GREEN AUDIT REPORT

DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALI

2020-21

OTTOTRACTIONS
Energy-Engineering-Environment

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OTTOTRACTIONS
Energy-Engineering-Environment

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DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY

ANGAMALY

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Energy-Engineering-Environment

Green Audit Report
DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY
Report No: EA 754
2021-March

Green Audit Team

Ottotractions

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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 of Bureau of Energy Efficiency, Government of India 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 De Paul Institute of Science & Technology, Angamaly, for their timely help extended to complete the audit and bringing out this report. We thank Rev. Fr. George Pottayil VC, Director; Fr. Lindo Puthuparambil VC, Director, Finance; Dr. Unny CJ, Principal and Jacob Thaliyan, Associate Professor for their advises and support during the audit.

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

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

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 green audit for the year 2020-21 has been carried out in accordance with the various rules and regulations in India.

This Certificate is issued to De Paul Institute of Science & Tehnology, Angamaly on their request.

Dated this 31st day of May 2021.

SURESH BABU B V

ACCREDITED ENERGY AUDITOR (AEA 33)

BUREAU OF ENERGY EFFICIENCY, GOVT OF INDIA

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1 Introduction

1.1 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 De Paul Institute of Science & Technology, Angamaly 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.

De Paul Institute of Science & Technology, Angamaly

De Paul Institute of Science & Technology (DiST), Angamaly, is an ISO 9001:2015 Certified professional college run by De Paul Education Trust and owned by Marymatha Province of Vincentian Congregation. Education is one of the most important areas of its activities. The Vincentians hold aloft the sublime values of justice, peace and love and aims at creating a new generation with a difference. The students must prove not only their academic excellence but also show a deep commitment to the society they live in. De Paul Institute of Science & Technology (DiST) provides a comprehensive range of academics like Media Courses, Courses in Computer science, Management course, MSW and BSW (Social Work Department) and is one among the leading MBA colleges in Kerala. The college is situated in an eco-friendly and academic-friendly atmosphere amidst fast developing industrial and business town and sylvan surroundings. The college is located in 2.45 acres of land with a total built up area 10,471.66 m^2.

Students	1318
Teaching & Non- Teaching staff	169
Total occupancy of the college.	1487

Total student strength of the campus is 1318. For calculating per capita carbon emission estimation, only the student strength is taken into account.

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 1487 occupants of this campuses will reach same number of households. This message will spread to at least 6000 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.

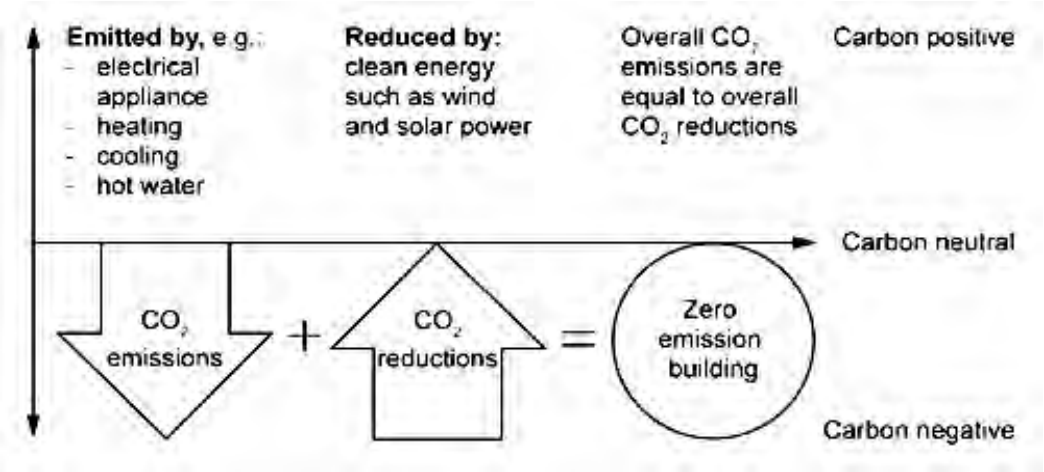
Global Warming Potential (GWP) is a measure of how much heat a greenhouse gas traps in the atmosphere up to a specific time horizon, relative to carbon dioxide. The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is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

The campus operates 8 vehicles for its logistics.

Carbon emission from transportation is 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 AND DISCUSSIONS

3.1 CARBON FOOTPRINT ESTIMATION

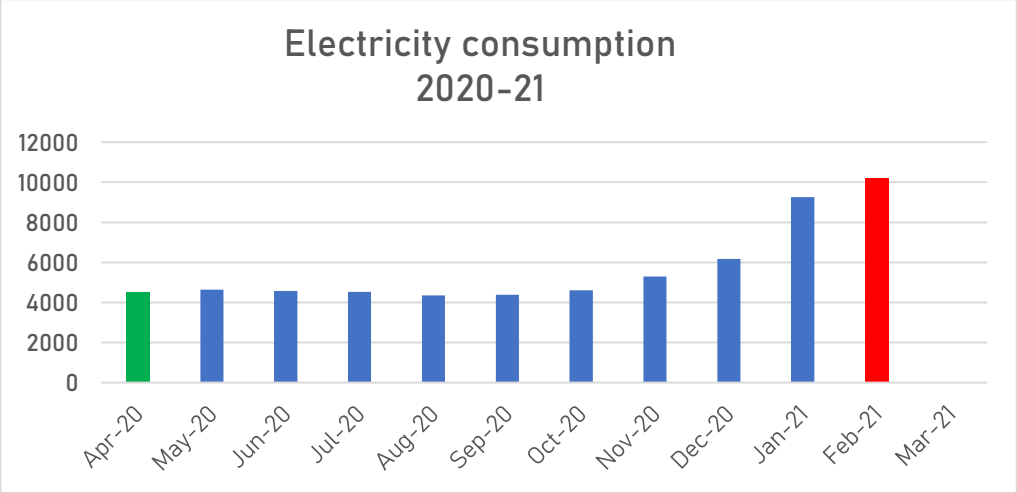
3.1.1 ENERGY

a. Electricity

Electricity is purchased from KSEB under HT category.

Electricity Connection Details (2020-21)		
DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY		
1	Name of the Consumer	DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY
2	Tariff	HT II (B) General
3	Consumer Number	1355790018065
4	Contract Demand (kVA)	75
5	Connected Load	148.56
6	Annual Electricity Consumption (kWh)	68199

Electricity Bill Analysis



- The total electricity consumption from KSEB was 68199 kWh during the year 2020-21.
- The power factor is maintained at 1.

OTTOTRACTIONS- ENERGY AUDIT		
DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY		
Baseline Data (2020-21)		
1	Electricity Provider	KSEB
2	Tariff	HT II (B) GENERAL
3	Contract Demand	75
4	Maximum Demand (avg. in kVA)	28
5	Connected Load(kW)	148.56
6	Electricity Consumption kWh /yr.	68199
7	Diesel Consumption L/yr.	4196
8	Diesel in kWh/yr.	57763
9	Petrol Consumption L/yr.	3035
10	Petrol in kWh/yr.	39528
11	LPG Consumption in kg/yr.	912
12	LPG Consumption in kWh	13256
13	Total Energy Consumption (kWh)/yr.	178746
14	Energy Cost (KSEB) (Lakhs Rs)/yr.	8.0
15	Rs/kWh (avg.) (KSEB)	12

Specific Energy Consumption

OTTOTRACTIONS- ENERGY AUDIT		
DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY		
Energy Performance Index		
1	Total Building area m^2	10472
2	Total Conditioned area	1257
3	% Conditioned area	12
4	Annual Energy Consumption kWh	178746
5	Specific Energy Consumption kWh/m^2	17.07

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. The waste such produced is used as food for the pigs.

Degradable Waste

Degradable Waste Generation 2020-21	
DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY	
Waste generated in kg per day	20.5
Waste generated in kg per Yr	449

Non-Degradable waste

Solid Non degradable Waste Generation 2020-21	
DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY	
Non degradable Waste generated per day	4
Waste generated in kg per Yr.	81

3.4. Transportation

The college owns four petrol vehicles and four diesel vehicles. The list of the vehicles is given below.

Vehicles of De Paul Institute of Science & Technology		
1	KL-63-E9686	Wagon R
2	KL-63-E9189	Innova Crysta
3	KL-63-A7274	Super Splendor
4	KL-63-B9892	Maruti Omni
5	KL-07-AF2983	Hero Honda Splendor
6	KL-63-B9892	Bharat Benz 914 Bus
7	KL-63-B2287	Tourister BS 42000 SCH BUS
8	KL-41-C1926	TATA LP 909/49 Euro II

The diesel and petrol consumed by the vehicles of the college during 2020-21 are **4195.64** and **3035.19** litres respectively as per the logbook details.

Carbon Emission Profile (2020-21)

Carbon emissions in the campus due to the day-to-day activities are calculated and is 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			
Sl. No.	Particulars	Remarks	Tonne of CO_2e
1	Annual Electricity Consumption (kWh) Grid	**68199**	**55.9**
2	Annual LPG Consumption in kg	912	1.4
3	Annual Diesel Consumption (L)	4196	13.4
4	Annual Petrol Consumption (L)	3035	9.4
5	Food Waste in kg/yr.	449	0.3
6	Paper Waste in kg/yr.	81	0.0
7	Plastic Waste in kg/yr.	50	0.02
8	**Total Carbon Foot Print $tCO_2e/yr.$**		**80.5**

3.6. 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.

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 Sequestration	
Particular	tCO_2e
Carbon sequestration	6.43

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'.

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Sl. No	Name of tree (common name/ scientific name)	Circumference	Stem diameter (cm)	Height of trees (m)
1	*Macaranga peltata*	49	15.66	7
2	*Swietenia macrophylla*	62	19.74	9
3	*Cocos nucifera*	42	13.37	7
4	*Artocarpus heterophyllus*	32	10.19	8
5	*Oligonychus biharensis*	50	15.92	8
6	*Syzygium jambos*	25	7.96	5
7	*Mimusops elengi*	57	18.14	9
8	*Borassus flabellifer*	31	9.87	9
9	*Bambusa vulgaris*	25	7.96	8
10	*Cassia fistula*	30	9.55	7
11	*Tamarindus indica*	51	16.23	7
12	*Terminalia catappa*	48	15.28	8
13	*Azadirachta indica*	45	14.32	8

CARBON FOOTPRINT OF THE CAMPUS (2020-21)

Various carbon emitting activities such as consumption of energy, transportation and waste generation leads to the total emission of **80.47 tCO_2e** per year by the campus. The total carbon sequestration by trees in the campus compound is **6.43 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.

tCO2e to be mitigated for carbon neutral campus			
Amount of carbon emission tCO2e	Amount of carbon sequestrated tCO2e	Amount of carbon mitigated through renewable energy tCO2e	To be mitigated tCO2e
80.47	6.43	0.00	74.04

Specific CO2 Footprint

Total Carbon Emission		
1	Total Carbon Foot Print tCO2e/yr	80.67
2	Carbon Sequestered	6.43
3	Effective Carbon footprint	74.24
4	Total No of Students	1318
5	Specific Carbon Footprint kg CO_2e/Student/Yr	**56.32**

The total specific carbon emission is estimated as 56.32 kg of CO_2e per student for the year 2020-21.

