ENVIRONMENT & GREEN AUDIT REPORT

SRI VENKATESHWARA COLLEGE OF ARTS AND SCIENCE
PERAVURANI-614804, THANJAVUR DISTRICT
TAMILNADU

YOJO NETWORK

AUDIT CONDUCTED BY

YOJO NETWORK & TRAINING CENTER
(Registered Audit Agencies)
GST no: 33AYXPP0304R1ZT
(Chennai ♦ Kumbakonam ♦ Karaikal)
Mobile: +91-9047205733
E-mail: yojoauditnetwork@gmail.com

ACKNOWLEDGEMENT

Yojo Network & Training Center is thankful to the Board of Management, Head of Institution, Faculty and Technical team members of SRI VENKATESHWARA COLLEGE OF ARTS AND SCIENCE for providing an opportunity to conduct a detailed Energy, Environment and Green Audit process in the college premises. It is our great pleasure which must be recorded here that the Management of SRI VENKATESHWARA COLLEGE OF ARTS AND SCIENCE extended all possible support and assistance resulting in thorough completion of the audit process. The audit team appreciates the co-operation and guidance extended during the course of site visit and measurements. We are also thankful to all those who gave us the necessary inputs and information to carry out this very vital exercise of Energy, Environment and Green Audit.

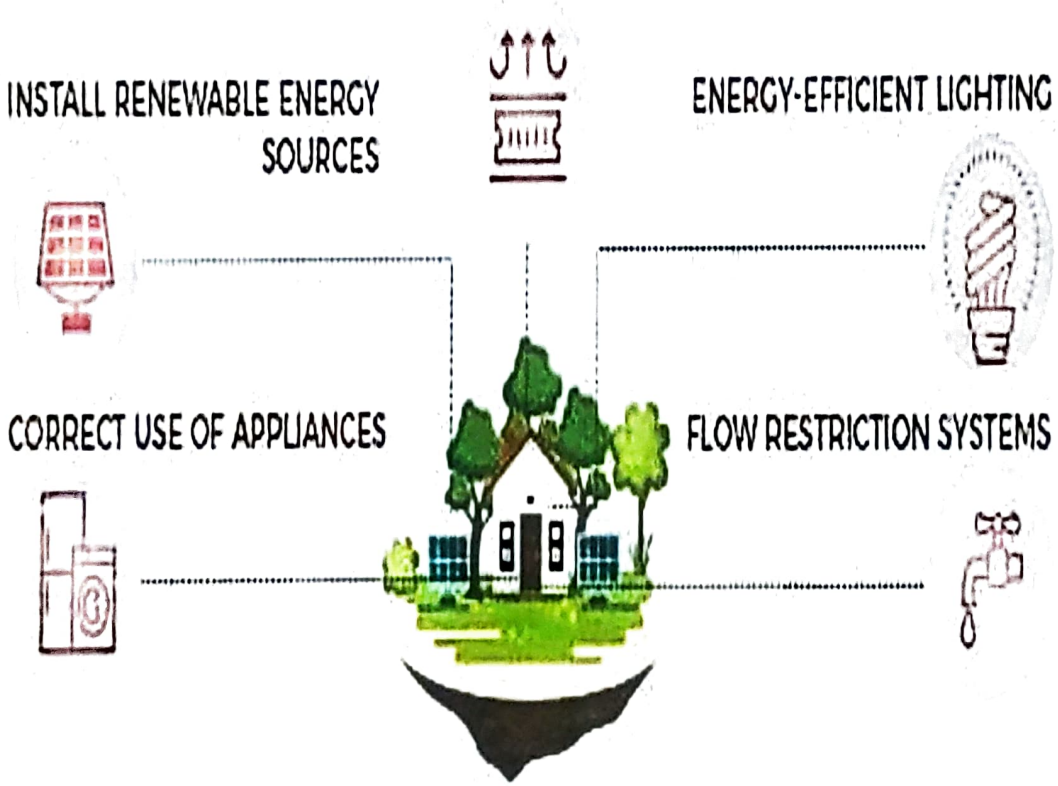
Finally, we offer our sincere thanks to all the members in the engineering division technical / non- technical divisions and office members who were directly and indirectly involved with us during collection of data and while conducting field measurements.

