor 3)						53			66									
	TOTAL	**0**	27	0	0	60	247	0	0	357	0	0	81	0	0	6	0	3	0

List of Trees in the Campus (above 15 cms growth)			
Sl No	Name	Botanical	Number
1	Almond Tree	Terminalia Cutappa	1
2	Mango Tree	Mangifera Indica	5
3	Burflower Tree	Neolamarckia cadamba	1
4	Fig Tree	Ficus Carica	1
5	Wild Jack Tree	Artocarpis Hirsutus	12
6	Cashew Tree	Anacardium Occidentale	1
7	Guava Tree	Psidium Guajava	1
8	Coconut Tree	Cocos Nucifera	6
9	Gooseberry	Phyllanthus Emblica	1
10	Rambuttan	Nephelium Lappaceum	2
11	Teak	Tectona Grandis	2
12	Kino Tree	Pterocarpus Marsupium	1
13	New Zealand Laurel	Corynocarpus Laevigatus	1
14	Papaya	Carica Papaya	1
15	Mangium Tree	Acacia Mangium	1

Electricity Bill Details										
Name of the Consumer				Mar Gregorious College of Law						
Connected Load (kW)				**57**	Consumer number		**1145184020458**			
Tariff				**LT-6F (Three Phase)**	Section		**Nalanchira**			
Month & Year	Monthly Consumption (kWh)	Average consumption (kWh)	Fixed charge (Rs)	Energy charge (Rs)	Duty (Rs)	Meter rent (Rs)	Extra fixed charge (Rs)	Extra energy charge (Rs)	Adjustment (Rs)	Total amount to be paid (Rs)
Jan-18	2298	2127	5040	20682	2068.2	17.7				28153
Jan-19	2508	2650	5040	22572.1	2257.2	17.7				29887
Jan-20	3570	3334	7980	32130.3	3213	36.7				43359

KERALA STATE ELECTRICITY BOARD LIMITED

DEMAND CUM DISCONNECTION NOTICE

(As per Regulation 122 & 123 of Kerala Electricity Supply Code 2014)

Section	**[4518]-Electrical Section Nalanchira**	**Phone#**	0471-2531686	**Customer Care**	1912
Consumer#	**1145184020458**	Reg. Mob# **854xxxx262**		**Regular CC Bill**	**KSEBL GSTIN: 32AAECK2277NBZ1**

Name & Mailing Address

THE DIRECTOR

MAR GREGORIUS COLLEGE OF LAW

TC 11/2394(3)

For redressing complaints/grievance approach the concerned CGRF

South: Chairperson,CGRF(South),KSEB Ltd, Vydythi Bhavanam,Kottarakkara-691506, Ph:0474-2060220

Central: Chairperson,CGRF(Central),KSEB Ltd, Power House Building Ernakulam-682018, Ph:0484-2394288

North: Chairperson,CGRF(North),KSEB Ltd,Gandhi Road,Kozhikode-32, Ph:0495-2367820

State Electricity Ombudsman, Pallikkavil Building,Mamangalam, Edappally, Kochi-682024 Ph:0484-2346488

Bill#	**4518220100110**	**Bill Area**	M01/1	**DTR**	JAI MATHA
Billing Period	**1/2022**[Monthly]	**Tariff/Phase**	LT-6F/Three	**Pole#**	JM-28/5
Bill Date	**01-01-2022**	**Due Date**	**11-01-2022**	**DC Date**	**28-01-2022**
Contract Demand	**(Nil)** VA [75% : 0KV, 130% : 0KV]	**Connected Load**	57000 Watts	**Security Deposit**	Rs.57000.00

Meter#	GOE000050004337180	**Average consumption(Monthly)**	
Meter Digits	6.2	**Power Unit/Zone**	**CUMULATIVE**
Meter Type/Owner	TOD/KSEB	KWH	3750

Last Billed Rdg. Date	**Prev. Rdg. Date**	**Prev. Meter Rdg. Status**	**Prst. Rdg. Date**	**Prst. Meter Rdg. Status**
01-12-2021	**01-12-2021**	**Working**	**01-01-2022**	**Working**

Power Unit	**Zone**	**Trading**	**Initial Reading(IR)**	**Final Reading(FR)**	**OMF**	**Units***
KWH	Cumulative	Import	2278.00	2409.00	30	3930

Remarks :

Last Paid Amount - Rs.47516.00

Last Payment Date - 06-12-2021

			[INR] Amount(Rs.)
Bill Details			
a)	Fixed Charges	Fixed Charge[FC]	7980.00
		Sub Total	**7980.00**
b)	Energy Charges	Energy Charge[EC]	35370.00
		Sub Total	**35370.00**
c)	Other Charges	Electricity Duty[ED]	3537.00
		Meter Rent[MR]	30.00
		Sub Total	**3567.00**
d)	GST	MR-CGST	2.70
		MR-SGST	2.70
		Sub Total	**5.40**
e)	Round Off		-0.40
e)	**Total Amt.(Bill#4518220100110)** *(a+b+c+d+e)*		**46922.00**
f)	Surcharge		0.00
g)	Reconnection Fee		0.00
h)	Interim Bills		0.00
i)	Arrears		0.00
j)	Less paid/adj.		-0.00
k)	Less Advance		-0.00
	Net Payable*(e+f+g+h+i-j-k)*		**46922.00**

Demand for 1/2022 is Rupees Forty Six Thousand Nine Hundred and Twenty Two Only

E&OE ***Payment Options:*** *Cash,Cheque,DD,MO.* ***Online: www.kseb.in (Debit/Credit Cards,Net Banking)****. Other Platforms: BBPS,Friends,Akshaya,CSC,NACH*

