GREEN AUDIT REPORT

ST. FRANCIS DE SALES COLLEGE

BENGALURU

Executed by

OTTOTRACTIONS
Energy - Engineering - Environment

2023

OTTOTRACTIONS
Energy - Engineering - Environment

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Green Audit Report
St. Francis De Sales College, Bengaluru
Report No: EA 1087/GA
2023-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. Ottotractions is an ISO 9001-2015, ISO 17020-2012 and ISO 14001-2015 Certified organization, which ensures the quality of its services.

Acknowledgment

We were privileged to work together with the administration and staff of St. Francis De Sales College, Bengaluru. We are grateful to them for the timely help extended to complete the audit and bringing out this report.

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
Government of India

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

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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 St. Francis De Sales College, Bengaluru 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.

ST. FRANCIS DE SALES COLLEGE, BENGALURU

St. Francis de Sales College is manned by the Missionaries of St. Francis de Sales (MSFS) of South West India Province, who firmly believe that 'the education of the heart is the heart of education' hailed by its founder Fr. Peter Marie Mermier. The MSFS Fathers have nearly two centuries of experience and expertise in imparting quality higher education in every continent of the world. The MSFS Fathers are optimistically committed to forming the 'Future world citizens' through more than 160 quality educational institutions in India.

The college is named after St. Francis de Sales, the patron of the Missionaries of St. Francis de Sales, who considered, knowledge as the eighth sacrament. We believe that true education is directed towards the formation of the human personality for the good of the society. Hence, we aim to motivate the young to strive for excellence and to become integrated persons who willingly shoulder the responsibility for building a just and humane society. Thus SFS College befits everyone's educational requirements, particularly of the backward classes and the less privileged sections of the rural belt of Rural Bengaluru.

Occupancy Details	
Particulars	2022-23
Total Students	2460
Staffs	120
Total Occupancy of the college	2580

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	St. Francis De Sales College, Bengaluru									
2	Address (include telephone, fax & e-mail)	St Francis de Sales College (SFS COLLEGE) Electronics City Post, Bengaluru,Karnataka – 560 100, India e mail-pro@sfscollege.in									
3	Year of Establishment	2004									
4	Name of building and Total No. of Electrical Connections/building	SFS College (2)									
5	Total Number of Students	Boys		Girls		Total	2460				
6	Total Number of Staff	120									
7	Total Occupancy	2580									
8	Total area of green cover	50%									
9	Type of Electrical Connection	HT	0	LT	2						
10	Total Connected Load (kW)	30									
11	Average Maximum Demand (KVA)	-									
12	Total built up area of the building (M^2)	12450									
13	Number of Buildings	1									
14	Average system Power Factor	0.99									
15	Details of capacitors connected	Nil									
16	Transformer Details (Nos., kVA, Voltage ratio)	TR 1									
		0									
17	DG Set Details (kVA)	DG1	DG2	DG3	DG4	DG5	Remarks				
		62.5									
18	Details of motors	Rating		Nos.		Remarks					
		5 to 10		2							
		10 to 50									
		Above 50									
19	Brief write-up about the firm and the energy/environmental conservation activities already undertaken.	Installed biogas plant, Energy conservation projects,Installed 12.5kWp solar power plant									
20	Contact Person & Telephone number										

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 visit it 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 1081 occupants of these campuses will reach same number of households. This message will spread to at least 4324 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.

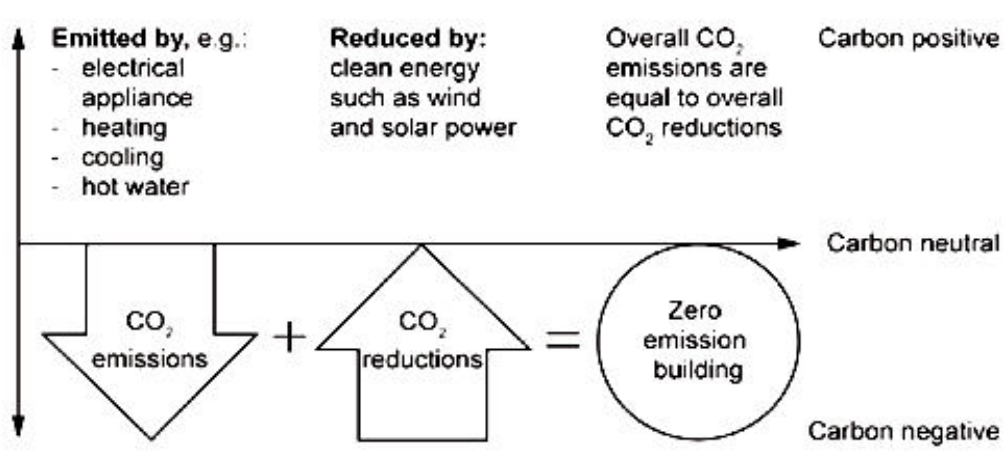
Global Warming Potential (GWP) is a measure of how much heat a greenhouse gas traps in the atmosphere up to a specific time horizon, relative to carbon dioxide. The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is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

Carbon emission from transportation to 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 below.

Step 1: Determine the total green weight of the tree

The green weight is the weight of the tree when it is alive. First, you have to calculate the green weight of the above-ground weight as follows:

W above-ground= 0.25 D2 H (for trees with D<11)

W above-ground= 0.15 D2 H (for trees with D>11)

W above-ground= Above-ground weight in pounds

D = Diameter of the trunk in inches

H = Height of the tree in feet

The root system weight is about 20% of the above-ground weight. Therefore, to determine the total green weight of the tree, multiply the above-ground weight by 1.2:

$W_{\text{total green weight}} = 1.2 * W_{\text{above-ground}}$

Step 2: Determine the dry weight of the tree

The average tree is 72.5% dry matter and 27.5% moisture. Therefore, to determine the dry weight of the tree, multiply the total green weight of the tree by 72.5%.

$W_{\text{dry weight}} = 0.725 * W_{\text{total green weight}}$

Step 3: Determine the weight of carbon in the tree

The average carbon content is generally 50% of the tree's dry weight total volume. Therefore, in determining the weight of carbon in the tree, multiply the dry weight of the tree by 50%.