Audit Team Members	
Er. V. Marimuthu., B.E., Er. C. Saravanakumar., B.E.,	UKAS Certified Energy Auditor (KQ-233) LeadAuditor-ISO-9001:2015,14001:2015(EMS), UKAS, KQ Reg., COC. Carbon Footprint Auditor Mobile:+91-9047205733
Er. R. Rajkumar, B.E.,	Audit Associate

ENVIRONMENT AND GREEN AUDIT REPORT

INTRODUCTION TO ENVIRONMENT-GREEN AUDIT

5 IDEAS FOR A SUSTAINABLE INSTITUTION



1.1 : Preface about the Institution:

1.1 : Preface about the Institution:

Sri Venkateshwara College of Arts and Science at Peravurani in Thanjavur District, a popular Co-educational College, affiliated to Bharathidasan University has been converted in to a women's college since 2010-2011 providing excellent scope for women's education. This college was started in the year 1998 by the Visionary Trust, Peravurani. This Institution has passed through a significant milestone in its life and completed 14 years of meritorious existence by fulfilling a long felt desire of higher education to the economically and educationally backward people living in and around of Peravurani. The sole aim of this Institution is to provide quality education coupled with discipline to the daughters of underprivileged small marginal farmers and fishermen living in and around Peravurani area. This College is one among those recognized by University Grants commission (UGC) for receiving grants as per section 12B of UGC act.

In a short span of fourteen years Sri Venkateshwara College of Arts and Science has registered a phenomenal growth offering 14 full-fledged undergraduate 4 postgraduate programmes besides M.Phil in Commerce and Microbiology with a student strength of 1500 and 75 faculty members. New courses are being introduced every year and we are very proud to register that our college has so far produced 50 University Ranks.

1.2 : Quality Policy:

Sri Venkateshwara College of Arts And Science maintains various policies to enhance the growth of the students, staff along with the growth of the Institution.

The policies are as follows:

- GREEN POLICY
- CODE OF CONDUCT
- RESOURCE MOBILISATION POLICY
- ENVIRONMENT POLICY

- ENERGY POLICY
- WASTE MANAGEMENT POLICY
- E-GOVERNANCE POLICY
- GRIEVANCE & REDRESSAL POLICY

1.2 : Scope of the Audit Process:

- Environmental Audit: Identification of history of activities, present environmental practices followed, monitoring records and known sources of environmental issues inside the college.
- Green Audit: Assessment on Campus greenery in terms of mature trees, flowering shrubs, bushes, medicinal plants, adoption of green energy generation and utilization, reduction of CO_2 due to green energy system and identification of possible implementation and enhancement of current greenery practices.

1.3 : Outcomes of the Audit Process:

- Recommendations based on field measurement with achievable Energy Conservation (ENCON) proposals under No cost / Low cost and Cost investment categories.
- Minimization of present energy cost by adjusting and optimizing energy usage and reduction of energy wastage without affecting the regular activities.
- Identification of possible cost and energy saving from energy conservation, waste reduction, reuse and recycling.
- Formation of methodology for long term road map for maintaining green environment within the campus and encourage the stakeholders for continuous improvements.