Senior Superintendent

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ENVIRONMENTAL AUDIT REPORT

MAR GREGORIOS COLLEGE OF LAW, THIRUVANANTHAPURAM

2021

Executed by

OTTOTRACTIONS
Energy-Engineering-Environment

ENVIRONMENT AUDIT REPORT

MAR GREGORIOS COLLEGE OF LAW

THIRUVANANTHAPURAM

December 2021

Environment Audit Report
MAR GREGORIOS COLLEGE OF LAW
Report No: EA 879
2021- December

Environment Audit Team

Ottotractions

1	Er. Suresh Babu B V,	Accredited Energy Auditor, AEA 33
2	Er. B. Zachariah	Director, Ottotractions
3	Er. Abin Baby,	Project Engineer, Ottotractions
4	Er. Devan J	Project Engineer, Ottotractions
5	Er. Ajay Dev K	Project Engineer, Ottotractions
6	Er. Jomon J S	Project Engineer, Ottotractions

About OTTOTRACTIONS

OTTOTRACTIONS established in 2005, is an organization with proven track record and knowledge in the field of energy, engineering, and environmental services. They are the first Accredited Energy Auditor from Kerala for conducting Mandatory Energy Audits in Designated Consumers as per Energy Conservation Act-2001. Government of Kerala recognized and appreciated **OTTOTRACTIONS** by presenting its prestigious **"The Kerala State Energy Conservation Award 2009"** for the best performance as an Energy Auditor.

Acknowledgment

We were privileged to work together with the administration and staff of Mar Gregorios College of Law, Thiruvananthapuram. for their timely help extended to complete the audit and bringing out this report.

We thank the management of Mar Ivanios College for entrusting Ottotractions to conduct the audits in all its mentee institutes as part of its Paramarsh Scheme

With gratitude, we acknowledge the diligent effort and commitments of all those who have helped to bring out this report.

We also take this opportunity to thank the bona-fide efforts of team OTTOTRACTIONS for unstinted support in carrying out this audit.

We thank our consultants, engineers and backup staff for their dedication to bring this report.

Thank you.

B V Suresh Babu
Accredited Energy Auditor
AEA 33, Bureau of Energy Efficiency

Contents

INTRODUCTION

Ottotractions was asked by the Mar Gregorios College of Law, Thiruvananthapuram to carry out an environmental audit of their campus building.

Each section contains recommendations for improvements relating to environmental issues, which are consolidated in the action plan in section 4.

BACKGROUND

The Malankara Syrian Catholic Major Archiepiscopal Church has a prominent role in the advancement of education in the State of Kerala especially in the last eight decades; it has established hundreds of primary, secondary and higher secondary schools, industrial training institutes and many professional colleges. Mar Gregorios College of Law (MGCL) was established in 2012 as another milestone in the glorious Mar Ivanios Vidyanagar Campus which was founded in 1949 by the Servant of God Archbishop Geevarghese Mar Ivanios. Mar Ivanios Vidyanagar, the educational campus, emerged from the educational

vision of the Malankara Syrian Catholic Major Archiepiscopal Church in the State of Kerala. The sprawling 43 hectares of verdant campus, abundant in natural beauty is the ideal learning environment. The campus is blessed with 17 centres of excellence in education. The campus has been named "Mar Ivanios Vidyanagar" in fond remembrance of Archbishop Mar Ivanios, the founder of Mar Ivanios College, the first educational institution in the campus. Other Institutions in the campus are, to name a few, Mar Baselios College of Engineering and Technology, Mar Theophilos Training College, Sarvodaya Schools (Both CBSE and ICSE) and Bethany Navajeevan College of Physiotherapy, etc.

The College is administered by the Major Archdiocese of the Malankara Syrian Catholic Major Archiepiscopal Church through the Malankara Catholic Educational Society of the Archdiocese of Trivandrum. Mar Gregorios College of Law was envisioned as a centre of excellence in legal education. The college was instituted in the name of His Grace Most Reverend Archbishop Benedict Mar Gregorios, who was the second Metropolitan Archbishop of the Malankara Syrian Catholic Major Archiepiscopal Church. The college is affiliated to the University of Kerala and recognized by the Bar Council of India.

Occupancy Details			
Particulars	2018-19	2019-20	2020-21
Total Students	812	880	892
Staffs	31	32	31
Total Occupancy of the college	843	912	923

Total student strength of the campus is 880. For calculating per capita carbon emission estimation, the student strength is taken into account.

ENVIRONMENTAL ISSUES

This section is broken down into the following different areas: waste, water, energy, resource and materials use and procurement. A final 'other' section is also included for any additional issues.

1.1. Waste

The way communities generate and manage their waste plays an absolutely key role in their ability to use resources efficiently. All buildings contain bins for both general waste and mixed recyclables (plastic bottles, card, cans and paper). On average each floor in the buildings areas has its own general waste bin and one recycling bin. When the bins are emptied by the cleaning staff. Bins are marked and kept in different colors for identification, however in some locations throughout the building it was unclear which bins were for which waste streams.

There are four basic ways in which campus can do plastic recycling collection services for plastic bottles and containers – curbside, drop-off, buy-back or deposit/refund programs. The first, and most widely accessible, collection method is curbside collection of recyclables. The campus is installed bins to collect plastic bottles and single use plastics. SGC has given a proper awareness on plastic waste problems and they are discouraging the students or teachers to carry plastics to the campus. The ECO club is very active in the campus and do a verity of programs to build awareness on waste management. The reports on different activities of the club are attached as technical supplement of this report.