4

Carbon Mitigation Plans

The total emission of the carbon dioxide per student is **56.32** kg per year. 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 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						
Executive Summary						
Consolidated Cost Benefit Analysis of Energy Efficiency Improvement Projects						
DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY						
Sl No	Projects	Investment	Cost saving	Simple Pay Back	Energy saved	
		(Lakhs Rs)	(Rs)/Yr	Months	kWh/Yr	toE/Yr
1	Energy Saving in Lighting by replacing existing 30 No's T12 Lamps to 18W LED Tube in Main block	0.25	0.17	18.06	1431	0.12
2	Energy Saving in Lighting by replacing existing 50 No's T8 Lamps to 18W LED Tube in Main block	0.42	0.33	14.90	2891	0.25
3	Energy Saving in Lighting by replacing existing 87 No's 15W CFL Lamp to 9W LED Bulb in Main block	0.15	0.01	177.48	1372	0.12
4	Energy Saving by replacing existing 122 No's in-efficient ceiling fans with BEE star labelled fans in Main block	2.65	0.26	122.69	2244	0.19
5	Energy Saving in Lighting by replacing existing 141 No's T8 Lamps to 18W LED Tube in Annex block	1.17	0.31	44.69	2717	0.23

6	Energy Saving in Lighting by replacing existing 36 No's 15W CFL Lamp to 9W LED Bulb in Annex block	0.06	0.01	73.44	599	0.05
7	Energy Saving by replacing existing 147 No's in-efficient ceiling fans with BEE star labelled fans in Annex block	3.20	0.31	122.69	2704	0.23
8	Energy Saving in Lighting by replacing existing 56 No's T8 Lamps to 18W LED Tube in Hostel block 1	0.46	0.40	14.11	3418	0.29
9	Energy Saving in Lighting by replacing existing 9 No's 15W CFL Lamp to 9W LED Bulb in Hostel block 1	0.02	0.01	18.36	150	0.01
10	Energy Saving by replacing existing 57 No's in-efficient ceiling fans with BEE star labelled fans in Hostel block 1	1.24	0.38	38.74	3320	0.29
11	Energy Saving in Lighting by replacing existing 34 No's T8 Lamps to 18W LED Tube in Hostel block 2	0.28	0.08	44.69	655	0.06
12	Energy Saving in Lighting by replacing existing 18 No's 15W CFL Lamp to 9W LED Bulb in Hostel block 2	0.03	0.01	36.72	300	0.03
13	Energy Saving by replacing existing 18 No's in-efficient ceiling fans with BEE star labelled fans in Hostel block 2	0.39	0.04	122.69	331	0.03
	Total	**10.32**	**2.32**	**65.33**	**22132.43**	**1.90**
(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. toe is tonne of oil equivalent)						

OTTOTRACTIONS- ENERGY AUDIT						
DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY						
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 70 kW Solar Power Plant	89425	89.43	25	65.28	1632.01

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 754.01	
Energy Saving in Lighting by replacing existing 30 No's T12 Lamps to 18W LED Tube in Main block	
Existing Scenario	
30 numbers of T12 lamps were identified during the energy audit field survey in the facility. During discussion with staffs, it is observed that the average utility of these fittings is of 80%.	
Proposed System	
The existing T12 may be replaced to LED tube of 18 W in phased manner and the savings will be of 33 % (inclusive of improved light output and reduced energy consumption)	
Financial Analysis	
Annual working hours (hr)	2920
No of fittings	30
Total load (kW)	1.65
Annual Energy Consumption (kWh)	4336
Expected Annual Energy saving for replacing all fittings (kWh)	1431
Cost of Power	11.56
Annual saving in Lakhs Rs (1st year)	0.17
Investment required for repairing existing fittings [@Rs 830 per fittings] (Lakhs Rs)	0.25
Simple Pay Back (in Months)	18.06

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 754.02	
Energy Saving in Lighting by replacing existing 50 No's T8 Lamps to 18W LED Tube in Main block	
Existing Scenario	
50 numbers of T8 lamps were identified during the energy audit field survey in the facility. During discussion with staffs, it is observed that the average utility of these fittings is of 80%.	
Proposed System	
The existing T8 may be replaced to LED tube of 18 W 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)	2920
No of fittings	50
Total load (kW)	2.00
Annual Energy Consumption (kWh)	5256
Expected Annual Energy saving for replacing all fittings (kWh)	2891
Cost of Power	11.56
Annual saving in Lakhs Rs (1st year)	0.33
Investment required for repairing existing fittings [@Rs 830 per fittings] (Lakhs Rs)	0.42
Simple Pay Back (in Months)	14.90

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code 754.03	
Energy Saving in Lighting by replacing existing 87 No's 15W CFL Lamp to 9W LED Bulb in Main block	
Existing Scenario	
87 numbers of 15W CFL lamps were identified during the energy audit field survey in the facility. During discussion with staffs it is observed that the average utility of these fittings are of 80%.	
Proposed System	
The existing CFL may be replaced to LED bulb of 9W in phased manner and the savings will be of 66% (inclusive of improved light output and reduced energy consumption)	
Financial Analysis	
Annual working hours (hr)	2920
No of fittings	87
Total load (kW)	1.31
Annual Energy Consumption (kWh)	3430
Expected Annual Energy saving for replacing all fittings (kWh)	1372
Cost of Power	11.56
Annual saving in Lakhs Rs (1st year)	0.01
Investment required for complete replacements [@Rs 170 per fittings] (Lakhs Rs)	0.15
Simple Pay Back (in Months)	177.48

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 754.04	
Energy Saving by replacing existing 122 No's in-efficient ceiling fans with BEE star labelled fans in Main block	
Existing Scenario	
There are 122 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)	2920
Total numbers of ordinary fans	122
Total load (kW)	8.54
Annual Energy Consumption (kWh)	7481
Expected Annual Energy saving, for total replacement(kWh)	2244
Cost of Power (Rs)	11.56
Annual saving in Lakhs Rs (1st year)	0.26
Investment required for a total replacement (Lakhs Rs)[@2175 Rs per Fan with 50W at full speed]	2.65
Simple Pay Back (in Months)	122.69

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 754.05	
Energy Saving in Lighting by replacing existing 141 No's T8 Lamps to 18W LED Tube in Annex block	
Existing Scenario	
141 numbers of T8 lamps were identified during the energy audit field survey in the facility. During discussion with staffs, it is observed that the average utility of these fittings are of 80%.	
Proposed System	
The existing T8 may be replaced to LED tube of 18 W 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)	2920
No of fittings	141
Total load (kW)	5.64
Annual Energy Consumption (kWh)	4941
Expected Annual Energy saving for replacing all fittings (kWh)	2717
Cost of Power	11.56
Annual saving in Lakhs Rs (1st year)	0.31
Investment required for repairing existing fittings [@Rs 830 per fittings](Lakhs Rs)	1.17
Simple Pay Back (in Months)	44.69

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code 754.06	
Energy Saving in Lighting by replacing existing 36 No's 15W CFL Lamp to 9W LED Bulb in Annex block	
Existing Scenario	
36 numbers of 15W CFL lamps were identified during the energy audit field survey in the facility. During discussion with staffs it is observed that the average utility of these fittings are of 80%.	
Proposed System	
The existing CFL may be replaced to LED bulb of 9W in phased manner and the savings will be of 66% (inclusive of improved light output and reduced energy consumption)	
Financial Analysis	
Annual working hours (hr)	2920
No of fittings	36
Total load (kW)	0.54
Annual Energy Consumption (kWh)	1498
Expected Annual Energy saving for replacing all fittings (kWh)	599
Cost of Power	11.56
Annual saving in Lakhs Rs (1st year)	0.01
Investment required for complete replacements [@Rs 170 per fittings](Lakhs Rs)	0.06
Simple Pay Back (in Months)	73.44

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 754.07	
Energy Saving by replacing existing 147 No's in-efficient ceiling fans with BEE star labelled fans in Annex block	
Existing Scenario	
There are 147 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)	2920
Total numbers of ordinary fans	147
Total load (kW)	10.29
Annual Energy Consumption (kWh)	9014
Expected Annual Energy saving, for total replacement(kWh)	2704
Cost of Power (Rs)	11.56
Annual saving in Lakhs Rs (1st year)	0.31
Investment required for a total replacement (Lakhs Rs)[@2175 Rs per Fan with 50W at full speed]	3.20
Simple Pay Back (in Months)	122.69

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 754.08	
Energy Saving in Lighting by replacing existing 56 No's T8 Lamps to 18W LED Tube in Hostel block 1	
Existing Scenario	
56 numbers of T8 lamps were identified during the energy audit field survey in the facility. During discussion with staffs, it is observed that the average utility of these fittings is of 80%.	
Proposed System	
The existing T8 may be replaced to LED tube of 18 W 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)	2920
No of fittings	56
Total load (kW)	2.24
Annual Energy Consumption (kWh)	6214
Expected Annual Energy saving for replacing all fittings (kWh)	3418
Cost of Power	11.56
Annual saving in Lakhs Rs (1st year)	0.40
Investment required for repairing existing fittings [@Rs 830 per fittings] (Lakhs Rs)	0.46
Simple Pay Back (in Months)	14.11

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code 754.09	
Energy Saving in Lighting by replacing existing 9 No's 15W CFL Lamp to 9W LED Bulb in Hostel block 1	
Existing Scenario	
9 numbers of 15W CFL lamps were identified during the energy audit field survey in the facility. During discussion with staffs it is observed that the average utility of these fittings are of 80%.	
Proposed System	
The existing CFL may be replaced to LED bulb of 9W in phased manner and the savings will be of 66% (inclusive of improved light output and reduced energy consumption)	
Financial Analysis	
Annual working hours (hr)	2920
No of fittings	9
Total load (kW)	0.14
Annual Energy Consumption (kWh)	374
Expected Annual Energy saving for replacing all fittings (kWh)	150
Cost of Power	11.56
Annual saving in Lakhs Rs (1st year)	0.01
Investment required for complete replacements [@Rs 170 per fittings] (Lakhs Rs)	0.02
Simple Pay Back (in Months)	18.36

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 754.10	
Energy Saving by replacing existing 57 No's in-efficient ceiling fans with BEE star labelled fans in Hostel block 1	
Existing Scenario	
There are 57 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)	2920
Total numbers of ordinary fans	57
Total load (kW)	3.99
Annual Energy Consumption (kWh)	11068
Expected Annual Energy saving, for total replacement(kWh)	3320
Cost of Power (Rs)	11.56
Annual saving in Lakhs Rs (1st year)	0.38
Investment required for a total replacement (Lakhs Rs)[@2175 Rs per Fan with 50W at full speed]	1.24
Simple Pay Back (in Months)	38.74

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 754.11	
Energy Saving in Lighting by replacing existing 34 No's T8 Lamps to 18W LED Tube in Hostel block 2	
Existing Scenario	
34 numbers of T8 lamps were identified during the energy audit field survey in the facility. During discussion with staffs, it is observed that the average utility of these fittings is of 80%.	
Proposed System	
The existing T8 may be replaced to LED tube of 18 W 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)	2920
No of fittings	34
Total load (kW)	1.36
Annual Energy Consumption (kWh)	1191
Expected Annual Energy saving for replacing all fittings (kWh)	655
Cost of Power	11.56
Annual saving in Lakhs Rs (1st year)	0.08
Investment required for repairing existing fittings [@Rs 830 per fittings] (Lakhs Rs)	0.28
Simple Pay Back (in Months)	44.69

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code 754.12	
Energy Saving in Lighting by replacing existing 18 No's 15W CFL Lamp to 9W LED Bulb in Hostel block 2	
Existing Scenario	
18 numbers of 15W CFL lamps were identified during the energy audit field survey in the facility. During discussion with staffs, it is observed that the average utility of these fittings is of 80%.	
Proposed System	
The existing CFL may be replaced to LED bulb of 9W in phased manner and the savings will be of 66% (inclusive of improved light output and reduced energy consumption)	
Financial Analysis	
Annual working hours (hr)	2920
No of fittings	18
Total load (kW)	0.27
Annual Energy Consumption (kWh)	749
Expected Annual Energy saving for replacing all fittings (kWh)	300
Cost of Power	11.56
Annual saving in Lakhs Rs (1st year)	0.01
Investment required for complete replacements [@Rs 170 per fittings] (Lakhs Rs)	0.03
Simple Pay Back (in Months)	36.72

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 754.13	
Energy Saving by replacing existing 18 No's in-efficient ceiling fans with BEE star labelled fans in Hostel block 2	
Existing Scenario	
There are 18 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)	2920
Total numbers of ordinary fans	18
Total load (kW)	1.26
Annual Energy Consumption (kWh)	1104
Expected Annual Energy saving, for total replacement(kWh)	331
Cost of Power (Rs)	11.56
Annual saving in Lakhs Rs (1st year)	0.04
Investment required for a total replacement (Lakhs Rs) [@2175 Rs per Fan with 50W at full speed]	0.39
Simple Pay Back (in Months)	122.69

OTTOTRACTIONS- ENERGY AUDIT	
Energy Saving Proposal Code EA 754.14	
Installation of 70 kW 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 70 kW 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)	70
Total average kWh per day expected (3.5kWh/day average)	245.00
Total annual Generating Capacity (kWh)	89425
Cost of energy generated annually Lakhs Rs	11.63
Investment required (INR lakh) (Approx.)	52.50
Simple Pay Back (in Months) lakh Rs	54.19
Life cycle in Yrs.	25
Total Saving in Life Cycle (Approx.) Rs Lakh	290.63

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	80.67
2	Carbon Sequestrated tCO2e/yr	6.43
3	Carbon mitigated by Renewable Energy tCO2e/yr	0.00
4	Carbon mitigated by Energy Efficiency (Proposed) tCO2e/yr	16.2
5	Carbon mitigated by solar power plant (Proposed) (70 kWp)	65.28
6	Effective Carbon footprint tCO2e/yr	-7.20
7	Total No of Students	1318
8	Specific Carbon Footprint kg CO2e/Student/Yr	**-5.46**

Cost to make the campus carbon negative		
1	Cost of implementation in energy efficiency in lakhs	10.32
2	Cost of implementation in Renewable efficiency in lakhs	52.50
3	Total in Lakhs	62.82
4	Total number of students	1318
5	Cost per student to make the campus carbon negative in Rs	4766.2

From this study it was found that carbon footprint of the campus to be -5.46 kgCO_2e/ Student/ Year in place of current footprint i.e., 56.32 kgCO_2e/ student/ Year. This will be achieved after implementing energy efficiency projects and implementation of additional 70kWp solar power plant. To achieve this an investment of **62.82 lakhs Rs** is required through energy efficiency projects and renewable energy is proposed. It will be around **4766.2 Rs per student** to make the campus the carbon negative. The projects given have to be implemented in a phased manner. All projects with simple pay back near one year may be done in the first phase and the rest in the next phases as per the availability of fund.