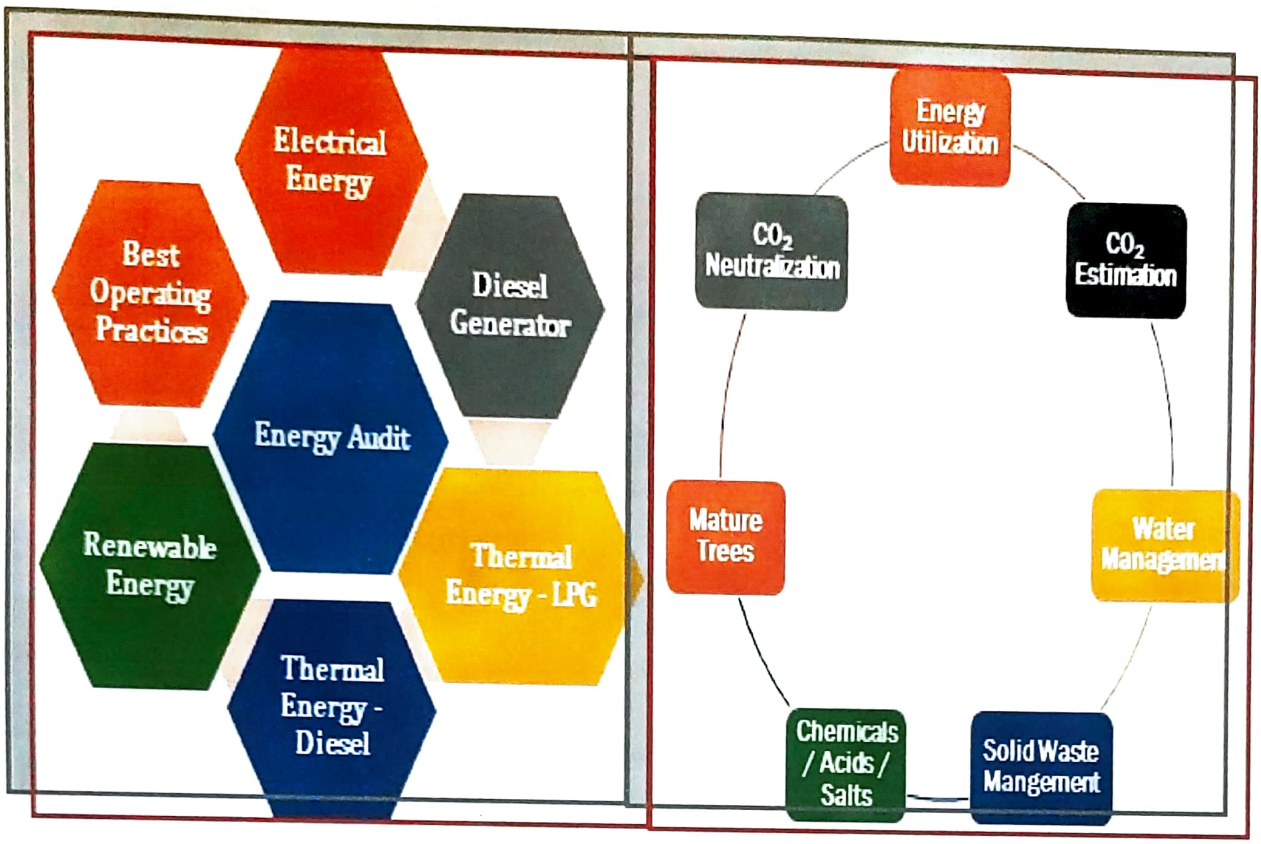
1.4 : Standards Used:

- Bureau of Energy Efficiency Guidelines to conduct the detailed energy audit process.
- ISO 14064-Part-1 – Specification with guidance at the organization level for quantification and reporting of GHG emissions and removals (Second Edition).
- ISO 14064-Part-2 – Specification with guidance at the project level for quantification, monitoring and reporting of GHG emissions reductions or removal enhancement (Second Edition-2019).
- ISO 14064-Part-3 – Specification with guidance for the verification and validation of GHG statements (Second Edition-2019).
- The Green house Gas Protocol- a Corporate Accounting and Reporting Standard (Revised

Edition) released by World Resources Institute & World Business Council for Sustainable Development – 2014.

- Ministry of Environment, Forest and Climate Change Notification on "Battery Waste Management Rules, 2020" & "E- Waste (Management) Rules, 2016", & "Solid Waste Management Rules, 2015"s.