The major concern of waste management will be focused on the solid waste produced by the campus. Solid wastes produced in the campus are mainly of three types, food waste, paper waste, and plastic waste. Food wastes produced in the campus are mainly by two means. The vegetable wastes produced in the kitchen during the food preparation. The food waste produced by the students and staffs of the campus after the consumption of meals.

Degradable Waste Generation			
Mar Gregorios College of Law, Thiruvananthapuram			
	2018-19	2019-20	2020-21
Total Occupancy	843	912	923
Waste generated in kg /day	16.86	18.24	18.46
Waste generated in kg /Yr	2225.52	2407.68	2436.72

Burning plastics shall be strictly restricted inside the campus. Burning plastic and other wastes releases dangerous substances such as heavy metals, Persistent Organic Pollutants, and other toxics into the air and ash waste residues. … Such pollutants contribute to the development of asthma, cancer, endocrine disruption, and the global burden of disease.

Solid non degradable Waste Generation			
Mar Gregorios College of Law, Thiruvananthapuram			
	2018-19	2019-20	2020-21
Total Occupancy	843	912	923
Waste paper generated in kg /day	0.1686	0.1824	0.1846
Waste plastic generated in kg /day	0.2529	0.2736	0.2769
Waste paper generated in kg /Yr	37.092	40.128	40.612
Waste plastic generated in kg /Yr	44.51	48.15	48.73

WASTE MINIMIZATION AND RECYCLING		
1	Does your institute generate any waste? If so, what are they?	Yes, Solid waste Canteen waste, paper, plastic, Horticulture Waste etc
2	What is the approximate amount of waste generated per day? (In Kilograms/month) (approx.)	Bio Non- Hazardous Others Degradable Biodegradable
3	How is the waste generated in the institute managed? By	Reuse of one side printed Paper for internal communication. Sewage water is discharged to public Sewer. Kitchen waste is used to generate manures. Two types of Waste bins are provided at campus for biodegradable and non-biodegradable waste.
	1 Composting	In-house
	2 Recycling	In-house
	3 Reusing	In-house
	4 Others (specify)	
4	Do you use recycled paper in institute?	Yes
5	Do you use reused paper in institute?	Yes
6	How would you spread the message of recycling to others in the community? Have you taken any initiatives? If yes, please specify.	Number of awareness programs through ECO Club
7	Can you achieve zero garbage in your institute? If yes, how?	Not yet achieved. Possible through waste management plan.

Green Cover Audit			
1	Is there a garden in your institute?	Yes	
2	Do students spend time in the garden?	Yes	
3	Total number of Plants in Campus	Plant type	Approx. number
		Trees	37
		Ornamental	Not estimated
4	Number of Tree Plantation Drives organized by School	Yes, Through ECO club	
5	Number of Trees Planted in Last FY.	NA	
	Survival Rate		80%

All the activities including energy consumption and waste management have their equivalent carbon emission and they positively contribute to the carbon footprint of the campus. Carbon sequestration is the reverse process, at which the emitted carbon dioxide will get sequestrated according to the type of carbon sequestration employed. Even though there are many natural sequestration processes are involved in a campus, the major type of sequestration among them is the carbon sequestration by trees.

Trees sequestrate carbon dioxide through the biochemical process of photosynthesis and it is stored as carbon in their trunk, branches, leaves and roots. The amount of carbon sequestrated by a tree can be calculated by different methods. In this study, the volumetric approach was taken into account, thus the details including CBH (Circumference at Breast Height), height, average age, and total number of the trees, are required. Details of the trees in the campus compound are given in the Table. Detailed table is included in the technical supplement.

Carbon Sequestration			
Particulars	2018-19	2019-20	2020-21
Total number of trees	29	35	37
Carbon sequestrated by trees in the campus (tCO2e)	0.98	1.04	1.15

Carbon sequestrated by a tree can be found out by using different methods. Since this study is employed the volumetric approach, the calculation consists of five processes.

- Determining the total weight of the tree
- Determining the dry weight of the tree
- Determining the weight of carbon in the tree
- Determining the weight of CO_2 sequestrated in the tree
- Determining the weight of CO_2 sequestrated in the tree per year

Carbon sequestrated by each species of trees in the campus compound is given in the Table. Detailed calculation results are listed out in the tables provided in the technical supplements of 'Carbon sequestration'.

List of Trees in the Campus (above 15 cms growth)			
Sl No	Name	Botanical	Number
1	Almond Tree	Terminalia Cutappa	1
2	Mango Tree	Mangifera Indica	5
3	Burflower Tree	Neolamarckia cadamba	1
4	Fig Tree	Ficus Carica	1
5	Wild Jack Tree	Artocarpis Hirsutus	12
6	Cashew Tree	Anacardium Occidentale	1
7	Guava Tree	Psidium Guajava	1
8	Coconut Tree	Cocos Nucifera	6
9	Gooseberry	Phyllanthus Emblica	1
10	Rambuttan	Nephelium Lappaceum	2
11	Teak	Tectona Grandis	2
12	Kino Tree	Pterocarpus Marsupium	1
13	New Zealand Laurel	Corynocarpus Laevigatus	1
14	Papaya	Carica Papaya	1
15	Mangium Tree	Acacia Mangium	1

3.1.1 ENERGY

a. Electricity

The total emission of the carbon dioxide per student is 36.94kg per year (2019-20). Emission reduction plans were prepared to bring the existing per capita carbon footprint to zero or below so as to bring the campus a carbon neutral or carbon negative campus. This can be achieved in many ways but, every alternate plan must be in such a way that, it must fulfill the actual purpose of each activity that is considered.