$W_{\text{carbon}} = 0.5 * W_{\text{dry weight}}$

Step 4: Determine the weight of carbon dioxide sequestered in the tree

CO_2 has one molecule of Carbon and 2 molecules of Oxygen. The atomic weight of Carbon is 12 (u) and the atomic weight of Oxygen is 16 (u). The weight of CO_2 in trees is determined by the ratio of CO_2 to C is 44/12 = 3.67. Therefore, to determine the weight of carbon dioxide sequestered in the tree, multiply the weight of carbon in the tree by 3.67. $W_{\text{carbon-dioxide}} = 3.67 * W_{\text{carbon}}$

3

RESULTS AND DISCUSSIONS

3.1 CARBON FOOTPRINT ESTIMATION

3.1.1 ENERGY

a. Electricity

Electricity is purchased from BESCOM under 2 LT Connections, the details are given below.

Electricity Connection Details		
St. Francis De Sales College, Bengaluru		
1	Name of the Consumer	St. Francis De Sales College, Bengaluru
2	Tariff	LT-6B Ndom
3	Consumer Numbers	1954504, 1988407
4	Connected Load Total (kW)	30
5	Annual Electricity Consumption (kWh)	26805

Electricity Bill Analysis

Electricity Bill Details (2022-23)		
Name of the Consumer	**St. Francis De Sales College, Bengaluru**	
Connected Load (kW)		**15**
Consumer No		**1954504**
Month	kWh	Total amount to be paid (Rs)
Apr	1468	15754
May	1437	14249
Jun	2665	25972
Jul	1401	15126
Aug	1820	19572
Sep	1901	21710
Oct	1433	16486
Nov	1768	19532
Dec	1867	21340
Jan	1195	13221
Feb	2082	21634
Mar	2746	27898

Electricity Bill Details (2022-23)		
Name of the Consumer	**St. Francis De Sales College, Bengaluru**	
Connected Load (kW)		**15**
Consumer No		**1988407**
Month	kWh	Total amount to be paid (Rs)
Apr	619	7330
May	287	3954
June	388	5447
July	276	3365
Aug	239	3842
Sep	287	3456
Oct	920	10832
Nov	403	5603
Dec	658	7235
Jan	260	2983
Feb	321	3707
Mar	364	4387

Annual Electricity Consumption (kWh)		
Consumer No	**2022-23**	**Connected Load (kW)**
1954504	21783	15
1988407	5022	15
Total	26805	30

b. Diesel

Diesel Consumption Details				
	Transportation	Generator	Total	cost
	in L	in L	in L	in Rs
22-23	0	189	189	17987

Base Line Energy Data		
St. Francis De Sales College, Bengaluru		
		2022-23
1	Electricity BESCOM (kWh)	26805
2	Electricity DG (kWh)	568
3	Electricity Solar , Off grid (kWh)	3992
4	Electricity (BESCOM + DG + Off grid) kWh	31365
5	Electricity Grid Tied (kWh)	15969
6	Diesel (L)	189
7	LPG (kg)	0.00
8	Biogas generated/year (kg)	330.00

Energy Consumption Profile		
Sl No	Fuel	2022-23
		kCal
1	Electricity	26974077
2	Diesel	1988063
3	LPG	0
4	Biogas	1540000
Total		30502140

Thermal Fuel Consumption	
St. Francis De Sales College, Bengaluru	
	2022-23
Annual LPG consumption in kg	0.0
Annual Diesel consumption in L	189
Annual petrol consumption in L	0
Annual Biogas consumption in kg	330.00

3.1.2 Renewable Energy

12.5kWp Solar Power plant

The installation of a 12.5kWp on-grid solar power plant in the campus is an exemplary initiative and one of the best practices adopted by the college. This solar power plant efficiently harnesses the abundant solar energy available, ensuring sustainable electricity generation. With an annual electricity generation capacity of 15330 units, this solar power plant not only meets a significant portion of the campus's energy needs but also helps in reducing the institution's carbon footprint. By mitigating approximately 10.48 tons of CO_2 emissions per year, the solar power plant plays a crucial role in promoting clean energy and environmental conservation within the college. It stands as a shining example of the college's commitment to renewable energy and serves as an inspiration for other institutions to follow suit.

Solar Power Plant		
Location	**Capacity (kWp)**	**2022-23**
		Annual generation (kWh)
College Campus	12.5	15969
Total kWh		15969

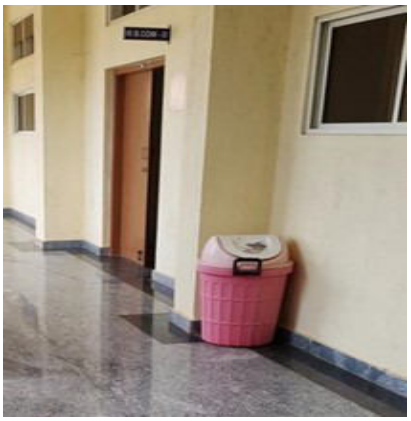
3.2. Specific Energy Consumption

OTTOTRACTIONS- ENERGY AUDIT		
St. Francis De Sales College, Bengaluru		
Energy Performance Index (EPI)		
Sl No	**Particulars**	2022-23
1	Total building area (m^2)	12450
2	Annual Energy Consumption (kCal)	30502140
3	Annual Energy Consumption (kWh)	35468
4	Total Energy in Toe	3.05
5	Specific Energy Consumption kWh/m^2	2.85

The specific energy consumption in 2022-23 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	
St. Francis De Sales College, Bengaluru	
Particulers	2022-23
Total Occupancy	2580
Waste generated in kg /day	51.6
Waste generated in kg /Yr	11352

Non-Degradable waste

Solid non degradable Waste Generation	
St. Francis De Sales College, Bengaluru	
Particulers	2022-23
Total Occupancy	2580
Waste paper generated in kg /day	0.516
Waste plastic generated in kg /day	0.774
Waste paper generated in kg /Yr	113.52
Waste plastic generated in kg /Yr	170.28

3.4. Transportation

The college have no vehicles for logistics

Carbon Emission Profile (2022-23)

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	tCo2e/kWh
Diesel	0.0032	tCo2e/kg
LPG	0.0015	tCo2e/kg
Biogas	0.0014	tCo2e/kg
Petrol	0.0031	tCo2e/kg
Food Waste	0.00063	tCo2e/kg
Paper Waste	0.00056	tCo2e/kg