1.5: Coverage in Environment & Green Audit Process:



1.6 List of Faculty Members Involved in Audit Process & Data Collection:

S. No.	Faculty Details	Contribution
1.	Dr. N.K. Rajendran Dean	Overall Coordinator for the Audit Process
2.	Mrs. S. Sakilabanu AP/ Dept. of Comp. Science	Collection of RO water & Water Distribution system.
3.	Mr. C. Ganeshamoorthy AP/ Dept. of Chemistry	Collection of Electrical Energy Parameters from College & Hostel.
4.	Mrs. R. Alamelumangai AP/ Dept. of Microbiology	Collection of Chemicals/Salts/Acids.
5.	Mr. P. Shanmuganatham AP/ Dept. of Microbiology	Fuel consumption of Transport Vehicles & Transport In charge.
6.	Mrs. R. Malathi AP/ Dept. of Tamil	Collection of LPG & Fire WoodData.
7.	Dr.V, Murugeshwari AP/ Dept. of Tamil	Collection E.B utility & D.GDetails.
8.	R. Parameshwari AP/ Dept. of Commerce	Collection of Trees & Plants with Botanical Name.
9	Dr. M. Sivabalan., Librarian, Arputha College of Arts and Science, Pudukkottai	External Member
10	Dr. M. Sugumar Coordinator IQAC Bharath College of Science & Management Thanjavur	External Member

ENVIRONMENT AUDIT REPORT

ENVIRONMENT AUDIT REPORT

PART-A

ESTIMATION OF CO_2 EMISSION & NEUTRALIZATION (ELECTRICITY, DIESEL, LPG & MATURE TREES)

AUDIT CONDUCTED BY

YOJO NETWORK & TRAINING CENTER

(Registered Audit Agencies)
GST no: 33AYXPP0304R1ZT
(Chennai ♦ Kumbakonam ♦ Karaikal)
Mobile: +91-9047205733
E-mail: yojoauditnetwork@gmail.com

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1.1 : Assessment of Annual Energy Usage:

Table-1 Shows the types of energy carriers used for the irregular operation in the college campus along with application area and their source.

Table-1: Energy Carriers, Application area and their sources used for College Operation.

S. No.	Type of Energy Carrier	Application Area	Source of Procurement
1.	Electricity LT Service for College	Powering to all electrical & electronic/HVAC/Motors/Pumps	From TANGEDCO
			Captive power plant
2.	Diesel	Transport vehicles and Diesel Generator(Captive Generation)	From authorized distributor
3.	Liquified Petroleum Gas(LPG)	Used for cooking application	
4.	Mature Trees	Nearly 387 Nos of different varieties with more than 20 years old.	

1.2: Environmental System: CO2 Balance Sheet:

The following tables 2 to 6 provide the balance sheet indicating various energy carriers associated with the regular activities and their CO_2 mapping from 2018-19 to 2022-23 Academic Year.


தமிழ்நாடு மின் உற்பத்தி மற்றும் பகிர்மானக் கழகம் லிமிடெட்

நாகப்பட்டினம் மின் பகிர்மான வட்டம்

மின் கட்டண இரசீது

பெயர் : CHAIRMAN VISHNARY TRUST

வரிசை எண் : NGT.A.X : 1517373

மின் இ.எண் : 06-451-007-333

இரசீது எண் :

2229.2

நாள் : 10-10-2022 11:18:25

வ. எண்	கட்டண விவரம்	
23100	CC Charges	46438
	Total	46438

மொத்தம்

தொகை (எழுத்தால்) Forty Six Thousand Four Hundred And Thirty Eight Only

By Cheque

TANGEDCO CIN No : U40109TN2009SGC073746

TANGEDCO GST No : 33AADCT4784E1ZC

HSN Code : 27160000

SAC Code : 996912

Cheque/DD No. 506556 Date: 10/10/2022 Amount 46438/-

"Electrical Energy & Distribution Services are exempted Under GST"

Table-2: Environmental System: CO_2 Balance Sheet (2018-19)

S. No	Annual Energy Consumption & CO_2 Emission			Annual CO_2 Neutralization		
	Description	Usage	CO_2 Emission (Tons)	Description	Usage	CO_2 Neutralized (Tons)
1.	Diesel	4355 Liters	12.4	Mature Trees	387No's	21.4
2.	Electrical Energy	96639 kwh	81.5			
3.	LPG	1731 kg	16.8	-	-	-
	Total Emission		110.7	Total-Neutralized		21.4
Balance CO2 to be Neutralized = 110.7 Tons / Annum & Per Capita CO2 Consumption = 21.4 Tons / Annum[1]						

1.3 : Environmental System: CO_2 Balance Sheet (2019-20):

Table-3: Environmental System: CO_2 Balance Sheet (2019-20)