Here, three major methods are taken in to account as the plans for reducing the carbon emission of the campus.

- Resource optimization
- Energy efficiency
- Renewable energy
- Electricity Consumption

Base Line Energy Data				
Mar Gregorios College of Law, Thiruvananthapuram				
		2018-19	2019-20	2020-21
1	Electricity KSEB (kWh)	27576.00	30096.00	12852.00
2	Electricity Solar - Off grid (kWh)	0.00	0.00	0.00
3	Electricity (KSEB + Off grid) kWh	27576.00	30096.00	12852.00
4	Electricity Grid Tied (kWh)	0.00	0.00	0.00
5	Diesel (L)	2423.31	1845.98	116.02
6	LPG (kg)	999.40	969.00	190.00
7	Biogas (kg)	-	-	-

Occupancy Details			
Particulars	2018-19	2019-20	2020-21
Total Students	812	880	892
Staffs	31	32	31
Total Occupancy of the college	843	912	923

Mar Gregorios College of Law, Thiruvananthapuram														
Sl. No	Location	LIGHTS						FAN			IT		AC	
		T5	T8	T12	ICL	CFL	LED T	CF	EF	WF	PC	Projector	1.5	2
1	Office 1						2	2			2			
2	Office 2					10	2	9			6			
3	Corridor					1								
4	Library						16	11			15	1		
5	class						3	2						
6	class1					2	5	2					1	
7	206		4					6				1		
8	class		2					2			4			
9	207					7		7						
10	class		3					8						
11	uo							2						
12	u1						5	6						
13	11 classroom (Floor 1)						50	66						
	11 classroom (Floor 2)						55	66						
13	11 classroom (Floor 3)						53	66						
TOTAL		0	27	0	0	60	247	357	0	0	81	6	3	0

During the energy audit filed studies, 27 Numbers T8 lamps identified, which is considered as inefficient. 247 LED Tubes were found during the audit. The detailed energy efficiency projects are given in the respective chapters of this report.

Mar Gregorios College of Law		
Sl. No	Location	Avg. Lux
1	Office 1	89
2	Office 2	78
3	Corridor	53
4	Library	97
5	class	83
6	Floor1	88
7	Floor2	86
8	Floor3	87
9	U0	88
10	U1	91

RESOURCE OPTIMISATION

The effective use of resources can limit its unnecessary wastage. Optimal usage of the resources (such as fuels) can save the fuel and can also reduce the carbon emission due to its consumption. This technique can be effectively implemented in the 'transportation' and 'waste' sectors of the campus.

WASTE MINIMISATION

Optimal utilization of paper and plastic stationaries can reduce the frequency of purchase of items. This can reduce the unnecessary wastage of money as well as the excess production of waste. In the case of food, proper food habits and housekeeping practices can optimize its usage.

Currently, they taking an appreciable effort to reduce the unnecessary production of wastes. But the campus still has opportunities to reduce the generation of waste and can improve much more. Resource optimization can be effectively implemented in all type of

waste generated in the campus and the campus can expect about 50% reduction the total waste produced.

ENERGY EFFICIENCY

Energy efficiency is the practice of reducing the energy requirements while achieving the required energy output. Energy efficiency can be effectively implemented in all the sectors of the campus.

FUELS FOR COOKING

The campus can install a solar water heater to rise the water temperature to a much higher level, then it has to consume only very less amount of thermal energy for preparing the same amount of food. This can make a positive benefit to the campus by saving money, energy and can reduce the carbon emission of the campus due to thermal energy consumed for cooking.

TRANSPORTATION

Energy efficiency of the transportation sector is mainly depended on the fuel efficiency of the vehicles used. Here mileage of the vehicle (kmpl - Kilometers per Litre) is calculated to assess the fuel efficiency of the vehicle. Percentage of closeness is the ratio of actual mileage of the vehicle to its expected mileage. If the percentage of closeness of mileages of each vehicle is greater than that of its average, then the efficiency status of the vehicle is considered as 'Above average' and else, it is considered as 'Below average'

Renewable Energy

After analyzing the historical and measured data the following projects are proposed to make the campus carbon neutral. The projects are from energy efficiency and renewable energy. The further additions in the green cover increase will also give positive impact in the carbon mitigation.

Executive Summary					
Consolidated Cost Benefit Analysis of Energy Efficiency Improvement Projects					
Mar Gregorios College of Law, Thiruvananthapuram					
Sl No	Projects	Investment	Cost saving	SPB	Energy saved
		(Lakhs Rs)	(Rs)/Yr	Months	kWh/Yr
1	Energy Saving in Lighting by replacing existing 27 No's T8 (40W) Lamps to 18W LED Tube	0.08	0.030	32.52	352
2	Energy Saving in Lighting by replacing existing 60 No's CFL(15W) Lamps to 9W LED Bulb	0.05	0.014	47.69	160
3	Energy Saving by replacing existing 357 No's in-efficent ceiling fans with Energy Efficient Five star fans	10.71	0.539	238.47	6340
	Total	11	1	106	6852
(The saving are projected as per the assumed operation time observed based in the discussions with the plant officials. The data of saving percentages are taken from BEE guide books and field measurements.)					
4	Installation of 30kWp Solar Power Plant	22.50	3.26	82.88	38325
5	Installation of 15Kg/day Biogas plant	0.2	0.26	9.39	5647
	Total	22.70	3.51	46.14	43972