Carbon Foot Print 2022-23

Carbon Foot Print			
Sl. No.	Particulars	2022-23	tCO2e
1	Electricity (kWh)	31365	25.72
2	Diesel (L)	189	0.61
3	LPG (kg)	0.00	0.00
4	Biogas (kg)	330.00	0.462
5	Degradable Waste in kg/yr.	11352.0	7.15
6	Paper Waste in kg/yr	113.52	0.06
Total Carbon Foot Print tCO2e/yr			34.00

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	2022-23
Total No of Trees	28
Carbon sequestrated by trees in the campus (tCO2e)	1.27

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 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

List of Trees in Campus

List of trees in campus			
Sl.No	**Botanical Name**	**Common Name**	Number
1	Tamarindus indica	Tamarind	1
2	Cupressus sempervirens	Cypress	1
3	Mangifera indica	Mango	1
4	Pisonia grandis	Grand devil's-claws	1
5	Phoenix reclinata	Wild date palm	1
6	Caryota Mitis	Fishtail palm	1

7	Carica papaya	Papaya	1
8	Spathodea campanulata	African tulip	1
9	Artocarpus heterophyllus	Jack Fruit	1
10	Cocos nucifera	Coconut	1
11	Ficus Benjamina	Weeping Fig	1
12	Delonix regia	Gulmohar	1
13	Magnolia champaca	Champa/Sampige	1
14	Dendrocalamus asper	Rough Giant Bamboo	1
15	Araucaria heterophylla	Christmas Tree	1
16	Cupressus macrocarpa	Monterey cypress/Goldcrest	1
17	Rhopalostylis sapida	Nikau Palm	1
18	Ficus retusa	Indian Laurel Fig	1
19	Hyophorbe lagenicaulis	Bottle palm	1
20	Tecoma Stans	Yellow bells	1
21	Filicium decipiens	Japanese Fern Tree	1
22	Tectona Grandis	Teak	1
23	Terminalia Catappa	Indian Almond	1
24	Grevillea robusta	Silver Oak	1
25	Moringa oleifera	Drumstick Tree	1
26	Pongamia Pinnata	Pongam Tree	1
27	Murraya koenigii	Curry Leaf	1
28	Azadirachta indica	Neem	1
	Total		28

CARBON FOOTPRINT OF THE CAMPUS (2022-23)

Various carbon emitting activities such as consumption of energy, transportation and waste generation leads to the total emission of **34.00tCO_2e** per year by the campus. The total carbon sequestration by trees in the campus compound is **1.27tCO_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:

Specific CO2 Footprint

Amount of Carbon to be mitigated for Low Carbon Campus		
Sl No	Particulars	2022-23
1	Total carbon emission tCO2e	34.00
2	Total carbon sequestration tCO2e	1.27
3	Amount of carbon mitigated through renewable energy tCO2e	13.56
4	To be mitigated tCO2e	19.17
5	Total No of Students	2580
6	Specific Carbon Footprint kg CO2e/Student/Yr	7.43

The total specific carbon footprint is estimated as **7.43** kg of CO_2e per student for the year 2022-23.

4

Carbon Mitigation Plans

The total emission of the carbon dioxide per student is **34.00** kg per year (2022-2023). 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 campus is 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 biogas and 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						
St. Francis De Sales College, Bengaluru						
Greenhouse Gas Mitigation through Major Energy Efficiency Projects						
Sl No	Projects proposed	Energy saved (Yearly)		Sustainability (Years)	First year ton of CO2 mitigated	Expected Tons of CO2 mitigated through out life cycle
		(kWh)	MWh	Years		
1	Energy Saving in Lighting by replacing existing 287 No's T8 (40W) Lamps to 18W LED Tube	6061	6.06	10	4.42	44.25
2	Energy Saving by replacing existing 347 No's in-efficient ceiling fans with Energy Efficient Five star fans	6529	6.53	10	4.77	47.66
Total		**12591**	**13**	**10**	**9.19**	**91.91**

OTTOTRACTIONS- ENERGY AUDIT						
St. Francis De Sales College, Bengaluru						
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 15kWp Solar Power Plant	20531	20.53	25	14.99	374.70

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal	
Energy Saving in Lighting by replacing existing 287 No's T8 (40W) Lamps to 18W LED Tube	
Existing Scenario	
287 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)	2400
No of fittings	287
Total load (kW)	11.48
Annual Energy Consumption (kWh)	11021
Expected Annual Energy saving for replacing all fittings (kWh)	6061
Cost of Power (Rs)	10.75
Annual saving in Lakhs Rs (1st year)	0.65
Investment required for complete replacements [@Rs 300 per fittings](Lakhs Rs)	0.86
Simple Pay Back (in Months)	15.86

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal	
Energy Saving by replacing existing 347 No's in-efficient ceiling fans with Energy Efficient Five star fans	
Existing Scenario	
There are 347 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)	2400
Total numbers of ordinary fans	347
Total load (kW)	24.29
Annual Energy Consumption (kWh)	23318
Expected Annual Energy saving, for total replacement(kWh)	6529
Cost of Power (Rs)	10.75
Annual saving in Lakhs Rs (1st year)	0.70
Investment required for a total replacement (Lakhs Rs)[@3000 Rs per Fan with 50W at full speed]	10.41
Simple Pay Back (in Months)	178.03

Energy Saving Proposal	
Installation of 15kWp 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 10kW 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)	15
Total average kWh per day expected (3.5kWh/day average)	56.25
Total annual Generating Capacity (kWh)	20531
Cost of energy generated annually Lakhs Rs	2.73
Investment required (INR lakh)(Approx)	8.25
Simple Pay Back (in Months)	36.26
Life cycle in Yrs	25
Total Saving in Life Cycle (Approx) RS lakh	68.27

Executive Summary					
Consolidated Cost Benefit Analysis of Energy Efficiency Improvement Projects					
St. Francis De Sales College, Bengaluru					
Sl No	Projects	Investment	Cost saving	SPB	Energy saved
		(Lakhs Rs)	(Rs)/Yr	Months	kWh/Yr
1	Energy Saving in Lighting by replacing existing 287 No's T8 (40W) Lamps to 18W LED Tube	0.86	0.651	15.86	6061
2	Energy Saving by replacing existing 347 No's in-efficent ceiling fans with Energy Efficient Five star fans	10.41	0.702	178.03	6529
3	Installation of 15kWp Solar Power Plant	8.25	2.731	36.26	20531
	Total	**19.52**	**4.08**	**76.72**	**33122**
(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.)					