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6

TECHNICAL SUPPLEMENTS

Abbreviations

3Ø / 1Ø	Three Phase/ Single Phase
A	Ampere
AC	Air Conditioner
AVG	Average
BEE	Bureau of Energy Efficiency
CEA	Central Electricity Authority
CFL	Compact Fluorescent Lamp
DG	Diesel Generator
DL	Down Light
EER	Energy Efficiency Rating
EF	Exhaust Fan
ELCB	Earth-leakage circuit breaker
HRC	High Rupturing Capacity Fuse
KSEB	Kerala State Electricity Board
kW	Kilo Wat
kWh	Kilo Watt Hour
LED	Light Emitting Diode
LED B	LED Bulb
LED T	LED Tube
M/c	Machine
MCB	Miniature Circuit Breaker
MCCB	Moulded Case Circuit Breaker.
NA	Not Applicable
N-E	Neutral to Earth
NL	Normal Loaded
OL	Over Loaded
PC	Personal Computer
P-E	Phase to Earth
PF	Pedestrian Fan
P-N	Phase to Neutral
Qty	Quantity
R	R Phase
RCCB	Residual Current Circuit breaker
SFU	Switch Fuse Unit
T8	T8 Fluorescent Lamp
TV	Television
UL	Underloaded
UPS	Uninterrupted Power Supply
W	Watts
WF	Wall Fan
Y	Y Phase
SDG	Sustainable Development Goals
AEA	Accredited Energy Auditor
UGC	University Grants Commission
NAAC	**National Assessment and Accreditation Council (NAAC)**
IQAC	Internal Quality Assurance Cell
GHG	Greenhouse gas
tCO_2e	Ton of Carbon Dioxide Equivalent
GWP	Global Warming Potential
HFC	Hydrofluorocarbon
LPG	Liquefied petroleum gas
kVA	Kilo Watt Ampere
HT	High Tension
LT	Low Tension
L	Litre
kg	Kilogram
EPI	Energy Performance Index
SEC	Specific Energy Consumption
CBH	Circumference at breast height
kmpl	Kilometer per Litre
kWp	Kilowatt peak
PSU	Public Sector Unit
EMC	Energy Management Centre
CDM	Clean Development Mechanism

ENERGY AUDIT AT DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY

Name of Building: MAIN BLOCK

Sl No	LOCATION		Lights							FAN				AC				IT			Others				
			T12	T8	CFL	LED T	LED bulb	LED	ICL	PF	WF	CF	EF	1 tonne	2 tonnes	1.5 tonne	11 tonnes	Projector	Photocopy &	PC	Water	Induction	TV	UPS	Washing
1	Ground Floor	Entrance		3	1																				
2		Corridor		2	1	10	4																		
3		Reception				15				1	2									1			1		
4		Principal Office		3	1	6										1				1			1		
5		G2 Office		1	1							1								3					
6		G5 Office		6	1							4							5	6					
7		G7 Office				2															1				
8		G8 Office			17		3				5								1	5					
9		G9 hall					9					3				2		1							
10		G10 hall			4		3				2			1											
		G11 hall			2		2						1												
11		Computer lab					10				10				4					69					
12		Electrical room																						2(10KVA)	
13		Ladies Toilet			4							1													
14	1st Floor	Computer lab		1								1													
15		F1(A) room		1		1						6									1				
16		F1(B) room		1								6									1				
17		F5 room	1			7						4									1				

18		Hardware lab	3									3												
19		Faculty section	6		1						2	8								12	1				
20		School of proff. Dept 1	2			1						2								4					
21		School of proff. Dept 2	2									5									1		1		
22		Seminar Hall			39						9			1		1		1							
23		Corridor	2			1																			
24		Toilet			7		3						2												
25	Second floor	Library and Computer lab		4		6				2		20								9					
26		Director room		1	1							1							1	1					
27		Director Placement room		1								2								1					
28		Staff room		4	1						1	6	1							11					
29		S7 room		4								5									1				
30		S8 room		2								5									1				
31		S9 room	4									5									1				
32		Corridor		1			11																		
33		Toilet			2		1					2													
34	Third	Corridor		4	2		2			1	2			1											

35		Room 3		2								4													
36		Room 4		1								1													
37		Language lab	6									6								6					
38		T4		1								2											1		
39		T5		1								3													
40		T9		2							2	3											1		
41		T10	2									5									1				
42		Tectorial Room		1								3									1				
43		Computer lab	2									5									1				
44		Outdoor						1	2																
45		Staff room		3							6									6					
46		Toilet			2								1												
Total			30	50	87	49	48	1	2	4	41	122	5	3	4	4	0	2	7	135	12	0	5	2	0

ENERGY AUDIT AT DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY																										
Name of Building:			HOSTEL BLOCK-1																							
Sl No	LOCATION		Lights							FAN				AC				IT			Others					
			T12	T8	CFL	LED T	LED bulb	LED	ICL	PF	WF	CF	EF	1 tonne	2 tonnes	1.5 tonne	11 tonnes	Projector	Photocopy	PC	Water	Induction	TV	5HP Motor	Washing
1	Ground Floor	Entrance				2																			
2		Reception				1					1	1								1					
3		Dining room				1	1					1									2	3			
4		G1 & G2 & G3			1	1						1							1	1					
5		Study Hall		7								8													
6		Toilet		4	2		1					1													
7		Guest Room		2	5							2	1	1											
8	First Floor	F1		1								1													
9		F2		1	1							1										1			
10		F3					1																		1
		F4					1																		
11		F5		1			1					1										1			
12		F6		1								1													
13		F7				5		2			5														

14		F9-F17, F19		9								9												
15		Corridor					7																	
16		Toilet					4																	
17	Second floor	S1		1								1												
18		S2		1								1												
19		S3		1								1												
20		S4		1								1												
21		S5		1								1												
22		S6		1								1												
23		S7		1								1												
24		S8		1								1												
25		S9		1								1												
26		S10		1								1												
27		S11		1								1												

28		S12		1								1												
29		S13		1								1												
30		S14		1								1												
31		S15		1								1												
32		S16		1								1												
33		S17		1								1												
34		S18		1								1												
35		S19		1								1												
36		S20		1								1												
37		S21		1								1												
38	Third Floor	T1		1								1												
39		T2		1								1												
40		T3		1								1												
41		T4		1								1												

42		T5		1								1													
43		T6		1								1													
44		T7		1								1													
45		T8		1								1													
46		T9		1								1													
47		T10		1								1													
48		T11		1								1													
49		T12		1								1													
50		T13		1								1													
51		T14		1								1													
52		T15		1								1													
53		T16		1								1													
54		T17		1								1													
55		Corridor			1		3		1															1	
		Total	0	56	9	10	16	2	0	0	6	57	1	1	0	0	0	0	1	2	2	5	0	1	1

ENERGY AUDIT AT DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY																										
Name of Building:			HOSTEL BLOCK-2																							
Sl No	LOCATION		Lights							FAN				AC				IT			Others				
			T12	T8	CFL	LED T	LED bulb	LED	ICL	PF	WF	CF	EF	1 tonne	2 tonne	1.5 tonne	11 tonne	Projector	Photocopy	PC	Water	Induction	TV	5HP Motor	Mixer and
1	Gro	kitchen		15		3	2					1										2	1		3
2	First Floor	Corridor			11		1																		
3		Room 1		1	2							1													
4		Room 2		4								4													
5		Room 3		3								3													
6		Room 4		1	2							1													
7		Room 5		1	2							1													
8		Others																						2	
9	Second	Corridor		1			1														1				
10		S4		1			1					1													

		S5		1			1					1														
11		S6		1			1					1														
12		S1		4								4														
13		S2		1																						
14		Toilet			1		2																			
15		Cantee n				3	14				4								2	2						
16		Gate					12																			
Total			0	34	18	6	35	0	0	0	4	18	0	0	0	0	0	0	2	2	1	2	1	2	3		

ENERGY AUDIT AT DE PAUL INSTITUTE OF SCIENCE & TECHNOLOGY,ANGAMALY																												
Name of Building:			ANNEX BLOCK																									
Sl No	LOCATION		Lights							FAN				AC				IT			Others							
			T12	T8	CFL	LED T	LED bulb	LED	ICL	PF	WF	CF	EF	1 tonne	2 tonne	1.5 tonne	11 tonne	Projector	Photocopy	PC	Water	UPS		Mixer	10HP Motor	Lift		
1	Baseme			22	1							31								1								
2	Ground	Reception		1	15	1	6	1												1				1				
3	Ground	Accounts (001)		1	1		4					2	1	1														

4		Accounts (002)		3	1							3	1						2	1					
5		Director Finance		4	1							4		1					1	1					
6		5		12								11									1		1		
7		6		1	1							1													
8		7		1								1													
9		8		2									2												
10		Electrical Room			1																				
11		Toilet Staff Room					2						1												
12		Rent Room		1	1																				
13		Councellor Room		1	1															1					
14		Admin Cabin		1								1													
15		Others																						1	2
16	First floor	101		4								4													
17		103		3								5						1							
18		104		3								4						1							
19		105		6								7						1							

20		106		6								5						1							
21		107		6								5	3					1							
22		108			1																				
23		109		1									1												
24		110			2				1				1												
25		111			1								1								1				
26		Faculty Room		3	1	3						6								7					
27		Corridor		1	1	2	2																		
28	Second Floor	201					18				13		1	3	3	2				70		1(6KVA)			
29		202		6								5						1							
30		203		6								5	2					1							
31		204		6								5	2					1							
32		205			1																	1(20KVA)			
33		206				1							1												

34		207		1			1						1											
35		208					1						1											
36		209		6	1							6								7				
37		Corridor		1		1	2																	
38	Third Floor	301		4								4												
39		303		3								5						1						
40		304		3								4						1						
41		305		6								7						1						
42		306		6								5						1						
41		307		6								5	3					1						
42		308			1																			
43		309		1									1											
44		310			2				1				1											
45		311			1								1								1			

46		Faculty Room		3	1	3						6								7					
47		Corridor		1	1	2	2																		
48	Fourth Floor	Media UG lab		10								17			3			2		54					
49		403		4								4													
50		404		3								5						1							
51		405		3								4						1							
52		406		6								7						1							
53		407		6								5						1							
54		408		6								5	3					1							
55		409			1																				
56		410		1									1												
57		411			2				1				1												
58		412		3								4						1							
59	Fifth	Media Studio		3	3	1	8					2		2	2					5			2		

60		503					18				13		1	3	3	2				70					
61		504		6								5						1							
62		505		6								5	2					1							
63		506		6								5	2					1							
64		507			1																				
65		508				1							1												
66		509		1			1						1												
67		510					1						1												
68		511		6	1							6								7					
69		512		3	1							5	1					1							
70		Corridor			1																				
71		Lift Room		2					1																
		Total	0	141	36	11	36	1	2	0	13	147	25	5	3	2	0	13	3	96	3	1	4	1	2

Electricity Bill Details (2020-2021)											
Month	Name of the Consumer			DEPAUL INSTITUTE OF SCIENCE & TECHNOLOGY, ANGAMALY							
	Contract demand (kVA)		75 KVA		Consumer number & Section			1345530020581			
	Tariff		HT II (B) GENERAL					ANGAMALY			
	kWh				kVA			PF	PF Penalty / Incentive	(Total)	Rs/kwh
	Z1	Z2	Z3	Total	Z1	Z2	Z3				
Apr-20				0				1.00	0		
May-20	2514	722	1400	4636	24	10	10	1.00	0	56902	12.27
Jun-20				0					0		
Jul-20	2572	670	1282	4524	25	9	11	1.00	0	55505	12.27
Aug-20	2410	662	1282	4354	22	8	9	1.00	0	54515	12.52
Sep-20	2438	674	1264	4376	23	10	10	0.99	0	54809	12.52
Oct-20	2630	690	1294	4614	19	11	9	1.00	0	56369	12.22
Nov-20	3212	724	1358	5294	28	8	10	1.00	0	60871	11.50
Dec-20	3848	790	1528	6166	34	8	11	1.00	0	66935	10.86
Jan-21	6072	1212	1978	9262	41	14	15	1.00	0	88799	9.59
Feb-21	6560	1312	2344	10216	47	16	18	1.00	0	95046	9.30
Mar-21										95046	

OTTOTRACTIONS
Energy-Engineering-Environment

Time series data

Title	DiST Electrical Load Study
Measurement period	20-04-2021 11:43:41 - 20-04-2021 11:54:26
Display period	20-04-2021 11:43:41 - 20-04-2021 11:54:25
Measurement interval	1 Second
Data interval	2 Second
Comment	Mains