Water Conservation Activities	
List four uses of water in your institute	Basic use of water in campus: 1. Drinking – Ground Water 2. Gardening – Rain water 3. Kitchen and Toilets – 4. Others –
How does your institute store water? Are there any water saving techniques followed in your institute?	Overhead Water Tanks and Sumps installed for storage of water. Water conservation are in place
If there is water wastage, specify why and How can the wastage be prevented / stopped?	No
Record water use from the institute water meter for six months (record at the same time of each day). At the end of the period, compile a table to show how many litres of water have been used.	No logbooks are available
Does your institute harvest rain water?	Yes
Is there any water recycling system?	Yes

General Environmental Awareness Questioner	
Are you aware of any environmental Laws pertaining to different aspects of environmental management?	Yes
Does your institute have any rules to protect the environment? List possible rules you could include.	Yes
Dose Environmental Ambient Air Quality Monitoring conducted by the Institute?	Yes
Dose Environmental Water and Wastewater Quality monitoring conducted by the Institute?	Yes
Dose stack monitoring of DG sets conducted by the Institute?	Yes
Is any warning notice, letter issued by state government bodies?	No
Dose any Hazardous waste generated by the Institute? If yes explain its category and disposal method	Yes
Are you aware of any environmental Laws pertaining to different aspects of environmental management?	Yes
Does your institute have any rules to protect the environment? List possible rules you could include.	No
Does housekeeping schedule in your campus?	Yes
Are students and faculties aware of environmental cleanliness ways? If Yes Explain	Yes
Dose Important Days Like World Environment Day, Earth Day, and Ozone Day etc. eminent in Campus?	Yes
Dose Institute participated in National and Local Environmental Protection Movement?	Yes
Dose Institute has any Recognition/certification for environment friendliness?	Yes
Dose Institute using renewable energy?	Yes
Dose Institution conducts a green/environmental audit of its campus?	Yes
Has the institution been audited / accredited by any other agency such as NABL, NABET, TQPM, NAAC etc.?	Yes

Best Practices and Initiatives	
Renewable Energy	Yes
Solar Power Plant	
Energy Audit and Green Audit Conducted	
Biogas Plant installed	
Biodiversity Conservation	Yes
Green Cover	
Tree Plantation Drives	Yes
ECO clubs	
Ground Water Recharge	Yes
Rain Water Harvesting System.	
Pollution Reduction Public Transportation	Yes
E Waste Management	Yes
Connected to authorized recycler	
Solid Waste Management	Yes
Lifting of garbage from campus on alternate day by Municipal Corporation.	
Adoption of Village	Yes
CSR	
Water Conservation	Yes
Energy Conservation	Yes

RECOMMENDATIONS

1. Implement a utility monitoring program.
    - Allocate staff to carry out meter readings for electricity, waste and water on regular basis
    - Add monitoring data to spreadsheet so results can be viewed graphically
    - Compare with the utility bills meter readings in order to ensure accuracy;

2. Consider adopting and implementing a sustainable procurement policy which takes into account the whole life cycle of a product, and make sure environmental issues are written into tenders when contracting out.
3. Consider trialing recycled paper again – many recycled brands today, such as Evolve, are just as good as virgin paper.
4. Trial the use of re-manufactured (i.e., Refilled) in toner cartridges rather than purchasing new ones.
5. Consider producing some designated 'environmental' pages on the intranet to make it easier for staff to find environmental information. If possible, a discussion forum could be setup to allow easy internal communications and staff to make suggestions for environmental improvements.
6. Environmental training could be formalized and carried out for all staff. It does not have to be too long or onerous, providing it covers key points, particularly in relation to wastes of all staff are aware of the legal requirements. At the very least, environmental information should be included in the induction pack.
7. Itisstronglyrecommendedthatenvironmentalinformationisalsogiventostudents and staff during induction. It is particularly important for them to be aware of what waste they can dispose on site and where they can dispose of it, and what waste streams they must take away with them.
8. Consider implementing an environmental management system to incorporate all improvements and monitoring requirements. It does not need to be a complex system certified to any particular standard, merely away of ensuring that baselines are set and progress is measured. Formation of Environment Policy and communicated to all faculties and other staff.
9. Plan for Zero Waste Campus Project
10. E-waste monthly inventory be maintained at campus as per E wasterules2016.
11. Water Meter should be installed at institute for monitoring of water consumption per capita.
12. Increase in Environmental promotional activities for spreading awareness at campus.
13. Environment/Green committee formation for regulating eco-friendly initiatives at campus premises and periphery.

CONCLUSION

This audit involved extensive consultation with all the campus team, interactions with key personnel on wide range of issues related to Environmental aspects. The audit has identified several observations for making the campus premise more environmental friendly. The recommendations are also mentioned with observations for the team to initiate actions.

However, there is scope for further improvement, particularly in relation to waste minimization and energy monitoring. By implementing a basic environmental management system, current good practice can be formalized and a framework can be setup for monitoring, implementation of action plans and continual improvement.

The audit team observed that the overall site is maintained well from environmental perspective. There is no major observations but few things are important to initiate urgently are waste management records by monthly inventory of hazardous waste, rainwater harvesting recharge; water balance cycle and periodic inspection of buildings; environment policy and initiation of composting at campus.