S. No	Annual Energy Consumption & CO_2 Emission			Annual CO_2 Neutralization		
	Description	Usage	CO_2 Emission (Tons)	Description	Usage	CO_2 Neutralized (Tons)
1.	Diesel	4338 Liters	12.8	Mature Trees	387 No's	21.4
2.	Electrical Energy	91647 kWh	81.3			
4.	LPG	1719 kg	16.4	-	-	-
Total Emission			110.5	Total- Neutralized		21.4
Balance CO2 to be Neutralized = 110.5 Tons/Annum & Per Capita CO2 Consumption = 21.4 Tons/Annum						

1.4 : Environmental System : CO_2 Balance Sheet (2020-21):

Table-4: Environmental System: CO_2 Balance Sheet (2020-21)

S. No	Annual Energy Consumption & CO_2 Emission			Annual CO_2 Neutralization		
	Description	Usage	CO_2 Emission (Tons)	Description	Usage	CO_2 Neutralized (Tons)
1.	Diesel	1351 Liters	4.0	Mature Trees	387 No's	21.4
2.	Electrical Energy	29502 kWh	45.0			
3.	LPG	455 kg	7.5	---	---	---
Total Emission			56.5	Total- Neutralized		21.4
Balance CO2 to be Neutralized = 56.5 Tons / Annum & Per Capita CO_2 Consumption = 21.4 Tons / Annum						

1.5 : Environmental System: CO_2 Balance Sheet (2021-22):

Table-5: Environmental System: CO_2 Balance Sheet (2021-22)

S. No.	Annual Energy Consumption & CO_2 Emission			Annual CO_2 Neutralization		
	Description	Usage	CO_2 Emission (Tons)	Description	Usage	CO_2 Neutralized (Tons)
1.	Diesel	4672 Liters	13.0	Mature Trees	387 No's	21.4
2.	Electrical Energy	93619 kWh	82.0			
3.	LPG	1770 kg	19.9	Biogas	---	---
Total Emission			114.9	Total- Neutralized		21.4
Balance CO_2 to be Neutralized = 114.9 Tons / Annum & Per Capita CO_2 Consumption = 21.4Tons / Annum						

1.6 : Environmental System: CO_2 Balance Sheet (2022-23):

Table-6: Environmental System: CO_2 Balance Sheet (2022-23)

S. No.	Annual Energy Consumption & CO2 Emission			Annual CO2 Neutralization		
	Description	Usage	CO_2 Emission (Tons)	Description	Usage	CO_2 Neutralized (Tons)
1.	Diesel	4791 Litres	13.1	Mature Trees	387 No's	21.4
2.	Electrical Energy	94515 kWh	82.8			
3.	LPG	1741 kg	19.8	---	----	-----
Total Emission			115.7	Total-Neutralized		21.4
Balance CO_2 to be Neutralized = 115.7 Tons / Annum & Per Capita CO_2 Consumption = 21.4Tons / Annum						

1.8: Observations:

- From the above tables; it is evident that the college is now trying to neutralize their CO_2 emission through various initiatives like i) Installation of roof top solar PV system & solar thermal hot water generation(cooking & bathing application) iii) Planting more number of trees and iv) Implementing various energy conservation measures (FTL to LED conversion, conventional fan to BLDC fans, Energy efficient motor replacement, judicious use of all types of energy etc.,)

1.9: References:

1. https://ecoscore.be/en/info/ecoscore/co2
2. http://www.tenmilliontrees.org/trees/#:~:text=A%20mature%20tree%20absorbs%20carbon,the%20average%20car's%20annual%20mileage .

LEAD AUDITOR
YOJO NETWORK
MUTT Street, Kumbakonam
B.O. : Opp. to NLC Arch,
Neyveli Plaza, Neyveli (TN).

YOJO Network KUMBAKONAM Pin:612 001

ENVIRONMENT AUDIT REPORT

PART-B

TRANSPORT & REFRIGERANT GASES IN AC SYSTEM

AUDIT CONDUCTED BY

YOJO NETWORK & TRAINING CENTER

(Registered Audit Agencies)
GST no: 33AYXPP0304R1ZT
(Chennai ♦ Kumbakonam ♦ Karaikal)
Mobile: +91-9047205733
E-mail: yojoauditnetwork@gmail.com

1.1: List of Transport Vehicles:

Pollution level of all vehicles is regularly monitored and is maintained within the prescribed limit since the college is committed to provide green environment for better atmosphere.