5
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	34.00
2	Carbon Sequrested tCO2e/yr	1.27
3	Carbon mitigated by Renewable Energy tCO2e/yr (Installed)	13.56
4	Carbon mitigated by Renewable Energy tCO2e/yr (Proposed)	14.99
5	Carbon mitigated by Energy Efficiency (Proposed) tCO2e/yr	9.19
6	Effective Carbon footprint tCO2e/yr	-5.01
7	Total No of Students	2460
8	Specific Carbon Footprint kg CO2e/Student/Yr	-2.03

From this study it was found that carbon footprint of the campus to be **-2.03**kgCO_2e/ Student/ Year in place of current footprint i.e.,**34.00** kgCO_2e/ student/ Year. To achieve this, an investment of **19.52Lakhs Rs** is required through energy efficiency and renewable energy projects proposed. It will be around **794 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	11.27
2	Cost of implementation in Renewable Energy Lakhs Rs	8.25
3	Total Lakhs Rs	19.52
4	Total number of students	2460
5	Cost per student to make the campus carbon negative Rs/ Student	794

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6

TECHNICAL SUPPLEMENT

St. Francis De Sales College, Bengaluru								
Sl. No	Building	Location	Lights		Fans	IT	AC	Others
			T8	LED T	CF	projector	1.5	LCD
1	First Floor	R. No. 101	4	2	4	1		1
2		R. No. 102	2	1	4	1		1
3		R. No. 103	2	1	4	1		1
4		R. No. 104	2	1	4	1		1
5		R. No. 105	2	1	4	1		1
6		R. No. 106	2		4	1		1
7		R. No. 107	2		2	1		1
8		R. No. 108	3	1	2	1		1
9		R. No. 109	3	1	2	1		1
10		R. No. 110	3	1	2	1		1
11		R. No. 111	3	1	2	1		1
12		Maths Lab	3	1	2			
13		Computer Lab 1		9	6	1		1
14		Computer Lab 2		9	6	1		1
15		Seminar Hall	5	1	6	1		
16		Business Lab		8	6	1		1
17		Auditorium	4	16	12	1		
18		IQAC	5		3			
19		Sick Room		1	1			
20		Kuvempu Hall	2		1			
21	Second Floor	R. No. 201	4	1	6	1		1
22		R. No. 202	5	2	6	1		1
23		R. No. 203	3	1	6	1		1

24		R. No. 204	5	1	6	1		1
25		R. No. 205	3	1	4	1		1
26		R. No. 206	4	1	4	1		1
27		R. No. 207	4	1	3	1		1
28		R. No. 208	2		2	1		1
29		R. No. 209	4	1	2	1		1
30		R. No. 210	4	1	2	1		1
31		R. No. 211	4	1	2	1		1
32		Psychology Lab	10	2	8	1		1
33		Physics Lab	4	2	4			
34		Chemistry Lab	6	2	5			
35		Electronics Lab	2	2	4			
36		Yoga Hall	4	4	4			
37	Third Floor	R. No. 301	4	1	4	1		1
38		R. No. 302	4	1	4	1		1
39		R. No. 303	5	1	4	1		1
40		R. No. 304	4	1	4	1		1
41		R. No. 305	5	1	4	1		1
42		R. No. 306	5	1	4	1		1
43		R. No. 307	5	1	4	1		1
44		R. No. 308	5	1	4	1		1
45		R. No. 309	5	1	4	1		1
46		R. No. 310	4	1	4	1		1
47		R. No. 311	5	1	4	1		1
48		R. No. 312	5	1	4	1		1
49		R. No. 401	6	1	4	1		1
50		R. No. 402	2	1	2	1		1
51		R. No. 403	6	1	4	1		1
52	Fourth Floor	R. No. 404	6	1	4	1		1
53		R. No. 405	5	1	4	1		1

54		R. No. 406	5	1	4	1		1
55		R. No. 407	2	1	4	1		1
56		R. No. 408	2	1	4	1		1
57		R. No. 409	2	1	4	1		1
58		R. No. 410	2	1	4	1		1
59		R. No. 411	3	1	6	1		1
60		R. No. 412	2	1	4	1		1
61		R. No. 413	2	1	4	1		1
62		R. No. 414	2	1	4	1		1
63		R. No. 415	2	1	4	1		1
64		R. No. 416	2	1	4	1		1
65		R. No. 417	2	1	4	1		1
66		R. No. 418	2	1	6	1		1
67		Conference Hall 1		48		1	4	1
68		Conference Hall 2		18		1	2	1
69		Conference Hall 3		22		1	2	1
70	Basement Floor	B01						
71		B02						
72		B03						
73		B04	4	1	2	1		1
74		B05	3	1	4	1		1
75		B06	4	1	4	1		1
76		B07	3	1	4	1		1
77		Gym Room	6	2				
78		Studio	4	12		1	1	
79		Ambedkar Room	4	4	2			
80	Ground Floor	Library	8	6	12			
81		Digital Library		8	4			
82		Faculty Room - PG	5		3			
83		NCC		8	1			

84		Staff Room 1	4	8	10			
85		Staff Room 2	2	4	4			
86		Staff Room 3	2	6	10			
87		Staff Room 4	2	4	4			
88		Staff Room 5	2	4	6			
89		Staff Room 6						
90		H R Office	2	8	4			
91		Principal Reception	6	14	2			
92		Academic Office		6	4			
93		Solar Street Light		10				
		Total	287	304	347	66	9	63

UPS			
S. No.	**Rating (kVA)**	**Nos**	**Total kVA**
1	1	6	6
2	2	1	2
3	2.5	1	2.5
4	3	2	6
5	3.5	3	10.5
6	5	1	5
7	10	1	10
8	30	2	60
Total			102