References

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- The PetroleumAct:1934–The PetroleumRules:2002
- The Central Motor Vehicle Act: 1988 (Amended2011) and The Central Motor Vehicle
- Rules:1989(Amendedin2005)
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- The Water [Prevention & Control Of Pollution] Act–1974 (Amended1988)& the Water(Prevention & Control of Pollution) Rules– 1975
- The Water [Prevention &Control of Pollution] CessAct-1977(Amended2003) and Rules-1978
- The Air [Prevention &Control Of Pollution] Act– 1981(Amended1987) The Air(Prevention & Control of Pollution) Rules– 1982
- The Gas Cylinders Rules–2016 (Replaces the Gas Cylinder Rules– 1981
- E-waste management rules2016
- Electrical Act 2003(Amended 2001)/ Rules1956(Amended2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules,2008 (Amended2016)
- The Noise Pollution Regulation & Controlrules,2000(Amended2010)
- The Batteries (Management and Handling) rules,2001(Amended 2010)
- Relevant Indian Standard Code practices

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REPORT ON THE BEACH CLEAN-UP EVENT

Event Details:

Date: September 16, 2023

Time: 3:00 PM - 5:00 PM

Beach Location: Veli Beach

Number of Green Volunteers:110

Introduction:

The Centre for Environmental Studies and Paryavaran Mitra Eco Club, in collaboration with the Sutera Foundation, proudly presented a significant event, the "Beach Clean-Up" as part of the "No More Beach Clean-Ups" Mega Awareness Campaign. This event was organized with the support of the Thiruvananthapuram Municipal Corporation. The primary aim of this initiative was to raise awareness about the importance of preserving our pristine shores and oceans by actively engaging in responsible environmental practices.

Event Highlights:

1. Location: Veli Beach was chosen as the site for this Beach Clean-Up due to its popularity and the need for regular maintenance. The beach, located along the Arabian Sea, serves as a vital recreational spot for the local community and tourists alike.

2. Participation: The event attracted an impressive turnout of 110 green volunteers, including students from Mar Gregorios College of Law and enthusiastic members of the Paryavaran Mitra Eco Club. The diversity in age and background among the participants highlighted the inclusive nature of the campaign.

3. Awareness: Prior to commencing the clean-up activities, an informative session was conducted by environmental experts and representatives from the Thiruvananthapuram Municipal Corporation. They shared valuable insights into the adverse effects of littering and pollution on coastal ecosystems and marine life. The session emphasized the urgent need for collective action to protect our environment.

4. Clean-Up Activities: The volunteers were provided with gloves, trash bags, and other necessary equipment. They were divided into groups; each assigned a specific section of the beach to clean. The participants enthusiastically collected various forms of waste, including plastic bottles, wrappers, cigarette butts, and other debris.

5. Waste Sorting: To ensure responsible waste management, collected materials were sorted into recyclables and non-recyclables. Recycling bins were provided for recyclable waste, while non-recyclables were properly disposed of in designated containers.

6. Collaboration: The event fostered collaboration between the local community, educational institutions, and governmental bodies. This cooperative effort

showcased the potential for positive change when stakeholders come together for a common cause.

Achievements:

The Beach Clean-Up event at Veli Beach on September 16, 2023, made significant strides in raising environmental awareness and promoting responsible behavior. Some notable achievements include:

- Removal of a substantial amount of litter and waste from the beach, contributing to the restoration of the natural beauty of Veli Beach.
- Education and enlightenment of 110 volunteers and countless onlookers regarding the importance of preserving our coastal ecosystems.
- Enhancement of community engagement and the establishment of lasting partnerships between educational institutions, NGOs, and local authorities in the pursuit of sustainable environmental practices.

Conclusion:

The "Beach Clean-Up" event organized by the Centre for Environmental Studies and Paryavaran Mitra Eco Club, in association with the Sutera Foundation, was a resounding success in furthering the goals of the "No More Beach Clean-Ups" Mega Awareness Campaign. It demonstrated the power of collective action in preserving our pristine shores and fostering environmental stewardship. The event's impact will hopefully inspire similar initiatives in the future, leading to cleaner and healthier coastal environments for generations to come.

അന്താരാഷ്ട്ര ഓസോൺ സംരക്ഷണദിനത്തിൽ തിരുവനന്തപുരം മാർ ഗ്രിഗോറിയോസ് കോളേജ് ഓഫ് ലോയിലെ സെന്റർ ഫോർ എൻവയോൺമെന്റൽ സ്റ്റഡീസും ഇക്കോ ക്ലബ്ബും സുസ്ഥിര ഫൗണ്ടേഷനും ചേർന്ന് വേളി കടൽത്തീരം ശുചീകരിച്ചപ്പോൾ. കോളേജ് ഡയറക്ടർ ഫാ. ജോസഫ് വെൻമാനം, സെൻറർ കോ-ഓർഡിനേറ്റർമാരായ ജിൻസി പി. ബാബു, സ്വാതി നായർ എന്നിവർ നേതൃത്വം നൽകി


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Join Us for a Cleaner Tomorrow!
Organized by:
Centre for Environmental Studies,
Paryavaran Mitra (Eco Club) of Mar Gregorios College of Law,
in collaboration with Sustera Foundation
United Nations Academic Impact
BEACH CLEAN-UP
Let's Preserve Our Pristine Shores
16 SEPTEMBER 2023
03: 00 pm to 05:00 Pm
Beach Location: Veli Beach
As part of the "No More Beach Clean-Ups" Mega Awareness Campaign
Organized by Thiruvananthapuram Municipal Corporation
Together, We Can Make a Difference!
Join Hands for a Cleaner, Greener, and Healthier Planet
Be the Change, Be a Paryavaran Mitra!