All the transport vehicles are having pollution certificates and maintaining the emission level within the Pollution Control Board limits

The no. of vehicles available in the college campus is represented inTable-1.

Table-1: List of Transporting Vehicles available in the College

S. No.	Type of Vehicle	Quantity	Purpose
1.	Bus	05	Students & Faculty Transportation
2.	Van	03	Office and Administrative Works
3.	Car	02	Transportation for the Principal & Visitors

1.2 : List of Air Conditioning System along with its Refrigerant:

Most of the AC system has R-32 as refrigerant which has Global Warning Potential (GWP) of 675 and hence Ozone Depletion Potential (ODP) is Zero.

Table-2: List of Multi-variant AC System available in the College

S. No.	Tonnage Capacity (TR)	Quantity
1.	1.5	10Nos
Total		10 Nos

Note: The most environment-friendly refrigerants that are available in Indian market currently are –R- 290ǁ and –R-600Aǁ. They are Hydrocarbons and their chemical names are –Propaneǁ for R-290 and –Iso- Butaneǁ for R-600A

They are completely halogen free, have no ozone depletion potential and are lowest in terms of global warming potential. They also have high-energy efficiency but are highly flammable as they are hydrocarbons.

LEAD AUDITOR
YOJO NETWORK
MUTT Street, Kumbakonam
B.O. : Opp. to NLC Arch,
Neyveli Plaza, Neyveli (TN).

YOJO Network ★ KUMBAKONAM ★ Pin:612 001

ENVIRONMENT AUDIT REPORT

PART-C

USAGE OF CHEMICALS SALS AND ACIDS (STORAGE, HANDLING AND BEST OPERATING PRACTICES)

AUDIT CONDUCTED BY

YOJO NETWORK & TRAINING CENTER

(Registered Audit Agencies)
GST no: 33AYXPP0304R1ZT
(Chennai ♦ Kumbakonam ♦ Karaikal)
Mobile: +91-9047205733
E-mail: yojoauditnetwork@gmail.com

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

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

1.2 : Storage of Chemicals / Salts / Acids:

- Less concentrated chemicals, salts and acids are stored in proper racks; cupboard sand high concentrated acids are stored in separate area filled with sand.
- Most of the chemicals, salts and acids used in the science departments are inorganic in nature and no harmful effects are created during the experiment process.
- Only trained teaching and non-teaching staffs are handling the chemicals and also they are well trained to handle any abnormal situations.
- Laboratories with chemicals are well ventilated with proper emergency exits. Adequate and correct sequence of fire extinguishers is placed near all the laboratories.

1.3 Use of Chemical for Vessels & Floor Cleaning:

In order to maintain hygiene in the College campus; the administration regularly clean the floor sand restrooms. In addition to this, the hostel management has to monitor the cleaning of vessels, kitchen floor, dining hall, store room and gas station.Table-1 shows the cleaning agents used to clean the above mentioned area;

Table-1: Cleaning Agents used for Floor and Vessel Cleaning

S.No.	Cleaning Agent	Application
1	Soap & Washing Powder	Vessel Cleaning
2	Soap Oil & Bleaching Powder	Floor Cleaning

1.4 : Recommendations: Eco Friendly – Green Cleaning Agents:

- On an average; the cleaning agents used today have about 51 harmful chemicals like Paraben, Phosphates or Chlorides. A lot of them are multi-purpose cleaners
- It is recommended to use natural ingredients like orange peel extract & vinegar. It leaves a mild and pleasant fragrance after use. The formula is free from all harmful chemicals & toxins. It is pH-neutral, gentle on the skin as well as on the surface where it is used
- Fig.1 shows the sample eco-friendly Green Pro certified cleaning agents used in the Institution for cleaning purpose.

Fig.1: Green Pro Certified Eco Friendly Cleaning Agents (ZERODER) used in the Institution