Date	Time	U1[V]	U2[V]	U3[V]	I1[A]	I2[A]	I3[A]	P[kW]	P1[kW]	P2[kW]	P3[kW]	Q[kvar]	Q1[kvar]
Average value in the period		238.77	240.03	239.55	28.77	24.35	24.99	12.77	5.53	2.51	4.73	-13.41	-3.94
Maximum value in the period		239.73	241.11	240.61	50.48	42.43	45.29	26.85	10.60	6.93	9.32	-4.02	1.33
Time of maximum value		20-04-2021 11:45:59	20-04-2021 11:45:59	20-04-2021 11:45:59	20-04-2021 11:52:51	20-04-2021 11:46:01	20-04-2021 11:52:51	20-04-2021 11:52:51	20-04-2021 11:52:51	20-04-2021 11:52:51	20-04-2021 11:52:51	20-04-2021 11:50:43	20-04-2021 11:50:35
Minimum value in the period		237.98	239.32	238.72	18.84	16.47	14.59	7.59	3.15	0.99	2.81	-27.26	-8.52
Time of minimum value		20-04-2021 11:50:45	20-04-2021 11:50:43	20-04-2021 11:50:45	20-04-2021 11:45:25	20-04-2021 11:44:35	20-04-2021 11:49:51	20-04-2021 11:49:01	20-04-2021 11:46:25	20-04-2021 11:44:51	20-04-2021 11:49:13	20-04-2021 11:46:01	20-04-2021 11:46:01
20-04-2021	11:43:41												
	11:43:43	238.48	239.76	239.29	19.70	16.59	16.81	8.49	3.98	1.06	3.46	-9.45	-2.50
	11:43:45	238.52	239.76	239.29	19.00	16.63	17.46	8.45	3.77	1.06	3.62	-9.48	-2.53
	11:43:47	238.49	239.70	239.19	18.95	16.60	17.67	8.49	3.75	1.05	3.69	-9.48	-2.53
	11:43:49	238.64	239.87	239.37	19.10	16.61	16.69	8.28	3.80	1.06	3.42	-9.42	-2.53
	11:43:51	238.80	239.98	239.45	19.05	16.63	16.64	8.25	3.78	1.06	3.41	-9.42	-2.53
	11:43:53	238.71	239.90	239.30	18.99	16.55	18.79	8.80	3.77	1.04	3.99	-9.57	-2.52
	11:43:55	238.63	239.84	239.27	19.09	16.61	19.26	8.96	3.79	1.06	4.12	-9.62	-2.53
	11:43:57	238.64	239.80	239.27	19.10	16.60	18.25	8.71	3.79	1.06	3.86	-9.53	-2.53
	11:43:59	238.58	239.72	239.21	19.11	16.58	17.38	8.50	3.79	1.05	3.66	-9.42	-2.53
	11:44:01	238.60	239.80	239.29	19.80	16.61	17.48	8.76	4.01	1.06	3.70	-9.46	-2.50
	11:44:03	238.74	239.99	239.40	19.66	16.55	17.55	8.72	3.97	1.04	3.71	-9.47	-2.51
	11:44:05	238.67	239.90	239.36	19.00	16.54	17.45	8.49	3.78	1.03	3.68	-9.42	-2.52
	11:44:07	238.81	240.05	239.53	19.06	16.54	17.31	8.46	3.80	1.03	3.63	-9.44	-2.52
	11:44:09	238.86	240.10	239.63	19.09	16.53	16.71	8.26	3.80	1.03	3.42	-9.43	-2.52
	11:44:11	238.84	240.07	239.63	20.26	16.67	17.20	8.82	4.10	1.18	3.55	-9.50	-2.58
	11:44:13	238.81	240.01	239.57	19.59	16.57	16.66	8.44	3.93	1.10	3.41	-9.42	-2.54
	11:44:15	238.96	240.20	239.69	18.95	16.49	16.60	8.15	3.76	1.00	3.39	-9.44	-2.52
	11:44:17	238.85	240.11	239.62	19.00	16.51	16.37	8.11	3.77	1.01	3.32	-9.42	-2.52
	11:44:19	238.89	240.11	239.76	19.05	16.51	15.15	7.78	3.79	1.02	2.98	-9.33	-2.52
	11:44:21	238.79	240.08	239.68	19.93	16.53	15.33	8.11	4.06	1.03	3.02	-9.39	-2.49
	11:44:23	238.88	240.20	239.63	19.40	16.55	16.17	8.18	3.90	1.03	3.25	-9.43	-2.51
	11:44:25	238.96	240.23	239.73	18.95	16.53	17.30	8.35	3.76	1.02	3.57	-9.49	-2.52
	11:44:27	238.97	240.13	239.71	19.05	16.53	15.52	7.91	3.79	1.03	3.09	-9.35	-2.52
	11:44:29	239.02	240.22	239.72	19.10	16.53	16.16	8.08	3.80	1.03	3.25	-9.41	-2.52
	11:44:31	238.86	240.11	239.59	19.05	16.51	16.61	8.20	3.79	1.02	3.39	-9.42	-2.52
	11:44:33	238.90	240.12	239.57	19.03	16.50	15.12	7.78	3.79	1.02	2.97	-9.31	-2.52
	11:44:35	238.91	240.11	239.70	18.97	16.47	15.08	7.75	3.77	1.02	2.96	-9.30	-2.52
	11:44:37	238.90	240.08	239.65	19.00	16.51	15.14	7.77	3.78	1.02	2.97	-9.32	-2.52
	11:44:39	238.81	240.09	239.60	19.07	16.52	15.13	7.79	3.79	1.03	2.97	-9.32	-2.52
	11:44:41	238.74	239.98	239.55	19.95	16.50	15.32	8.11	4.07	1.02	3.03	-9.37	-2.48
	11:44:43	238.78	239.98	239.58	19.25	16.52	15.16	7.86	3.86	1.02	2.98	-9.32	-2.51
	11:44:45	238.86	240.02	239.60	19.56	16.55	15.51	8.04	3.92	1.06	3.07	-9.39	-2.55
	11:44:47	238.94	240.19	239.73	20.21	16.67	15.48	8.31	4.09	1.16	3.07	-9.39	-2.58
	11:44:49	238.87	240.15	239.66	19.14	16.53	15.07	7.78	3.81	1.02	2.96	-9.34	-2.53
	11:44:51	238.81	239.99	239.56	18.92	16.49	17.09	8.25	3.75	0.99	3.51	-9.48	-2.52
	11:44:53	238.78	239.97	239.58	18.96	16.52	15.34	7.81	3.76	1.01	3.03	-9.33	-2.52
	11:44:55	238.98	240.26	239.81	18.94	16.53	15.04	7.76	3.76	1.05	2.96	-9.29	-2.52
	11:44:57	239.04	240.34	239.83	19.02	16.54	15.13	7.78	3.78	1.03	2.97	-9.34	-2.53
	11:44:59	238.98	240.20	239.72	19.25	16.53	15.14	7.85	3.85	1.03	2.98	-9.34	-2.52
	11:45:01	238.98	240.19	239.78	19.93	16.52	15.21	8.09	4.06	1.03	3.00	-9.37	-2.49
	11:45:03	238.99	240.25	239.79	19.16	16.52	15.13	7.82	3.82	1.03	2.98	-9.33	-2.52

OTTOTRACTIONS
Energy-Engineering-Environment

Time series data

Title	DiST Electrical Load Study
Measurement period	20-04-2021 11:43:41 - 20-04-2021 11:54:26
Display period	20-04-2021 11:43:41 - 20-04-2021 11:54:25
Measurement interval	1 Second
Data interval	2 Second
Comment	Mains

Date	Time	U1[V]	U2[V]	U3[V]	I1[A]	I2[A]	I3[A]	P[kW]	P1[kW]	P2[kW]	P3[kW]	Q[kvar]	Q1[kvar]
20-04-2021	11:45:05	238.90	240.24	239.72	19.01	16.51	15.55	7.88	3.78	1.02	3.08	-9.36	-2.52
	11:45:07	239.01	240.35	239.76	19.06	16.51	17.67	8.50	3.79	1.02	3.68	-9.53	-2.53
	11:45:09	238.93	240.15	239.63	19.06	16.53	16.68	8.22	3.79	1.02	3.41	-9.44	-2.53
	11:45:11	238.93	240.14	239.67	19.00	16.53	15.16	7.77	3.77	1.02	2.98	-9.33	-2.53
	11:45:13	238.79	240.09	239.63	18.95	16.51	15.15	7.75	3.76	1.02	2.97	-9.32	-2.52
	11:45:15	238.87	240.19	239.73	18.93	16.48	15.06	7.72	3.76	1.02	2.96	-9.30	-2.52
	11:45:17	238.97	240.21	239.77	19.05	16.58	15.21	7.81	3.79	1.04	2.99	-9.35	-2.53
	11:45:19	239.02	240.25	239.84	19.73	16.61	15.44	8.09	3.98	1.07	3.05	-9.41	-2.54
	11:45:21	238.99	240.23	239.81	21.02	16.70	15.65	8.60	4.32	1.18	3.11	-9.46	-2.57
	11:45:23	239.14	240.37	239.90	19.51	16.58	15.19	7.94	3.91	1.05	2.99	-9.39	-2.54
	11:45:25	239.08	240.29	239.84	18.84	16.54	15.13	7.69	3.73	1.00	2.97	-9.35	-2.53
	11:45:27	239.17	240.53	239.96	19.02	16.55	15.72	8.00	3.78	1.02	3.20	-9.35	-2.53
	11:45:29	239.05	240.38	239.78	19.02	16.57	16.34	8.17	3.78	1.03	3.36	-9.39	-2.53
	11:45:31	239.14	240.43	239.86	18.99	16.57	17.84	8.59	3.78	1.02	3.79	-9.50	-2.53
	11:45:33	239.14	240.44	239.91	19.00	16.58	15.43	7.89	3.78	1.03	3.08	-9.35	-2.53
	11:45:35	239.00	240.29	239.75	18.97	16.53	15.11	7.76	3.77	1.02	2.97	-9.32	-2.52
	11:45:37	238.98	240.35	239.74	20.02	16.87	16.63	8.84	4.11	1.34	3.39	-9.28	-2.45
	11:45:39	238.87	240.21	239.67	24.72	18.77	22.55	12.98	5.41	2.66	4.92	-8.99	-2.37
	11:45:41	238.75	240.07	239.60	26.84	19.85	25.57	14.83	5.96	3.16	5.71	-8.91	-2.35
	11:45:43	239.22	240.55	240.07	30.55	27.47	27.85	13.73	5.66	3.05	5.03	-15.17	-4.53
	11:45:45	239.35	240.71	240.23	32.27	30.27	29.63	13.87	5.69	3.13	5.05	-17.24	-5.22
	11:45:47	239.21	240.58	240.11	32.32	30.30	29.69	13.95	5.72	3.15	5.08	-17.21	-5.21
	11:45:49	239.19	240.60	240.07	32.23	30.19	29.58	13.79	5.68	3.09	5.04	-17.24	-5.22
	11:45:51	239.16	240.52	240.07	32.12	29.94	29.52	13.63	5.62	3.01	5.02	-17.23	-5.25
	11:45:53	239.39	240.76	240.32	37.51	37.03	35.41	13.45	5.54	2.94	4.97	-22.62	-7.02
	11:45:55	239.60	240.94	240.52	41.09	41.88	38.39	12.17	5.28	2.51	4.39	-26.49	-8.31
	11:45:57	239.68	241.08	240.57	39.69	42.17	37.65	9.64	4.36	1.58	3.71	-27.07	-8.46
	11:45:59	239.73	241.11	240.61	39.35	42.19	37.42	8.85	4.11	1.23	3.52	-27.20	-8.49
	11:46:01	239.73	241.08	240.59	39.70	42.43	36.82	8.66	4.25	1.27	3.14	-27.26	-8.52
	11:46:03	239.58	240.78	240.38	34.88	35.39	33.01	8.00	3.55	1.10	3.35	-23.47	-7.56
	11:46:05	239.61	240.75	240.40	31.02	29.55	30.18	7.98	3.23	1.09	3.67	-20.29	-6.70
	11:46:07	239.73	240.82	240.51	31.09	29.55	30.99	8.38	3.28	1.08	4.02	-20.37	-6.69
	11:46:09	239.73	240.80	240.45	31.07	29.55	31.06	8.43	3.27	1.08	4.07	-20.36	-6.69
	11:46:11	239.70	240.78	240.46	31.08	29.55	30.07	7.97	3.26	1.08	3.63	-20.29	-6.70
	11:46:13	239.49	240.52	240.21	26.70	24.42	25.90	7.95	3.27	1.08	3.61	-16.59	-5.45
	11:46:15	239.21	240.34	240.04	20.54	17.18	20.14	7.95	3.26	1.08	3.62	-11.38	-3.68
	11:46:17	239.22	240.33	240.04	20.48	17.12	20.07	7.90	3.24	1.06	3.61	-11.35	-3.68
	11:46:19	239.06	240.23	239.93	21.11	17.19	20.18	8.18	3.48	1.07	3.63	-11.39	-3.66
	11:46:21	239.01	240.11	239.81	21.13	17.18	20.54	8.41	3.51	1.17	3.74	-11.32	-3.64
	11:46:23	239.07	240.17	239.85	20.26	16.76	20.40	8.04	3.22	1.14	3.69	-11.16	-3.63
	11:46:25	239.15	240.30	239.95	20.03	16.79	22.14	8.45	3.15	1.08	4.23	-11.33	-3.61
	11:46:27	239.21	240.34	239.98	20.09	16.82	20.16	7.88	3.18	1.08	3.62	-11.19	-3.60
	11:46:29	239.16	240.33	239.98	20.66	16.93	20.41	8.22	3.36	1.18	3.69	-11.22	-3.63
	11:46:31	239.19	240.31	239.98	21.06	17.01	20.28	8.41	3.48	1.28	3.66	-11.19	-3.65
	11:46:33	239.21	240.32	239.94	20.28	16.84	20.23	8.02	3.24	1.11	3.68	-11.17	-3.61
	11:46:35	239.22	240.35	239.99	20.10	16.80	20.68	8.14	3.18	1.10	3.87	-11.15	-3.61
	11:46:37	239.14	240.30	239.94	20.67	17.18	21.10	8.72	3.41	1.30	4.01	-11.13	-3.58
	11:46:39	239.09	240.19	239.89	22.84	17.79	22.51	10.32	4.14	1.80	4.38	-11.03	-3.55
	11:46:41	238.76	239.86	239.60	25.55	19.66	26.45	13.57	5.06	3.02	5.50	-10.49	-3.43