അന്താരാഷ്ട്ര ഓസോൺ സംരക്ഷണ ദിനത്തോടനുബന്ധിച്ച് മാർ ഗ്രിഗോറിയോസ് കോളജ് ഓഫ് ലോയിലെ സെന്റർ ഫോർ എൻവയോൺമെന്റൽ സ്റ്റഡീസും, ഇക്കോക്ലബും, സുസ്ഥര ഫൗണ്ടേഷനും സംയുക്തമായി 'നോ മോർ ബീച്ച് ക്ലീനപ്പ്' കാമ്പയിന്റെ ഭാഗമായി വേളി കടൽത്തീരം ശുചീകരിച്ചപ്പോൾ.

ഓസോൺ ദിനാചരണം നടത്തി

തിരുവനന്തപുരം: അന്താരാഷ്ട്ര ഓസോൺ സംരക്ഷണ ദിനത്തോടനുബന്ധിച്ച് തിരുവനന്തപുരം മാർ ഗ്രിഗോറിയോസ് കോളജ് ഓഫ് ലോയിലെ സെന്റർ ഫോർ എൻവയോൺമെന്റൽ സ്റ്റഡീസും ഇക്കോ ക്ലബും, സുസ്ഥര ഫൗണ്ടേഷനും സംയുക്തമായി തിരുവനന്തപുരം മുനിസിപ്പൽ കോർപ്പറേഷനിൽ നടത്തിവരുന്ന "നോ മോർ ബീച്ച് ക്ലീനപ്പ്- മെഗാ അവെർനസ് കാമ്പയിൻ" ന്റെ ഭാഗമായി വേളി കടൽ തീരം ശുചീകരിച്ചു.

കോളജ് ഡയറക്ടർ ഫാ. ജോസഫ് വെൻമാനത്തിന്റെയും സെന്റർ കോർഡിനേറ്റർമാരായ ജിൻസി. പി. ബാബുവിന്റെയും സ്വാതിനായരുടെയും നേതൃത്വത്തിൽ 110-ഓളം ഗ്രീൻ വോളന്റിയർമാർ പരുപാടിയിൽ പങ്കെടുത്തു.

സായാഹ്ന ധർണ സംഘടിപ്പിച്ചു

നെടുമങ്ങാട്: മദ്യനയം പിൻവലിക്കുക, കേരളത്തിൽ ഉടനീളം മദ്യശാലകൾ തുറന്നു മദ്യപ്രളയം സൃഷ്ടിക്കുന്ന നയങ്ങൾ പിൻവലിക്കുക, സർക്കാർ പാഠ്യപദ്ധതി പരിഷ്കരിക്കുക. എന്നീ ആവശ്യങ്ങൾ ഉന്നയിച്ച് കേരള മദ്യനിരോധന സമിതി നെടുമങ്ങാട് ചന്തമുക്കിൽ സംഘടിപ്പിച്ച സായാഹ്ന ധർണ നഗര

ഓസോൺ ദിനം: വേളി കടൽത്തീരം ശുചീകരിച്ചു

തിരുവനന്തപുരം● ഓസോൺ സംരക്ഷണ ദിനത്തോടനുബന്ധിച്ച് നാലാഞ്ചിറ മാർ ഗ്രിഗോറിയോസ് കോളജ് ഓഫ് ലോയിലെ സെന്റർ ഫോർ എൻവയൺമെന്റൽ സ്റ്റഡീസും ഇക്കോ ക്ലബും സുസ്ഥിര ഫൗണ്ടേഷനും ചേർന്ന് വേളി കടൽത്തീരം ശുചീകരിച്ചു.

കോളജ് ഡയറക്ടർ ഫാ. ജോസഫ് വെൻമാനത്ത്, സെന്റർ കോ ഓർഡിനേറ്റർമാരായ ജിൻസി. പി. ബാബു, സ്വാതി നായർ എന്നിവർ നേതൃത്വം നൽകി.

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REPORT ON THE BEACH CLEAN-UP EVENT

Event Details:

Date: 16 march 2024

Time: 3:00 PM - 5:00 PM

Beach Location: Vettukadu Beach

Number of Green Volunteers:60

Introduction:

The Centre for Environmental Studies and Paryavaran Mitra Eco Club, in collaboration with the Sutera Foundation, proudly presented a significant event, the "Beach Clean-Up" as part of the "No More Beach Clean-Ups" Mega Awareness Campaign. This event was organized with the support of the Thiruvananthapuram Municipal Corporation. The primary aim of this initiative was to raise awareness about the importance of preserving our pristine shores and oceans by actively engaging in responsible environmental practices.

Event Highlights:

1. Location: Vettukadu Beach was chosen as the site for this Beach Clean-Up due to its popularity and the need for regular maintenance. The beach, located along the Arabian Sea, serves as a vital recreational spot for the local community and tourists alike.

2. Participation: The event attracted an impressive turnout of 60 green volunteers, including students from Mar Gregorios College of Law and enthusiastic members of the Paryavaran Mitra Eco Club. The diversity in age and background among the participants highlighted the inclusive nature of the campaign.

3. Awareness: Prior to commencing the clean-up activities, an informative session was conducted by environmental experts and representatives from the Thiruvananthapuram Municipal Corporation. They shared valuable insights into the adverse effects of littering and pollution on coastal ecosystems and marine life. The session emphasized the urgent need for collective action to protect our environment.

4. Clean-Up Activities: The volunteers were provided with gloves, trash bags, and other necessary equipment. They were divided into groups; each assigned a specific section of the beach to clean. The participants enthusiastically collected various forms of waste, including plastic bottles, wrappers, cigarette butts, and other debris.