List of Flora in the campus aged above 10 years

S.No	Botanical Name	Common Name	Aged above (in years)
1	Tamarindus indica	Tamarind	10
2	Cupressus sempervirens	Cypress	10
3	Mangifera indica	Mango	10
4	Pisonia grandis	Grand devil's-claws	10
5	Phoenix reclinata	Wild date palm	10
6	Caryota Mitis	Fishtail palm	10
7	Carica papaya	Papaya	-
8	Spathodea campanulata	African tulip	10
9	Artocarpus heterophyllus	Jack Fruit	10
10	Cocos nucifera	Coconut	10
11	Ficus Benjamina	Weeping Fig	10
12	Delonix regia	Gulmohar	10
13	Magnolia champaca	Champa/Sampige	10
14	Dendrocalamus asper	Rough Giant Bamboo	10
15	Araucaria heterophylla	Christmas Tree	10
16	Cupressus macrocarpa	Monterey cypress/Goldcrest	10
17	Rhopalostylis sapida	Nikau Palm	10
18	Ficus retusa	Indian Laurel Fig	10
19	Hyophorbe lagenicaulis	Bottle palm	10
20	Tecoma Stans	Yellow bells	10
21	Filicium decipiens	Japanese Fern Tree	10
22	Tectona Grandis	Teak	10
23	Terminalia Catappa	Indian Almond	10
24	Grevillea robusta	Silver Oak	10
25	Moringa oleifera	Drumstick Tree	10
26	Pongamia Pinnata	Pongam Tree	10
27	Murraya koenigii	Curry Leaf	10
28	Azadirachta indica	Neem	10

Index

bE-Responsible

Ensyde
Koramangala - 95
Bangalore

Responsible e-waste management

28 Feb 2020

St. Francis De Sales College
Electronics city
Bengaluru

Respected
Rev Dr Roy P.K.
Principal

Saahas in partnership with Environmental Synergies in Development (ENSYDE), both NGOs, is implementing the responsible collection and disposal of non-bulk e-waste through KSPCB authorized recyclers .
We have carried out over 320 successful campaigns and collected over 65 tonnes of E- Waste in Bangalore.

We would be happy to collect electronic waste from your institution for a period of one year. We thank you for your association with the bE-Responsible program and for taking a step in disposing your e-waste in a safe manner.

Yours Sincerely,
for Vijayaraghavan

www.be-responsible.in

PRINCIPAL
St.Francis de Sales College
Electronics City Post, Bengaluru - 560 100

SAAHAS

ENSYDE

MEMORANDUM OF UNDERSTANDING

This Memorandum of understanding

is signed on April 6, 2020 for a period of 3 years

Among and between

St Francis de Sales College, Electronic City post, Bengaluru - 560100, represented by its Authorized Signatory **Rev. Dr. Roy P.K** and hereinafter referred to as **SFS COLLEGE** (which Expressions shall, unless repugnant to the context of meaning thereof, mean and include its executors, authorized representatives, administrators, successors in interest and permitted assigns) of the first party

AND

Scieniot Technologies an Existing Company within the meaning of the company's act, 1956 having its office at, **No, 10, SA Complex, 100 ft. Ring Road, JP Nagar 6th Phase, Bengaluru -78,** Represented through its propertior **Dr. Sanjeev. S**, referred to as party of the second Party (Which Expressions Shall, unless repugnant to the context of meaning thereof, mean and include its executors, authorized representatives, administrators, successors in interest and permitted assigns)

Whereas **Scieniot Technologies** will collect **Dry waste and E- waste under the WOW Initiative and send to ITC Factory for Recycling.** ITC Has Set up a material recycling factory at Bhadrachalem and Kovai, which is Fully compliant with environment Protection Act, 1986, and the municipal Solid Waste (Management and handling) rules 2000 to convert the waste paper into reusable paper, further ITC-PSPD recycles 25,000 MT of Waste Paper in a Month.

Whereas **SFS COLLEGE** has agreed to give away the paper, E-Waste and the plastic waste generated in its Bangalore location. The Collection of Dry Recyclables from **SFS COLLEGE** will be initiated from as per schedule, where both the parties agreed mutually.

NOW THIS MOU WITNESS AS UNDER:

This MOU Is intended to create a Synergic Alliance between **SFS COLLEGE** and **SCIENIOT TECHNOLOGIES** for the Re-cycling Dry waste, E-Waste which is a vital element in the protection of Environment.

SCIENIOT TECHNOLOGIES Bangalore

ST FRANCIS DE SALES COLLEGE BANGALORE

1. Definition

1.1 **Wastepaper:** Discarded paper including cardboard, newspaper and magazines, shredded papers, old office records, etc.

1.2 **E-waste:** unusable Electronic waste, waste or not working computer / physics / chemistry equipment's

1.3 **Designated day:** a day in a week / fortnight /month agreed between parties.

2. Pick up location:

Location:

SFS COLLEGE	
Contact Person	Mr. Siby
Designation	Supervisor
Mobile No:	7259699759 || 9591981031
Land Line No:	080- 27834611
Email Id:	principal@sfscollege.in
Preferable week day for pickup	Saturday
Time	10 AM

3. Quality and Quantity

3.1 Material should be free from food particles, without any contamination of garbage, municipalwaste, or any item which are detrimental to WOW Initiative.

3.2 Minimum required quantity is 200 kgs.

4. Roles and responsibilities of SFS College.

4.1 **SFS College** Should Identify the quantum of waste paper and e-waste generated at various locations.

4.2 **SFS College** Should store the wastepaper and e-waste, and Scieniot technologies would pick up on manually agreed schedule.

4.3 **SFS College** agrees to appoint **Mr. Siby** (or his representative) as its representative to co-ordinate on various activities identified in MOU and to Notify **Scieniot Technologies** within one month of any change in the responsibilities

4.4 **SFS College** need to allocate for itself sufficient storage space for keeping the materials safely.

ST FRANCIS DE SALES COLLEGE * BANGALORE *

SCIENIOT TECHNOLOGIES * Bangalore *

4.5 A sale invoice in the name of **Scieniot Technologies** shall be issued with local applicable **GST** to enable faster payment from **scieniot technologies.** Invoice will be sent by post/ courier or by hand to the address given in this **MOU within 2 days** from the date of collection of material along with the copies of weighment Slips, Copy of the same can be scanned and sent to scieniotlab@gmail.com for speedy processing.

4.6 Payment will be processed within one week from the date of receipt of the invoice along with gate pass and weighment slips.

5. Roles and Responsibilities of Scieniot Technologies

5.1 **Payment Option.** In Considering for enabling **Scieniot Technologies** to pick up the material from **SFS College, Scieniot technologies** shall pay to SFS College, the consideration amount based on weight recorded

@ Rs. 5/- per kg (Rupees five) for carton boxes etc

@ Rs 6/- per kg (Rupees six) for paper and paper related items like answer scripts, shedding papers, old magazines, office records etc

@ Rs 10/- per kg (Rupees ten) for newspapers

@ Rs 15/- per kg (Rupees fifteen) for E—waste, Plastic Waste, Metal Waste, etc.