OTTOTRACTIONS
Energy-Engineering-Environment

Time series data

Title	DiST Electrical Load Study		
Measurement period	20-04-2021 11:43:41 - 20-04-2021 11:54:26		
Display period	20-04-2021 11:43:41 - 20-04-2021 11:54:25		
Measurement interval	1 Second	Data interval	2 Second
Comment	Mains		

Date	Time	U1[V]	U2[V]	U3[V]	I1[A]	I2[A]	I3[A]	P[kW]	P1[kW]	P2[kW]	P3[kW]	Q[kvar]	Q1[kvar]
20-04-2021	11:46:43	238.70	239.86	239.57	24.51	19.26	25.85	12.89	4.73	2.84	5.32	-10.57	-3.45
	11:46:45	238.66	239.90	239.63	24.57	19.19	25.81	12.87	4.75	2.82	5.31	-10.57	-3.45
	11:46:47	238.67	239.84	239.62	24.57	19.18	25.75	12.85	4.75	2.81	5.30	-10.57	-3.45
	11:46:49	238.63	239.78	239.59	24.31	18.98	25.46	12.60	4.66	2.73	5.22	-10.59	-3.46
	11:46:51	238.62	239.76	239.51	22.77	18.08	24.83	11.22	4.12	2.08	5.02	-10.96	-3.53
	11:46:53	238.70	239.87	239.59	20.87	17.21	21.43	8.69	3.40	1.28	4.01	-11.28	-3.64
	11:46:55	238.55	239.76	239.49	20.18	16.67	20.26	7.97	3.20	1.13	3.66	-11.10	-3.61
	11:46:57	238.75	239.89	239.59	20.04	16.69	19.98	7.81	3.18	1.06	3.57	-11.10	-3.58
	11:46:59	238.63	239.83	239.48	20.82	16.79	20.22	8.21	3.47	1.10	3.64	-11.14	-3.55
	11:47:01	238.59	239.76	239.44	20.23	16.80	20.15	7.98	3.25	1.12	3.62	-11.11	-3.57
	11:47:03	238.56	239.72	239.40	20.61	16.80	20.52	8.19	3.32	1.15	3.72	-11.18	-3.62
	11:47:05	238.65	239.84	239.53	21.04	16.93	20.42	8.40	3.47	1.23	3.70	-11.17	-3.63
	11:47:07	238.70	239.83	239.53	20.28	16.82	20.05	7.96	3.24	1.13	3.59	-11.13	-3.59
	11:47:09	238.65	239.80	239.46	20.43	17.06	20.37	8.25	3.32	1.25	3.69	-11.11	-3.57
	11:47:11	238.51	239.68	239.33	21.32	17.43	21.24	9.01	3.58	1.47	3.97	-11.15	-3.61
	11:47:13	238.38	239.54	239.23	23.99	18.90	25.10	12.29	4.55	2.64	5.10	-10.61	-3.46
	11:47:15	238.45	239.57	239.30	22.01	17.76	23.50	10.20	3.82	1.76	4.62	-11.11	-3.58
	11:47:17	238.65	239.76	239.44	20.73	17.05	21.61	8.64	3.37	1.22	4.06	-11.29	-3.63
	11:47:19	238.65	239.80	239.48	20.83	16.68	20.47	8.30	3.46	1.10	3.75	-11.11	-3.57
	11:47:21	238.74	239.83	239.53	20.21	16.81	20.70	8.21	3.23	1.12	3.87	-11.11	-3.59
	11:47:23	238.82	239.93	239.66	21.98	19.89	21.63	8.03	3.30	1.12	3.61	-12.84	-4.07
	11:47:25	238.99	240.27	239.92	28.15	29.20	24.72	7.82	3.81	1.07	2.95	-18.05	-5.55
	11:47:27	238.65	239.96	239.57	21.32	19.81	17.52	7.67	3.74	1.01	2.93	-11.61	-3.34
	11:47:29	238.50	239.83	239.40	18.96	16.54	15.06	7.72	3.75	1.03	2.94	-9.31	-2.53
	11:47:31	238.54	239.91	239.40	19.00	16.56	15.09	7.76	3.76	1.04	2.96	-9.31	-2.53
	11:47:33	238.59	239.85	239.33	19.01	16.54	16.77	8.21	3.76	1.04	3.41	-9.45	-2.53
	11:47:35	238.53	239.86	239.37	19.01	16.54	15.09	7.75	3.76	1.04	2.95	-9.31	-2.54
	11:47:37	238.57	239.96	239.47	19.33	16.55	15.11	7.86	3.87	1.04	2.96	-9.33	-2.52
	11:47:39	238.58	239.95	239.47	20.93	16.65	15.69	8.56	4.29	1.17	3.12	-9.44	-2.57
	11:47:41	238.59	239.90	239.43	19.99	16.63	15.39	8.19	4.03	1.13	3.04	-9.37	-2.56
	11:47:43	238.46	239.79	239.31	19.01	16.52	15.13	7.77	3.76	1.04	2.96	-9.30	-2.53
	11:47:45	238.53	239.87	239.38	19.07	16.54	15.12	7.79	3.78	1.05	2.96	-9.31	-2.53
	11:47:47	238.54	239.84	239.31	19.01	16.54	17.26	8.36	3.76	1.05	3.56	-9.47	-2.53
	11:47:49	238.49	239.78	239.30	18.98	16.53	15.38	7.84	3.75	1.04	3.04	-9.32	-2.53
	11:47:51	238.59	239.81	239.37	18.99	16.54	15.10	7.75	3.76	1.04	2.96	-9.31	-2.53
	11:47:53	238.50	239.78	239.29	18.98	16.53	15.06	7.74	3.75	1.04	2.95	-9.30	-2.53
	11:47:55	238.51	239.81	239.30	18.94	16.53	15.01	7.69	3.75	1.02	2.93	-9.31	-2.53
	11:47:57	238.56	239.87	239.30	19.36	16.52	14.98	7.80	3.88	1.01	2.92	-9.33	-2.52
	11:47:59	238.52	239.85	239.30	19.65	16.48	15.27	8.02	3.97	1.02	3.04	-9.32	-2.50
	11:48:01	238.46	239.73	239.19	19.05	16.57	15.77	8.03	3.77	1.05	3.21	-9.30	-2.53
	11:48:03	238.42	239.67	239.17	19.01	16.54	15.30	7.84	3.76	1.05	3.03	-9.29	-2.53
	11:48:05	238.48	239.77	239.27	19.04	16.54	15.06	7.76	3.77	1.04	2.95	-9.30	-2.53
	11:48:07	238.49	239.83	239.22	19.04	16.56	16.76	8.23	3.77	1.04	3.41	-9.44	-2.53
	11:48:09	238.54	239.86	239.28	19.03	16.56	15.11	7.77	3.77	1.04	2.96	-9.31	-2.53
	11:48:11	238.44	239.69	239.17	19.01	16.55	15.10	7.75	3.76	1.04	2.96	-9.31	-2.53
	11:48:13	238.54	239.78	239.31	19.81	16.67	15.40	8.14	3.97	1.15	3.03	-9.37	-2.57
	11:48:15	238.41	239.64	239.18	20.01	16.75	15.23	8.22	4.02	1.22	2.99	-9.33	-2.57
	11:48:17	238.55	239.79	239.31	19.60	16.63	15.09	7.98	3.96	1.07	2.95	-9.33	-2.49
	11:48:19	238.64	239.84	239.35	19.65	16.65	17.47	8.69	3.99	1.08	3.63	-9.49	-2.50

OTTOTRACTIONS
Energy-Engineering-Environment

Time series data

Title	DiST Electrical Load Study		
Measurement period	20-04-2021 11:43:41 - 20-04-2021 11:54:26		
Display period	20-04-2021 11:43:41 - 20-04-2021 11:54:25		
Measurement interval	1 Second	Data interval	2 Second
Comment	Mains		

Date	Time	U1[V]	U2[V]	U3[V]	I1[A]	I2[A]	I3[A]	P[kW]	P1[kW]	P2[kW]	P3[kW]	Q[kvar]	Q1[kvar]
20-04-2021	11:48:21	238.69	239.89	239.46	19.05	16.73	15.22	7.90	3.81	1.10	3.00	-9.30	-2.49
	11:48:23	238.58	239.81	239.35	18.97	16.64	15.09	7.79	3.76	1.07	2.96	-9.30	-2.51
	11:48:25	238.60	239.82	239.37	18.90	16.51	14.99	7.68	3.74	1.02	2.93	-9.30	-2.53
	11:48:27	238.57	239.73	239.32	18.88	16.49	14.97	7.65	3.72	1.01	2.92	-9.29	-2.53
	11:48:29	238.47	239.70	239.23	18.89	16.51	15.05	7.69	3.73	1.03	2.94	-9.30	-2.54
	11:48:31	238.35	239.56	239.15	18.95	16.51	15.07	7.72	3.74	1.03	2.94	-9.29	-2.53
	11:48:33	238.35	239.51	239.13	18.98	16.51	15.16	7.76	3.75	1.03	2.97	-9.29	-2.53
	11:48:35	238.26	239.44	239.03	18.99	16.51	15.69	7.96	3.76	1.04	3.17	-9.28	-2.53
	11:48:37	238.40	239.57	239.18	19.78	16.51	15.46	8.12	4.00	1.04	3.09	-9.33	-2.51
	11:48:39	238.40	239.59	239.17	19.44	16.49	16.36	8.23	3.90	1.04	3.30	-9.41	-2.52
	11:48:41	238.43	239.60	239.14	18.88	16.50	16.23	8.05	3.74	1.03	3.28	-9.35	-2.51
	11:48:43	238.33	239.54	239.08	18.93	16.53	15.09	7.74	3.76	1.04	2.95	-9.28	-2.50
	11:48:45	238.46	239.67	239.19	19.01	16.53	15.06	7.76	3.78	1.03	2.95	-9.28	-2.50
	11:48:47	238.54	239.74	239.27	19.45	16.59	15.30	7.98	3.90	1.09	3.00	-9.33	-2.52
	11:48:49	238.48	239.70	239.25	20.18	16.72	15.27	8.30	4.08	1.21	3.00	-9.32	-2.55
	11:48:51	238.35	239.59	239.09	19.28	16.61	15.10	7.88	3.85	1.09	2.95	-9.29	-2.52
	11:48:53	238.50	239.72	239.24	19.02	16.54	15.09	7.77	3.78	1.03	2.95	-9.30	-2.51
	11:48:55	238.61	239.85	239.38	18.95	16.53	15.90	7.95	3.77	1.02	3.17	-9.38	-2.51
	11:48:57	238.50	239.75	239.25	19.76	16.52	15.37	8.06	4.01	1.01	3.03	-9.36	-2.47
	11:48:59	238.61	239.83	239.37	19.33	16.53	14.61	7.73	3.89	1.03	2.82	-9.28	-2.49
	11:49:01	238.55	239.81	239.31	18.84	16.48	14.59	7.59	3.74	1.03	2.83	-9.22	-2.50
	11:49:03	238.64	239.83	239.35	18.94	16.55	14.68	7.64	3.76	1.04	2.84	-9.26	-2.51
	11:49:05	238.58	239.79	239.34	19.04	16.54	14.61	7.65	3.79	1.04	2.82	-9.26	-2.50
	11:49:07	238.66	239.90	239.43	19.06	16.56	14.77	7.70	3.79	1.04	2.87	-9.28	-2.51
	11:49:09	238.62	239.89	239.34	19.04	16.56	15.50	7.94	3.79	1.04	3.12	-9.30	-2.51
	11:49:11	238.64	239.93	239.31	19.06	16.57	17.01	8.34	3.79	1.04	3.51	-9.44	-2.51
	11:49:13	238.76	240.00	239.48	19.06	16.58	14.59	7.63	3.79	1.04	2.81	-9.29	-2.52
	11:49:15	238.72	239.96	239.48	19.26	16.63	14.84	7.82	3.86	1.07	2.88	-9.29	-2.49
	11:49:17	238.71	239.93	239.48	20.34	16.64	15.30	8.35	4.21	1.11	3.03	-9.32	-2.42
	11:49:19	238.78	239.98	239.53	19.66	16.68	15.41	8.25	4.02	1.18	3.06	-9.24	-2.43
	11:49:21	238.74	239.91	239.47	18.85	16.48	14.88	7.71	3.78	1.02	2.93	-9.22	-2.45
	11:49:23	238.68	239.86	239.40	20.24	16.67	15.49	8.34	4.13	1.14	3.08	-9.37	-2.51
	11:49:25	238.71	239.95	239.47	19.76	16.62	15.05	8.07	4.01	1.11	2.97	-9.29	-2.49
	11:49:27	238.77	240.00	239.45	18.95	16.53	14.88	7.72	3.80	1.00	2.92	-9.26	-2.46
	11:49:29	238.86	240.02	239.50	19.03	16.55	15.39	7.88	3.82	1.02	3.05	-9.31	-2.47
	11:49:31	238.85	240.06	239.48	19.35	16.55	16.19	8.24	3.92	1.03	3.29	-9.37	-2.45
	11:49:33	238.99	240.19	239.66	19.37	16.56	14.98	8.01	4.03	1.03	2.95	-9.20	-2.28
	11:49:35	238.93	240.16	239.68	19.79	16.56	14.92	8.11	4.15	1.03	2.94	-9.22	-2.28
	11:49:37	238.91	240.20	239.70	20.64	16.61	15.37	8.53	4.39	1.06	3.08	-9.28	-2.25
	11:49:39	238.90	240.15	239.64	19.71	16.62	15.33	8.26	4.11	1.07	3.10	-9.21	-2.31
	11:49:41	238.97	240.22	239.65	19.41	16.55	15.16	8.01	4.01	1.03	2.97	-9.27	-2.33
	11:49:43	238.79	240.11	239.55	19.53	16.56	16.55	8.45	4.04	1.04	3.38	-9.35	-2.33
	11:49:45	238.88	240.17	239.64	19.60	16.58	14.64	7.92	4.06	1.04	2.82	-9.25	-2.33
	11:49:47	238.81	240.11	239.54	19.53	16.59	14.68	7.90	4.04	1.03	2.83	-9.24	-2.33
	11:49:49	238.74	240.06	239.54	19.59	16.60	14.65	7.93	4.05	1.04	2.83	-9.24	-2.33
	11:49:51	238.71	240.01	239.50	19.60	16.60	14.59	7.91	4.06	1.05	2.81	-9.23	-2.33
	11:49:53	238.64	239.93	239.49	19.56	16.59	14.62	7.91	4.05	1.04	2.82	-9.23	-2.33
	11:49:55	238.61	239.90	239.44	20.08	16.58	14.70	8.07	4.19	1.03	2.84	-9.28	-2.32
	11:49:57	238.58	239.91	239.44	21.57	16.72	15.04	8.66	4.57	1.16	2.94	-9.37	-2.60