5. Waste Sorting: To ensure responsible waste management, collected materials were sorted into recyclables and non-recyclables. Recycling bins were provided for recyclable waste, while non-recyclables were properly disposed of in designated containers.

6. Collaboration: The event fostered collaboration between the local community, educational institutions, and governmental bodies. This cooperative effort

showcased the potential for positive change when stakeholders come together for a common cause.

Achievements:

The Beach Clean-Up event at Veli Beach on16 March 2024, made significant strides in raising environmental awareness and promoting responsible behavior. Some notable achievements include:

- Removal of a substantial amount of litter and waste from the beach, contributing to the restoration of the natural beauty of Vettukadu Beach.
- Education and enlightenment of 60 volunteers and countless onlookers regarding the importance of preserving our coastal ecosystems.
- Enhancement of community engagement and the establishment of lasting partnerships between educational institutions, NGOs, and local authorities in the pursuit of sustainable environmental practices.

Brand auditing was done.

Conclusion:

The "Beach Clean-Up" event organized by the Centre for Environmental Studies and Paryavaran Mitra Eco Club, in association with the Sutera Foundation, was a resounding success in furthering the goals of the "No More Beach Clean-Ups" Mega Awareness Campaign. It demonstrated the power of collective action in preserving our pristine shores and fostering environmental stewardship. The event's impact will hopefully inspire similar initiatives in the future, leading to cleaner and healthier coastal environments for generations to come.


No More Beach Clean Ups!
A MEGA AWARENESS CAMPAIGN
Organised by

അന്താരാഷ്ട്ര ഓസോൺ സംരക്ഷണ ദിനത്തോടനുബന്ധിച്ച് മാർ ഗ്രിഗോറിയോസ് കോളജ് ഓഫ് ലോയിലെ സെന്റർ ഫോർ എൻവയോൺമെന്റൽ സ്റ്റഡീസും, ഇക്കോക്ലബും, സുസ്ഥര ഫൗണ്ടേഷനും സംയുക്തമായി 'നോ മോർ ബീച്ച് ക്ലീനപ്പ്' കാമ്പയിന്റെ ഭാഗമായി വേളി കടൽത്തീരം ശുചീകരിച്ചപ്പോൾ.

ഓസോൺ ദിനാചരണം നടത്തി

തിരുവനന്തപുരം: അന്താരാഷ്ട്ര ഓസോൺ സംരക്ഷണ ദിനത്തോടനുബന്ധിച്ച് തിരുവനന്തപുരം മാർ ഗ്രിഗോറിയോസ് കോളജ് ഓഫ് ലോയിലെ സെന്റർ ഫോർ എൻവയോൺമെന്റൽ സ്റ്റഡീസും ഇക്കോ ക്ലബും, സുസ്ഥര ഫൗണ്ടേഷനും സംയുക്തമായി തിരുവനന്തപുരം മുനിസിപ്പൽ കോർപ്പറേഷനിൽ നടത്തിവരുന്ന "നോ മോർ ബീച്ച് ക്ലീനപ്പ്- മെഗാ അവെർനസ് കാമ്പയിൻ" ന്റെ ഭാഗമായി വേളി കടൽ തീരം ശുചീകരിച്ചു.

കോളജ് ഡയറക്ടർ ഫാ. ജോസഫ് വെൻമാനത്തിന്റെയും സെന്റർ കോർഡിനേറ്റർമാരായ ജിൻസി. പി. ബാബുവിന്റെയും സ്വാതിനായരുടെയും നേതൃത്വത്തിൽ 110-ഓളം ഗ്രീൻ വോളന്റിയർമാർ പരുപാടിയിൽ പങ്കെടുത്തു.

സായാഹ്ന ധർണ സംഘടിപ്പിച്ചു

നെടുമങ്ങാട്: മദ്യനയം പിൻവലിക്കുക, കേരളത്തിൽ ഉടനീളം മദ്യശാലകൾ തുറന്നു മദ്യപ്രളയം സൃഷ്ടിക്കുന്ന നയങ്ങൾ പിൻവലിക്കുക, സർക്കാർ പാഠ്യപദ്ധതി പരിഷ്കരിക്കുക. എന്നീ ആവശ്യങ്ങൾ ഉന്നയിച്ച് കേരള മദ്യനിരോധന സമിതി നെടുമങ്ങാട് ചന്തമുക്കിൽ സംഘടിപ്പിച്ച സായാഹ്ന ധർണ നഗര

ഓസോൺ ദിനം: വേളി കടൽത്തീരം ശുചീകരിച്ചു

തിരുവനന്തപുരം● ഓസോൺ സംരക്ഷണ ദിനത്തോടനുബന്ധിച്ച് നാലാഞ്ചിറ മാർ ഗ്രിഗോറിയോസ് കോളജ് ഓഫ് ലോയിലെ സെന്റർ ഫോർ എൻവയൺമെന്റൽ സ്റ്റഡീസും ഇക്കോ ക്ലബും സുസ്ഥിര ഫൗണ്ടേഷനും ചേർന്ന് വേളി കടൽത്തീരം ശുചീകരിച്ചു.

കോളജ് ഡയറക്ടർ ഫാ. ജോസഫ് വെൻമാനത്ത്, സെന്റർ കോ ഓർഡിനേറ്റർമാരായ ജിൻസി. പി. ബാബു, സ്വാതി നായർ എന്നിവർ നേതൃത്വം നൽകി.