@Rs 70/- per piece (Rupees eighty), for computer monitor

Payouts will be done upon receiving, finalizing and weighing.

5.2 **Scieniot Technologies** shall make necessary arrangements for transportation of the waste collected to its go down.

5.3 **Scieniot Technologies** Shall not use or disseminate any confidential information printed on the waste paper if the waste paper is not properly shredded by SFS College and the information is Legible.

6. Roles and Responsibilities:

6.1 The details laid out in the MOU, notwithstanding the essence and spirit of the MOU is an understanding Between **SFS College and Scieniot Technologies.**

6.2 Any notice or other communication under or in connection with this agreement shall be in writing in the English language and shall be delivered personally or sent by email to the party due to receive the notice or communication at its address The Principal, SFS College, Electronic City PO., Bangalore-100, principal@sfscollege.in set out in this contract or such address as the party may specify by notice in writing to other.

6.3 In Addition **ITC will issue material Recycling certificate to your company or institution** indicating number of trees saved (as you are aware, one ton of paper recycled can save 22 fully crown trees and 7000 gallons of water.)

ST. FRANCIS DE SALES COLLEGE BANGALORE

SCIENIOT TECHNOLOGIES Bangalore

Address for Communication:

Following is the address to which all notices shall be sent.

Local Office Address:

#10 SA Complex,
100 ft Ring Road, JP Nagar 6th Phase,
Near JP Nagar Metro Station, Bengaluru -78

FOR

SFS COLLEGE
Electronic City Post, Bangalore - 100

7. Execution of this Agreement shall be deemed to be.

7.1 A confirmation by both the parties that no benefit, either in cash has been provided by the party to the other party or to any officer or employee, or any relative or associate of any officer of employee of either part or any of its associate institution/ companies in order to enter into this agreement.

7.2 An undertaking by both the parties not to provide any benefit either in cash or any kind to any officer / employee/ relative/ associate /of any officer or employee of either party as reward or consideration either for entering into this MOU or other mater relating to this agreement.

8. Other Terms

8.1 **Force majeure**: neither party shall be liable to the damages for any delay or failure to perform its obligations here under, if such delay or failure is due to reason beyond the control of the concerned party including without limitation, strikes, riots, wars, fires, epidemics, quarantine, restrictions, unusually severe weather changes, earth quakes, explosions, acts of god or state or any public enemy or acts mandated by applicable laws, regulation and order, whether valid or Invalid, of anygovernmental body.

8.2 **Entry into force and duration**: this agreement comes into force from **April 6** for a Period of Three Years, Either Party may terminate this agreement by giving 30 days' written notice the other party. We wish to suggest for open ended document not a periodical document since this recycling activity is a continuous activity.

8.3 Any dispute arising this agreement shall be settled amicably between the parties. This agreement is subject to Jurisdiction of Courts at Bangalore.

8.4 **SFS COLLEGE** Security has the right to check / investigate the transporter of wastepaper / vehicle carrying e-waste for Scieniot Technologies.

ST. FRANCIS DE SALES COLLEGE BANGALORE

SCIENIOT TECHNOLOGIES Bangalore

8.5 The Parties Covalent that they will comply with all applicable laws and regulations in their conduct pursuant to this agreement.

8.6 Both the parties shall agree that it will not make use of, decimate, or in any way disclose any confidential information to any person, firm or business, furthermore, the existence of any discussions, negotiations or agreements in progress between the parties shall not be released to any form of public media without written approval of both parties.

9 Anti-Bribery:

Both the parties hereby represents, warrants and undertakes that, in connection with the transaction contemplated by this agreement , any mater pertaining directly or indirectly to this agreement, including without limitation the negotiation of this agreement and the fulfilment of contracting party obligations hear under, or any other transaction involving, or undertaken behalf of relevant contracting **SFS College** entities shall not make any payments or transfer anything of value directly or indirectly:

i) To any government officials or employee (including employee of government corporation or public international organization) or to any political party or candidate for public office or

ii) To any other person or entity if such payments or transfers would violate the laws in India.

iii) It is the intent of the parties that the no payments or transfers of value shall be made which have the purpose of effect or public commercial bribery or acceptance or acquiescence in extortion kickbacks or other unlawful or improper means of obtaining business.

In witness where of the parties here to have signed this agreement on the day, month and year mentioned here in before.

For SFS COLLEGE

Authorized Signatory
[Rev. Dr. Roy P. K]
[Principal]

For SCIENIOT TECHNOLOGIES

Authorized Signatory
[Dr. Sanjeev.S]
[Director]

PRINCIPAL
St. Francis de Sales College
Electronics City Post, Bangalore - 560 100.

ST FRANCIS DE SALES COLLEGE * BANGALORE *

SCIENIOT TECHNOLOGIES * Bangalore *

From,

Municipal Council

Hebbagodi, Anekal Taluk,

Bengaluru-100

To,

St. Francis de Sales College

Hebbagodi, Anekal Taluk,

Bengaluru-100

Respected Sir,

SUB: Regarding the collection of waste from SFS College.

With regard to the above, The Hebbagodi Municipal Council is collecting waste from the SFS College from June 2020 onwards. You are supporting in giving the waste after segregating into wet waste and dry waste. We are thankful for the co-operation you are extending to our clean drive staff. The Hebbagodi Municipal Corporation hopes to get the same co-operation from you in future also.