OTTOTRACTIONS
Energy-Engineering-Environment

Time series data

Title	DiST Electrical Load Study		
Measurement period	20-04-2021 11:43:41 - 20-04-2021 11:54:26		
Display period	20-04-2021 11:43:41 - 20-04-2021 11:54:25		
Measurement interval	1 Second	Data interval	2 Second
Comment	Mains		

Date	Time	U1[V]	U2[V]	U3[V]	I1[A]	I2[A]	I3[A]	P[kW]	P1[kW]	P2[kW]	P3[kW]	Q[kvar]	Q1[kvar]
20-04-2021	11:49:59	238.54	239.88	239.40	20.40	16.64	14.90	8.26	4.27	1.10	2.90	-9.28	-2.35
	11:50:01	238.53	239.87	239.41	19.49	16.56	15.07	8.02	4.02	1.04	2.96	-9.24	-2.33
	11:50:03	238.55	239.88	239.38	19.54	16.51	16.97	8.56	4.04	1.03	3.49	-9.36	-2.32
	11:50:05	238.48	239.80	239.31	19.68	16.58	15.48	8.19	4.08	1.05	3.08	-9.27	-2.33
	11:50:07	238.54	239.88	239.37	19.60	16.56	16.13	8.36	4.06	1.04	3.27	-9.30	-2.33
	11:50:09	238.58	239.94	239.32	19.61	16.55	15.82	8.42	4.06	1.04	3.32	-9.16	-2.33
	11:50:11	238.57	239.88	239.38	19.67	16.56	15.08	8.18	4.07	1.05	3.06	-9.15	-2.33
	11:50:13	238.61	239.91	239.36	19.75	16.58	15.08	8.20	4.10	1.04	3.06	-9.17	-2.33
	11:50:15	238.70	239.99	239.45	20.24	16.59	15.04	8.33	4.24	1.04	3.05	-9.20	-2.31
	11:50:17	238.63	239.88	239.40	20.43	16.57	15.07	8.40	4.30	1.04	3.06	-9.21	-2.31
	11:50:19	238.63	239.87	239.33	19.63	16.57	16.69	8.59	4.07	1.04	3.49	-9.29	-2.33
	11:50:21	238.70	239.90	239.39	19.59	16.59	15.01	8.14	4.05	1.04	3.04	-9.16	-2.34
	11:50:23	238.70	239.95	239.41	19.57	16.54	14.93	8.11	4.05	1.03	3.03	-9.14	-2.33
	11:50:25	238.69	239.90	239.38	19.68	16.59	14.93	8.13	4.08	1.04	3.02	-9.16	-2.33
	11:50:27	238.68	239.93	239.45	19.57	16.57	14.91	8.08	4.05	1.03	3.02	-9.16	-2.33
	11:50:29	238.79	240.08	239.53	19.58	16.61	14.97	8.11	4.05	1.03	3.03	-9.18	-2.34
	11:50:31	238.74	240.09	239.48	20.60	16.73	15.27	8.57	4.31	1.17	3.10	-9.23	-2.38
	11:50:33	238.55	239.84	239.27	20.63	16.79	17.33	9.18	4.32	1.21	3.67	-9.33	-2.37
	11:50:35	238.48	239.76	239.26	24.36	17.91	19.28	11.38	5.28	2.03	4.08	-7.42	1.33
	11:50:37	238.13	239.44	238.92	31.46	19.26	26.37	17.94	7.46	4.22	6.26	-4.08	-0.68
	11:50:39	238.23	239.49	239.00	30.53	19.23	26.41	17.74	7.25	4.22	6.28	-4.05	-0.64
	11:50:41	238.20	239.49	238.94	30.49	19.24	27.26	17.93	7.24	4.22	6.48	-4.05	-0.63
	11:50:43	238.00	239.32	238.76	30.54	19.12	26.28	17.66	7.24	4.18	6.25	-4.02	-0.63
	11:50:45	237.98	239.33	238.72	30.64	19.22	26.17	17.67	7.27	4.20	6.22	-4.09	-0.65
	11:50:47	238.16	239.43	238.90	31.61	22.04	27.08	17.63	7.24	4.19	6.21	-7.04	-1.68
	11:50:49	238.49	239.75	239.18	33.46	26.95	28.73	17.57	7.20	4.17	6.20	-12.06	-3.44
	11:50:51	238.42	239.59	239.04	34.96	28.07	32.27	19.12	7.51	4.63	6.98	-12.30	-3.58
	11:50:53	238.40	239.55	239.03	33.73	26.13	31.23	18.85	7.38	4.51	6.96	-10.88	-3.19
	11:50:55	238.40	239.57	239.04	34.49	26.04	30.29	18.80	7.60	4.48	6.72	-10.84	-3.15
	11:50:57	238.57	239.68	239.15	35.94	29.06	32.26	18.69	7.47	4.50	6.73	-13.48	-4.04
	11:50:59	238.83	240.03	239.47	40.04	36.06	36.84	18.58	7.34	4.51	6.73	-19.65	-6.13
	11:51:01	238.78	239.95	239.40	40.03	36.08	36.91	18.60	7.33	4.52	6.75	-19.64	-6.13
	11:51:03	238.78	239.90	239.36	40.14	36.05	38.04	18.99	7.38	4.51	7.10	-19.67	-6.12
	11:51:05	238.76	239.90	239.39	40.33	36.12	38.25	19.14	7.42	4.52	7.20	-19.68	-6.13
	11:51:07	238.71	239.88	239.38	41.35	36.47	37.51	19.35	7.70	4.68	6.97	-19.68	-6.18
	11:51:09	238.77	239.90	239.41	40.66	36.30	36.92	18.86	7.52	4.60	6.75	-19.68	-6.15
	11:51:11	238.86	240.03	239.52	40.19	36.13	36.92	18.64	7.39	4.52	6.75	-19.69	-6.14
	11:51:13	238.81	240.04	239.49	40.19	36.15	36.96	18.64	7.38	4.52	6.74	-19.72	-6.14
	11:51:15	238.77	240.02	239.44	41.00	36.17	37.00	18.93	7.66	4.52	6.76	-19.71	-6.10
	11:51:17	238.98	240.13	239.55	40.40	36.18	36.97	18.73	7.46	4.52	6.75	-19.72	-6.13
	11:51:19	238.94	240.11	239.55	40.07	36.16	36.97	18.62	7.34	4.52	6.76	-19.71	-6.14
	11:51:21	238.92	240.10	239.57	40.06	36.16	36.98	18.61	7.34	4.52	6.76	-19.72	-6.14
	11:51:23	238.90	240.05	239.47	40.10	36.18	37.63	18.81	7.35	4.52	6.94	-19.75	-6.15
	11:51:25	238.94	240.13	239.52	40.18	36.15	38.44	19.09	7.38	4.50	7.21	-19.78	-6.14
	11:51:27	238.81	240.06	239.49	41.24	36.13	36.87	18.97	7.75	4.50	6.73	-19.70	-6.06
	11:51:29	238.91	240.14	239.59	42.15	36.19	37.00	19.29	8.02	4.52	6.76	-19.77	-6.10
	11:51:31	238.87	240.13	239.61	42.55	36.21	37.27	19.53	8.12	4.53	6.88	-19.77	-6.11
	11:51:33	238.86	240.11	239.54	42.89	36.19	37.36	19.69	8.23	4.53	6.92	-19.75	-6.10
	11:51:35	238.89	240.13	239.63	43.84	36.21	37.04	19.85	8.54	4.53	6.78	-19.81	-6.07

OTTOTRACTIONS
Energy-Engineering-Environment

Time series data

Title	DiST Electrical Load Study
Measurement period	20-04-2021 11:43:41 - 20-04-2021 11:54:26
Display period	20-04-2021 11:43:41 - 20-04-2021 11:54:25
Measurement interval	1 Second
Data interval	2 Second
Comment	Mains