Thanking You

Municipal Council

Hebbagodi

PRINCIPAL
St.Francis de Sales College
Eletronics City Post, Bengaluru - 560 100

Bill Format

Annexure-I

ಬೆಂಗಳೂರು ವಿದ್ಯುತ್ ಸರಬರಾಜು ಕಂಪನಿ ನಿಯಮಿತ

CORPORATE OFFICE SOLAR ROOF TOP CENTRALIZED BILLING CENTER BANGALORE

NET Metering SRTPV Bill For the Month - SEPTEMBER-2022

BR No :

Date :

1	ಆರ್.ಆರ್.ಸಂಖ್ಯೆ / RRNO		ZANEH71
2	ಅಕೌಂಟ್ ಐಡಿ/ Account ID / Connection ID		1941638
3	ಹೆಸರು ಮತ್ತು ವಿಳಾಸ/ Name and Address:		PRESIDENT HEBBAGODI KARNATAKA PRAYANA SANGHA
4	ಮಾಪಕ ಓದುಗರ ಸಂಖ್ಯೆ / Meter-Reader Code		JE ANANTHNAGARA
5	ಟಕಾತಿ / Tariff		LT-2(B)(I)
6	ಮಂಜೂರಾದ ವಿದ್ಯುತ್ ಪ್ರಮಾಣ / Sanctioned Load in		13 kw
6B	ಮಂಜೂರಾದ ವಿದ್ಯುತ್ ಪ್ರಮಾಣ / Solar Installed capacity in kw		12.5KW
7	ಬಿಲ್ಲಿಂಗ್ ಅವಧಿ /Billing Period		01.8.2022 TO 31.8.2022
8	ಮಾಪಕ ಓದುವ ದಿನಾಂಕ / Reading Date		01-Sep-22
9	ಬೈ- ಡೈರೆಕ್ಷನಲ್ ಮಾಪಕ ಕ್ರಮ ಸಂಖ್ಯೆ/ Bi-Directional Meter Sl No		X1187483
10	ವಿದ್ಯುತ್ ದಾಖಲಿಕೆಗಳು / Energy Recorded	(A) ವಿದ್ಯುತ್ ಒಳಹರಿವು / Energy Import	(B) ವಿದ್ಯುತ್ ಹೊರಹರಿವು / Energy Export
11	ಇಂದಿನ ಗಣಾಂಕ / Present Reading	98344.80	1194.40
12	ಹಿಂದಿನ ಗಣಾಂಕ / Previous Reading	92668.20	1150.00
13	ವ್ಯತ್ಯಾಸ / Difference (11-12)	5676.60	44.40
14	ಮಾಪಕ ಗುಣಾಂಕ / Meter Constant	1	
15	ಒಟ್ಟು ವಿದ್ಯುತ್ ಒಳಹರಿವು / ಹೊರಹರಿವು / Total Energy Import / Export (13X 14)	5676.60	44.40
16	ನಿವ್ವಳ ಬಳಕೆ/ಉತ್ಪಾದನೆ / Net Import (Consumption) /Export :	5632.20	0
17	(15A - 15B = Plus ನಿವ್ವಳ ಬಳಕೆ / Net Consumption) = ಗ್ರಾಹಕರಿಂದ ಪಾವತಿಸಿಕೊಳ್ಳಬೇಕು / Payable by Consumer	0	0
18	(15B - 15A = Plus ನಿವ್ವಳ ಉತ್ಪಾದನೆ / Net Export) = ಬೆಸ್ಕಂ ಗ್ರಾಹಕರಿಗೆ ಪಾವತಿಸಬೇಕು / Payable by BESCOM	0	0
19	ದಾಖಲಿತ ಬೇಡಿಕೆ / Recorded MD	35.05	5.20
19a	Total Load in KVA	35.05	0.00
20	ಪವರ್ ಫ್ಯಾಕ್ಟರ್ / Power Factor	0.98	0.92

II) SRTPV Meter Details :

1	SRTPV Meter Sl NO	C905302
2	Present Reading	54466.50
3	Previous Reading	53999.80
4	Difference (2-3)	466.70
5	Meter Constant	1
6	Total (4*5)	467

21	ಖರೀದಿ ದರ / Cost of Purchase				ಸಬ್ಸಿಡಿ ರಹಿತ / Without Subsidy	ಸಬ್ಸಿಡಿ ಸಹಿತ / With Subsidy
					3.07	
22	whether the consumer has availed MNRE subsidy (Yes or No)				NO	
	ಗ್ರಾಹಕರಿಗೆ ಪಾವತಿಸಬೇಕಾದ ಒಟ್ಟು ಮೊತ್ತ / Gross Amount payable to Consumer				0	
24	ಗ್ರಾಹಕರು ಬೆವಿಕಂಗೆ ಪಾವತಿಸಬೇಕಾದ ಮೊತ್ತ / To be paid by Consumer					
A	ನಿಗದಿತ/ಬೇಡಿಕೆ ಶುಲ್ಕ Fixed/Demand Charges (KVA X Unit Rate)	HP	ಬೃ.ಬೆಂ.ಮ.ಪಾ/ಸ.ಪಾ/ಸ.ಸ್ವ.ಸಂ/ BBMP/CMC/ULB in Rs.	ಗ್ರಾಮ ಪಂಚಾಯತಿ / Village Panchayath in Rs.	Charges	
i	Slab1	13		120.00	1560.00	
ii	Slab2	12		0.00	0.00	
iii	Slab3	0		150.00	0.00	
24A	Total Fixed charges(i+ii)				1560.00	
24B	ಗರಿಷ್ಠ ಬೇಡಿಕೆ ದಂಡ ಶುಲ್ಕ / MD Penalty Charges [(MD Recorded - Sanctioned load) X Rate				5280	
C	ವಿದ್ಯುತ್ ಶುಲ್ಕ / Energy Charges [Units X Rate]					
			YES			
i	01-200	200	7.35		1470.00	
ii	200 ABOVE	5432	8.60		46716.92	
iii					0.00	
iv					0.00	
24C	Total Energy charges(i+ii+iii+iv)				48186.92	
24D	ತೆರಿಗೆ / Tax 9% Import				4336.82	
24E	FAC Charges				1746.00	
24F	ಪವರ್ ಫ್ಯಾಕ್ಟರ್ ದಂಡ ಶುಲ್ಕ / Power Factor Penalty				0.00	
24G	ಬಾಕಿ / Arrears				0.00	
24H	ಜಮೆ , ಹೊಂದಾಣಿಕೆಗಳು / Credits, Adjustments/Round off adj				0	
25	ಗ್ರಾಹಕರು ಬೆವಿಕಂಗೆ ಪಾವತಿಸಬೇಕಾದ ನಿವ್ವಳ ಮೊತ್ತ / Net Amount to be paid by Consumer (24A+24B+24C+24D+24E+24F+24G-24H)				61110	
26	ಬೆವಿಕಂ ಗ್ರಾಹಕರಿಗೆ ಪಾವತಿಸಬೇಕಾದ ನಿವ್ವಳ ಮೊತ್ತ / Net Amount to be paid to by BESCOM				0	
27	ಪಾವತಿಗೆ ಕಡೇ ದಿನಾಂಕ / Due Date for Payment				15-Sep-22	

Assistant Executive Engineer
Veerasandra, C, O&M Sub-division

GSTIN:29AACCB1412G1Z5

ಉಪ ವಿಭಾಗ	VEERASANDRA
ಸ್ಥಳ ಸಂಕೇತ	5130206
ಮಾ.ಓ.ಸಂಕೇತ	MRC10
ಆರ್.ಆರ್.ಸಂಖ್ಯೆ	HB13515
ಗ್ರಾಹಕರ ಐ.ಡಿ	1954504

ಬೆವಿಕಂ

ಹೆಸರು ಮತ್ತು ವಿಳಾಸ
KARNATAKA FRANCHISE SOCIE

HEBBAGODI

ಜಕಾತಿ	LT-2 (b)(I)-M-U
ಮಂ.ಪ್ರಮಾಣ	8.00KW
ದಾ.ವಿ.ಪ್ರಮಾಣ	15.25KW
ಓದುವ ದಿನಾಂಕ	01-10-2022
ಬಿಲ್ ಸಂಖ್ಯೆ	95450401
ಹಾಲಿ ಮಾಪನ	40296.00
ಹಿಂದಿನ ಮಾಪನ	38863.00
ಬಳಕೆ	1433
ಮಾಪಕ ಸ್ಥಿರಾಂಕ	1.00
ಪಿ.ಎಫ್	0.85

ನಿಗದಿತ ಶುಲ್ಕ (ಪರಿಮಾಣ,ದರ,ಮೊತ್ತ)		
8.00	120.00	960.00
ವಿದ್ಯುತ್ ಶುಲ್ಕ (ಪರಿಮಾಣ,ದರ,ಮೊತ್ತ)		
200.00	7.35	1470.00
1233.00	8.60	10603.80
ಇಂ.ಹೊ.ಮೊತ್ತ (ಪರಿಮಾಣ,ದರ,ಮೊತ್ತ)		
1433	0.74	1060.42

ಪಿ.ಎಫ್.ದಂಡ	0.00
ಅಧಿಕ ಪ್ರಮಾಣ ದಂಡ	
BMD (7.25 * 120.00 * 1.5) -> 1305..	
ರಿಯಾಯಿತಿ	0.00
ಬಡ್ಡಿ	0.00
ತೆರಿಗೆ	1086.04
ಬಿಲ್ ಮೊತ್ತ	16485.86
ಬಾಕಿ	0.00
ಸರ್ಕಾರದ ಸಹಾಯಧನ	0.00
ಪಾವತಿಸಬೇಕಾದ ಮೊತ್ತ (₹)	16486.00
ಪಾವತಿಗೆ ಕಡೆ ದಿನಾಂಕ	15-10-2022

ಬೆವಿಕಂ

SD:19430/Paid:16450/Bal:2980

195450416486

ಕೋವಿಡ್-19 ಆತಂಕ ಬೇಡ, ಮುನ್ನೆಚ್ಚರಿಕೆ ಇರಲಿ
ಮಾಸ್ಕ್ ಧರಿಸಿ, ಸಾಮಾಜಿಕ ಅಂತರ ಪಾಲಿಸಿ.

ಬೆಸ್ಕಾಂ ವಿದ್ಯುತ್ ಸರಬರಾಜು ಕಂಪನಿ ನಿಯಮಿತ
67ನೇ ವರ್ಷದ ಕನ್ನಡ ರಾಜ್ಯೋತ್ಸವದ ಶುಭಾಶಯಗಳು

ವಿದ್ಯುತ್ ಬಿಲ್

GSTIN:29AACCB1412G1Z5

ಉಪ ವಿಭಾಗ	VEERASANDRA
ಸ್ಥಳ ಸಂಕೇತ	5130206
ಮಾ.ಓ. ಸಂಕೇತ	MRC10
ಆರ್.ಆರ್.ಸಂಖ್ಯೆ	HBAEHMS753
ಗ್ರಾಹಕರ ಐ.ಡಿ	1988407

ಹೆಸರು ಮತ್ತು ವಿಳಾಸ
SUVIDHYA EDUCATION INSTI

SUVIDHYA EDUCATION I

ಜಕಾತಿ	LI-2 (b)(i)-M-U
ಮಂ.ವಿ ಪ್ರಮಾಣ	15.00KW
ರಾ.ವಿ ಪ್ರಮಾಣ	1.00KW
ಓದುವ ದಿನಾಂಕ	01-11-2022
ಬಿಲ್ ಸಂಖ್ಯೆ	98840701
ಹಾಲಿ ಮಾಪನ	83860.00
ಹಿಂದಿನ ಮಾಪನ	83457.00
ಬಳಕೆ	403
ಮಾಪಕ ಸ್ಥಿರಾಂಕ	1.00
ಪಿ.ಎಫ್	0.85

ಸ್ಥಿರ ಶುಲ್ಕ (ಪರಿಮಾಣ.ದರ.ಮೊತ್ತ)		
15.00	120.00	1800.00
ವಿದ್ಯುತ್ ಶುಲ್ಕ (ಪರಿಮಾಣ.ದರ.ಮೊತ್ತ)		
200.00	7.35	1470.00
203.00	8.60	1745.80
ಇಂ.ಹೊ.ಮೊತ್ತ (ಪರಿಮಾಣ.ದ.ಮೊತ್ತ)		
403	0.74	298.22

ಪಿ.ಎಫ್.ದಂಡ	0.00
ಅಧಿಕ ಪ್ರಮಾಣ ದಂಡ	0.00
ರಿಯಾಯಿತಿ	0.00
ಬಡ್ಡಿ	0.00
ತೆರಿಗೆ	289.42
ಬಿಲ್ ಮೊತ್ತ	5603.44
ಬಾಕಿ	0.00
ಸರ್ಕಾರದ ಸಹಾಯಧನ	0.00
ಪಾವತಿಸಬೇಕಾದ ಮೊತ್ತ (₹)	5603.00
ಪಾವತಿಗೆ ಕಡೆ ದಿನಾಂಕ	15-11-2022

19884075603

ಕೋವಿಡ್ -19 - ಆತಂಕ ಬೇಡ, ಮುನ್ನೆಚ್ಚರಿಕೆ ಇರಲಿ
ಮಾಸ್ಕ್ ಧರಿಸಿ, ಸಾಮಾಜಿಕ ಅಂತರ ಪಾಲಿಸಿ.