Date	Time	U1[V]	U2[V]	U3[V]	I1[A]	I2[A]	I3[A]	P[kW]	P1[kW]	P2[kW]	P3[kW]	Q[kvar]	Q1[kvar]
20-04-2021	11:51:37	238.99	240.17	239.68	43.25	36.21	36.96	19.63	8.35	4.53	6.76	-19.81	-6.10
	11:51:39	238.89	240.16	239.62	43.29	36.20	38.18	19.99	8.34	4.54	7.12	-19.87	-6.12
	11:51:41	238.96	240.20	239.68	44.46	36.35	37.91	20.33	8.66	4.62	7.05	-19.89	-6.15
	11:51:43	238.87	240.17	239.62	43.88	36.29	37.07	19.91	8.51	4.60	6.80	-19.81	-6.12
	11:51:45	238.94	240.26	239.67	43.11	36.11	36.88	19.58	8.30	4.53	6.75	-19.76	-6.10
	11:51:47	238.91	240.17	239.66	43.03	36.12	36.97	19.56	8.27	4.52	6.78	-19.77	-6.11
	11:51:49	238.90	240.19	239.64	42.97	36.11	36.92	19.53	8.25	4.52	6.76	-19.77	-6.11
	11:51:51	238.89	240.20	239.61	42.97	36.11	36.96	19.55	8.25	4.53	6.77	-19.76	-6.11
	11:51:53	238.97	240.28	239.74	43.27	36.12	36.92	19.63	8.35	4.53	6.76	-19.79	-6.10
	11:51:55	238.96	240.27	239.68	43.83	36.08	38.92	20.41	8.54	4.51	7.37	-19.86	-6.07
	11:51:57	238.92	240.21	239.62	43.01	36.06	37.31	19.66	8.28	4.50	6.88	-19.77	-6.09
	11:51:59	238.98	240.22	239.65	42.85	36.08	36.97	19.52	8.22	4.52	6.78	-19.76	-6.11
	11:52:01	238.96	240.24	239.67	42.90	36.13	37.51	19.76	8.23	4.53	7.00	-19.73	-6.11
	11:52:03	238.81	240.09	239.58	43.00	36.10	37.01	19.58	8.26	4.52	6.79	-19.75	-6.11
	11:52:05	238.88	240.14	239.62	42.94	36.05	36.83	19.50	8.25	4.51	6.74	-19.73	-6.10
	11:52:07	238.92	240.17	239.63	43.00	36.16	37.00	19.57	8.26	4.54	6.78	-19.78	-6.11
	11:52:09	238.93	240.24	239.70	42.99	36.14	36.99	19.56	8.26	4.53	6.77	-19.78	-6.10
	11:52:11	238.78	240.12	239.54	43.02	36.14	37.00	19.56	8.27	4.53	6.77	-19.78	-6.10
	11:52:13	238.73	240.10	239.52	43.40	36.14	37.65	19.87	8.38	4.53	6.96	-19.80	-6.09
	11:52:15	238.78	240.11	239.52	44.75	36.35	38.42	20.58	8.76	4.62	7.19	-19.89	-6.12
	11:52:17	238.89	240.20	239.63	44.09	36.38	37.19	20.02	8.57	4.63	6.83	-19.84	-6.13
	11:52:19	239.03	240.35	239.76	43.02	36.18	36.97	19.57	8.27	4.54	6.77	-19.80	-6.12
	11:52:21	238.92	240.22	239.67	43.02	36.15	36.98	19.58	8.27	4.53	6.78	-19.78	-6.11
	11:52:23	238.95	240.28	239.72	43.03	36.11	37.62	19.76	8.28	4.52	6.97	-19.80	-6.11
	11:52:25	238.92	240.29	239.67	42.99	36.03	39.08	20.23	8.27	4.50	7.46	-19.79	-6.10
	11:52:27	238.90	240.26	239.68	42.94	36.06	37.26	19.66	8.25	4.50	6.91	-19.73	-6.10
	11:52:29	238.86	240.20	239.62	42.97	36.07	39.06	20.18	8.25	4.52	7.41	-19.82	-6.10
	11:52:31	239.02	240.33	239.87	43.06	36.07	36.95	19.59	8.29	4.52	6.78	-19.77	-6.11
	11:52:33	239.08	240.42	239.94	43.61	36.08	36.93	19.75	8.47	4.52	6.78	-19.79	-6.09
	11:52:35	239.08	240.40	239.89	43.79	36.21	37.05	19.87	8.53	4.54	6.80	-19.81	-6.07
	11:52:37	239.23	240.56	240.03	43.27	36.47	37.07	19.81	8.39	4.61	6.81	-19.82	-6.07
	11:52:39	239.19	240.48	239.90	44.55	37.40	38.80	21.36	8.85	5.14	7.37	-19.54	-5.93
	11:52:41	239.06	240.36	239.87	48.42	40.13	43.22	25.27	10.05	6.53	8.71	-18.95	-5.76
	11:52:43	239.04	240.36	239.83	49.01	40.36	43.70	25.69	10.20	6.65	8.85	-18.90	-5.76
	11:52:45	238.93	240.24	239.70	48.71	40.18	43.31	25.42	10.12	6.57	8.74	-18.90	-5.75
	11:52:47	238.91	240.24	239.71	48.93	40.44	43.54	25.66	10.19	6.66	8.81	-18.86	-5.72
	11:52:49	238.84	240.23	239.64	49.47	40.68	45.18	26.30	10.33	6.73	9.25	-18.95	-5.74
	11:52:51	238.73	240.10	239.58	50.48	41.27	45.29	26.85	10.60	6.93	9.32	-18.86	-5.73
	11:52:53	238.64	240.05	239.49	50.31	40.86	44.04	26.18	10.54	6.71	8.94	-19.01	-5.76
	11:52:55	238.63	240.03	239.49	49.16	40.05	42.89	25.20	10.20	6.40	8.60	-19.10	-5.79
	11:52:57	238.87	240.19	239.63	45.80	38.07	39.71	22.25	9.19	5.41	7.66	-19.52	-5.94
	11:52:59	238.97	240.31	239.77	44.09	37.09	37.95	20.46	8.62	4.78	7.07	-19.90	-6.07
	11:53:01	238.95	240.30	239.74	43.65	36.69	37.11	19.86	8.44	4.60	6.82	-19.94	-6.12
	11:53:03	238.85	240.18	239.66	43.56	36.49	36.87	19.68	8.40	4.53	6.75	-19.93	-6.14
	11:53:05	238.77	240.12	239.54	43.63	36.54	36.78	19.69	8.42	4.55	6.72	-19.92	-6.13
	11:53:07	238.85	240.22	239.63	43.52	36.53	36.73	19.63	8.39	4.54	6.71	-19.92	-6.14
	11:53:09	238.84	240.23	239.63	43.59	36.54	36.77	19.68	8.41	4.55	6.72	-19.92	-6.14
	11:53:11	238.85	240.23	239.68	43.65	36.56	36.84	19.76	8.44	4.58	6.75	-19.89	-6.13
	11:53:13	238.72	240.10	239.52	44.71	36.73	38.27	20.72	8.81	4.76	7.16	-19.79	-6.02

OTTOTRACTIONS
Energy-Engineering-Environment

Time series data

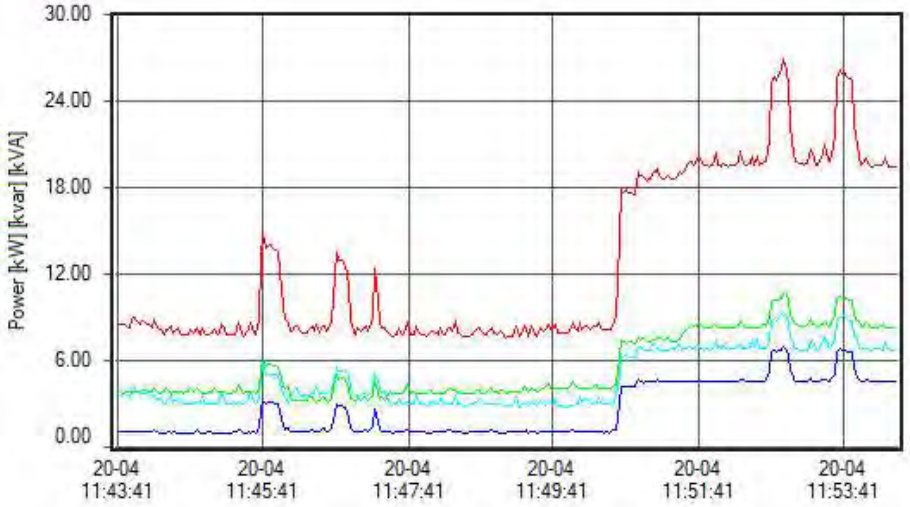
Title	DiST Electrical Load Study		
Measurement period	20-04-2021 11:43:41 - 20-04-2021 11:54:26		
Display period	20-04-2021 11:43:41 - 20-04-2021 11:54:25		
Measurement interval	1 Second	Data interval	2 Second
Comment	Mains		

Date	Time	U1[V]	U2[V]	U3[V]	I1[A]	I2[A]	I3[A]	P[kW]	P1[kW]	P2[kW]	P3[kW]	Q[kvar]	Q1[kvar]
20-04-2021	11:53:15	238.77	240.13	239.56	43.55	36.17	38.89	20.46	8.46	4.57	7.43	-19.70	-6.05
	11:53:17	238.80	240.13	239.62	43.10	36.22	36.77	19.61	8.32	4.57	6.73	-19.70	-6.06
	11:53:19	238.74	240.07	239.58	43.08	36.25	36.83	19.64	8.32	4.58	6.75	-19.70	-6.05
	11:53:21	238.85	240.14	239.67	43.17	36.26	37.16	19.80	8.36	4.59	6.86	-19.70	-6.05
	11:53:23	238.76	240.17	239.66	43.85	36.32	38.51	20.41	8.54	4.63	7.25	-19.77	-6.07
	11:53:25	238.74	240.09	239.56	44.37	36.53	39.67	21.03	8.69	4.72	7.62	-19.77	-6.06
	11:53:27	238.78	240.14	239.61	43.22	36.14	37.91	20.04	8.40	4.54	7.11	-19.68	-6.01
	11:53:29	238.64	240.04	239.47	43.25	36.31	37.10	19.80	8.40	4.57	6.84	-19.68	-6.00
	11:53:31	238.68	240.09	239.55	43.77	36.72	37.59	20.32	8.58	4.76	6.99	-19.65	-5.96
	11:53:33	238.61	239.98	239.49	45.93	37.34	38.70	21.64	9.22	5.07	7.36	-19.58	-5.93
	11:53:35	238.51	239.80	239.36	49.38	40.33	43.34	25.61	10.30	6.56	8.75	-18.87	-5.72
	11:53:37	238.55	239.87	239.38	49.64	40.88	44.12	26.14	10.38	6.79	8.97	-18.82	-5.71
	11:53:39	238.57	239.88	239.39	49.36	40.68	43.99	25.93	10.29	6.70	8.94	-18.87	-5.74
	11:53:41	238.61	239.92	239.44	49.37	40.65	44.31	26.06	10.30	6.70	9.07	-18.83	-5.73
	11:53:43	238.59	239.94	239.47	49.18	40.41	43.54	25.64	10.23	6.61	8.80	-18.91	-5.75
	11:53:45	238.54	239.89	239.38	49.09	40.31	43.37	25.55	10.21	6.59	8.76	-18.87	-5.74
	11:53:47	238.61	239.94	239.43	48.97	40.25	43.31	25.50	10.19	6.57	8.75	-18.85	-5.73
	11:53:49	238.72	240.05	239.52	45.94	38.10	39.62	22.34	9.21	5.50	7.63	-19.38	-5.94
	11:53:51	238.67	239.98	239.47	44.40	36.90	39.53	21.08	8.70	4.81	7.57	-19.80	-6.06
	11:53:53	238.82	240.12	239.61	44.24	36.29	37.23	20.19	8.69	4.64	6.86	-19.69	-6.02
	11:53:55	238.83	240.14	239.63	43.24	36.18	36.72	19.65	8.38	4.56	6.72	-19.69	-6.04
	11:53:57	238.77	240.11	239.53	43.45	36.29	37.04	19.83	8.43	4.60	6.80	-19.72	-6.06
	11:53:59	238.69	240.05	239.45	44.15	36.45	37.11	20.11	8.62	4.68	6.82	-19.73	-6.07
	11:54:01	238.77	240.11	239.55	43.22	36.09	36.79	19.61	8.34	4.55	6.73	-19.70	-6.09
	11:54:03	238.69	240.07	239.48	43.02	36.05	36.75	19.50	8.28	4.51	6.71	-19.71	-6.07
	11:54:05	238.56	239.88	239.35	42.98	36.03	36.73	19.47	8.26	4.51	6.71	-19.68	-6.07
	11:54:07	238.62	239.95	239.38	42.95	36.01	36.99	19.59	8.26	4.51	6.82	-19.64	-6.07
	11:54:09	238.65	239.99	239.34	42.89	36.02	37.01	19.59	8.24	4.51	6.83	-19.64	-6.07
	11:54:11	238.51	239.83	239.28	43.30	36.06	36.73	19.57	8.37	4.51	6.70	-19.70	-6.06
	11:54:13	238.47	239.81	239.28	43.79	36.09	36.84	19.77	8.52	4.52	6.73	-19.71	-6.04
	11:54:15	238.55	239.86	239.26	43.07	36.05	38.74	20.11	8.31	4.50	7.31	-19.76	-6.06
	11:54:17	238.50	239.79	239.22	42.91	36.01	36.91	19.52	8.24	4.52	6.77	-19.65	-6.07
	11:54:19	238.48	239.79	239.24	42.91	36.02	36.76	19.48	8.24	4.52	6.72	-19.65	-6.07
	11:54:21	238.49	239.83	239.27	42.90	36.01	36.74	19.46	8.24	4.51	6.71	-19.65	-6.07
	11:54:23	238.40	239.74	239.19	43.01	36.01	36.72	19.49	8.28	4.52	6.71	-19.64	-6.06
	11:54:25	238.32	239.65	239.08	42.90	35.93	36.65	19.42	8.24	4.49	6.69	-19.61	-6.05

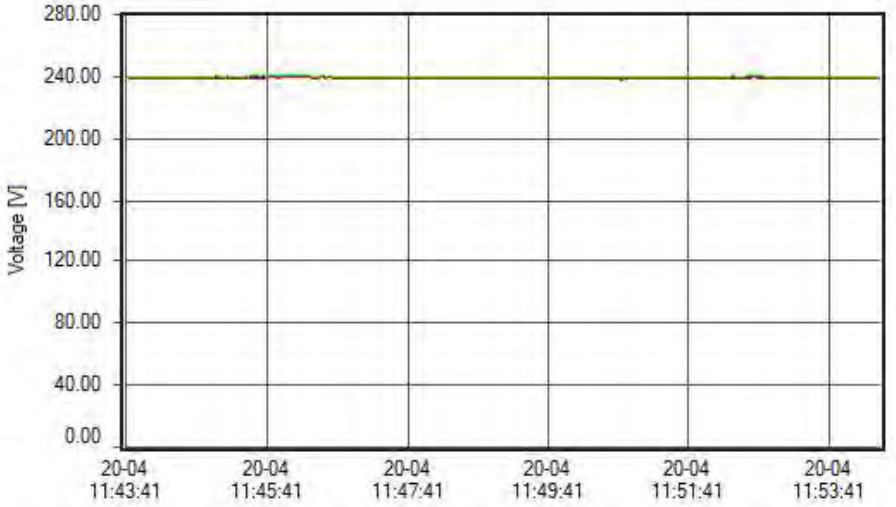
OTTOTRACTIONS
Energy-Engineering-Environment

Time series graph

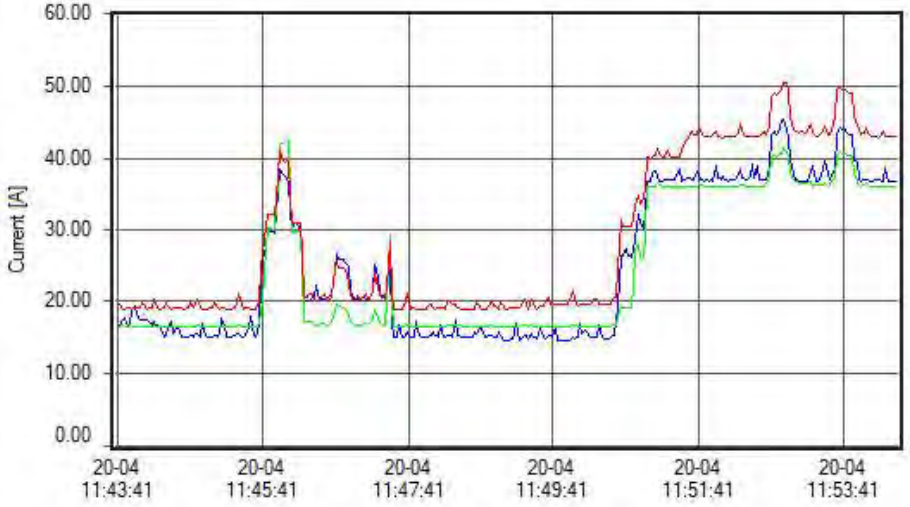
Title	DiST Electrical Load Study		
Measurement period	20-04-2021 11:43:41 - 20-04-2021 11:54:26		
Display period	20-04-2021 11:43:41 - 20-04-2021 11:54:25		
Measurement interval	1 Second	Data interval	2 Second
Comment	Mains		



Left axis
P[kW] P1[kW] P2[kW] P3[kW]



Left axis
U1[V] U2[V] U3[V]

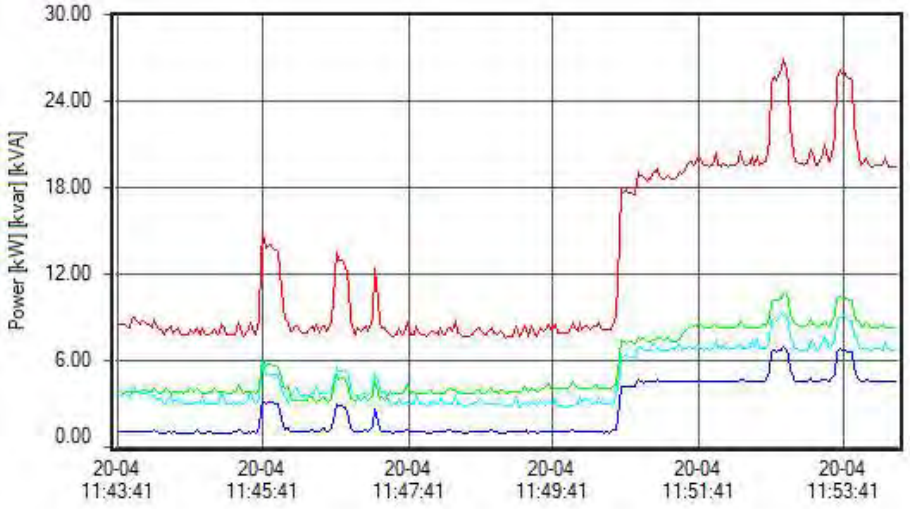


Left axis
I1[A] I2[A] I3[A]

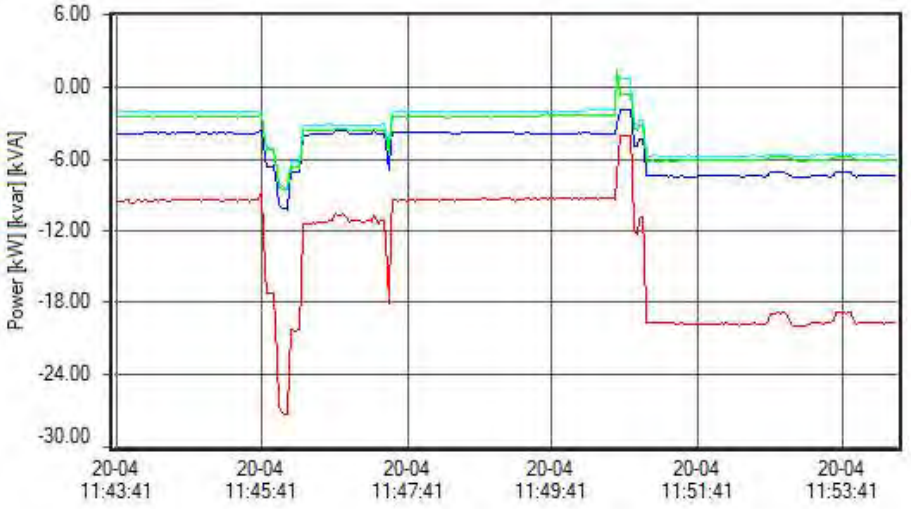
OTTOTRACTIONS
Energy-Engineering-Environment

Time series graph

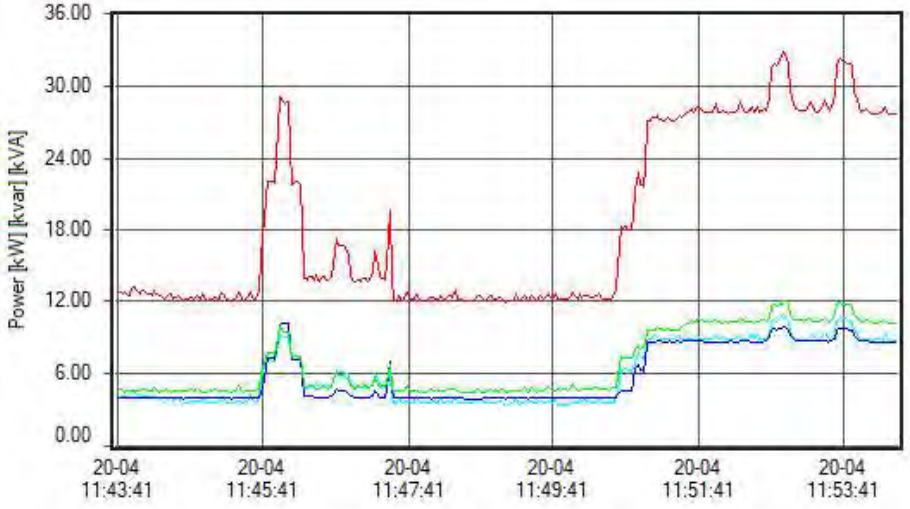
Title	DiST Electrical Load Study		
Measurement period	20-04-2021 11:43:41 - 20-04-2021 11:54:26		
Display period	20-04-2021 11:43:41 - 20-04-2021 11:54:25		
Measurement interval	1 Second	Data interval	2 Second
Comment	Mains		



Left axis
P[kW] P1[kW] P2[kW] P3[kW]



Left axis
Q[kvar] Q1[kvar] Q2[kvar] Q3[kvar]

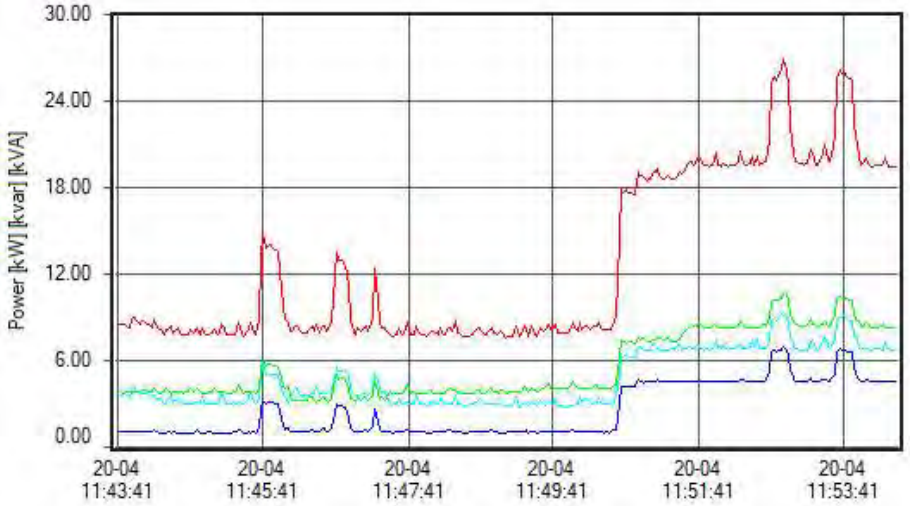


Left axis
S[kVA] S1[kVA] S2[kVA] S3[kVA]

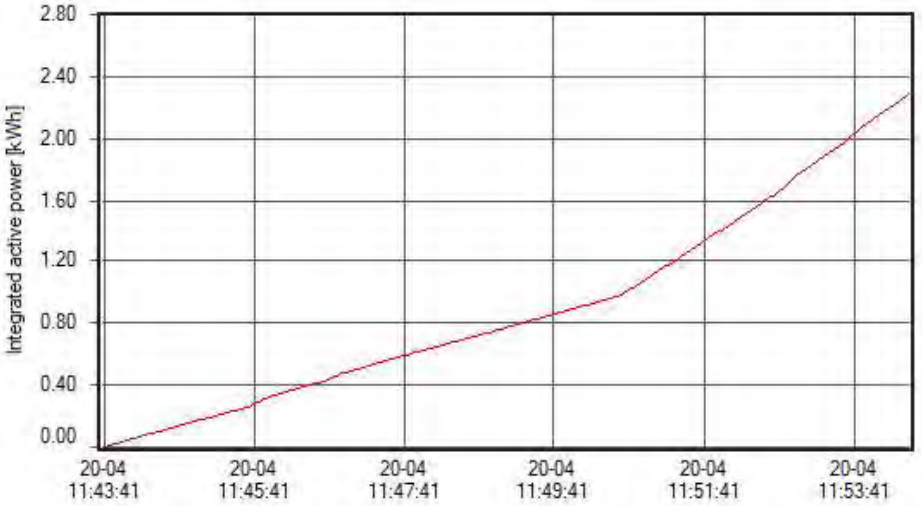
OTTOTRACTIONS
Energy-Engineering-Environment

Time series graph

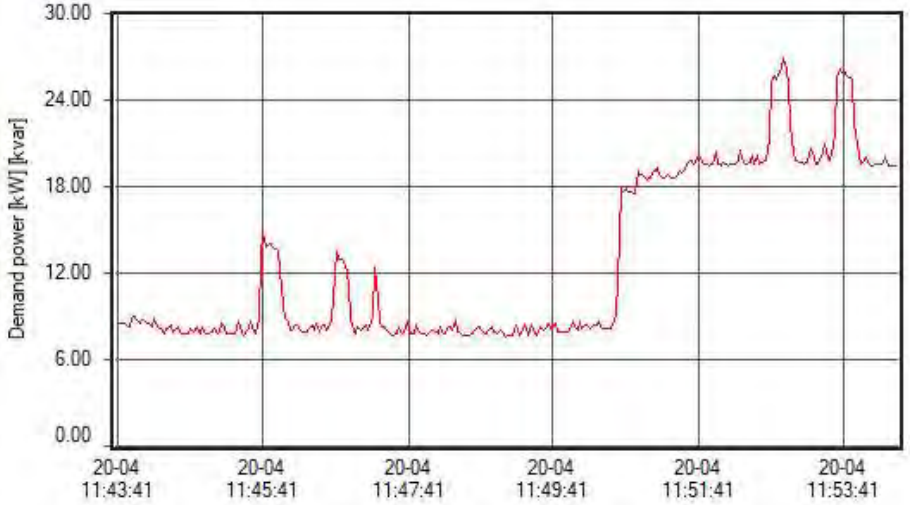
Title	DiST Electrical Load Study		
Measurement period	20-04-2021 11:43:41 - 20-04-2021 11:54:26		
Display period	20-04-2021 11:43:41 - 20-04-2021 11:54:25		
Measurement interval	1 Second	Data interval	2 Second
Comment	Mains		



Left axis
P[kW] P1[kW] P2[kW] P3[kW]



Left axis
WP+[kWh]



Left axis
Pdem+[kW]