ENERGY AUDITING FOR ELECTRICITY AND WATER IN PRESIDENCY CAMPUS, BENGALURU

A PROJECT REPORT

Submitted by

SHILPA.R (2016CVE011)

AJITH KUMAR.M (2016CVE012)

KARTHIK THONDI (2016CVE014)

RAHUL RANGANATH (2016CVE017)

In partial fulfillment for the award of the degree
Of
BACHELOR OF TECHNOLOGY
In
CIVIL ENGINEERING

SCHOOL OF ENGINEERING

Under the Guidance of
Dr. VENKATESHA RAJU

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY
2018-2019

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PRESIDENCY UNIVERSITY

Itgalpura, Rajankunte, Yelahanka, Bengaluru-560064

Department of Civil Engineering

BONAFIDE CERTIFICATE

Certified that this report "**STUDY ON ENERGY AUDITING FOR ELECTRICITY AND WATER IN PRESIDENCY CAMPUS.**" is bonafide work of "**SHILPA.R (2016CVE011), AJITH KUMAR.M (2016CVE012), KARTHIK THONDI (2016CVE014), and RAHUL RANGANATH (2016CVE017)**" who have carried out the project work under my supervision.

Dr.venkatesha raju	**Dr. S. B. Anadinni**	**Dr.C Prabhakar Reddy**
Project Guide	Head of Dept.	Dean
Presidency University	Civil Engineering	School of Engineering
	Presidency University	Presidency University

Name of the Examiners

1)

2)

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DECLARATION

We are the students of second year B.Tech, Civil Engineering, Presidency University, Bangalore, named Mrs.Shilpa.R, Ajith kumar.M, Karthik thondi, and Rahul Ranganath hereby declare that the project work entitled "STUDY ON ENERGY AUDITING FOR ELECTRICITY AND WATER IN PRESIDENCY CAMPUS" has been independently carried out and submitted in the partial fulfillment for the award of the degree of Bachelor of Technology in Civil Engineering during the academic year of 2018-19. Further the matter embodied in the project has not been submitted previously by anybody for the award of any Degree or Diploma to any other institution.

Place: Bangalore

Date: 10/01/2019

Mrs. Shilpa. R ID: 2016CVE011

Mr. Ajith kumar. M ID: 2016CVE012

Mr. Karthik Thondi ID: 2016CVE014

Mr. Rahul Ranganath ID: 2016CVE017

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ACKNOWLEDGEMT

For completing this project work, we have received support and guidance from many people which we like to mention deep in gratitude and great pleasure. Firstly, we cordially thank **Presidency University** in plat forming such intellectual works and supporting us in all means for our successful completion of the project. We extend our gratitude to our beloved **Chancellor, Pro-chancellor, Vice-Chancellor, Registrar, Dean-School of Law and Dean-School of Management** for their support and encouragement in completion of the project.

We would like to express our sincere gratitude and indebtedness to our guide **Mr.VENKATESHA RAJU**, Assistant professor, Department of Civil Engineering, Presidency University for her valuable guidance and keen interest throughout our project work.

We are thankful to **Mr. Kiran B** Assistant Professor, Department of Civil Engineering who has facilitated us all resources and guided us throughout the work as a University project coordinator.

We are thankful to **Dr. S. B. Anadinni**, Head of the Department of Civil Engineering, Presidency University for his moral support and motivation, timely guidance, advice and encouragement provided to us during the period of our project work.

We express our cordial thanks to **Dr. C Prabhakar Reddy**, Dean School of Engineering, Presidency University, who always gave time in corrections and rectifications in our errors both intellectual and discipline for our representation out in the society for positive survival.

We are grateful to Teaching and Non-Teaching staff of Department of Civil Engineering and also staff from other Departments who have extended their valuable help and cooperation

Ultimately, we would wholeheartedly thank our family members and friends for their encouragement and support throughout the work.

Mrs.Shilpa, Mr.Ajith kumar, Karthik Thondi, Rahul Ranganth

ABSTRACT

An energy audit is an inspection, survey and analysis of energy flows in building, Process or system with the objective of understanding the energy dynamics of the System under study. Typically an energy audit is conducted to seek opportunities to reduce the amount of energy input into the system without negatively affecting the outputs when the object of study is an occupied building then reducing energy Consumption while maintaining or improving human comfort, health and safety are Of primary concern.

Beyond simply identifying the sources of energy use. An energy audit seeks to prioritize the energy uses according to the greatest to least cost effective opportunities for energy savings.

The energy audit report establishes the needs for plant metering and monitoring Enabling the plant manager to institutionalize the practice and hence, save money For the years to come. The steps and sets the preliminary budget for the energy Management program.

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INTRODUCTION:

ENERGY AUDITING: An energy audit is an inspection survey an analysis of energy flows, for energy conservation in a building, process or system to reduce the amount of energy input into the system without negatively affecting the outputs. In commercial and industrial real estate, energy audit is the first step in identifying opportunities to reduce energy expense and carbon footprint.

THE NEED FOR AUDITING ENERGY:

The purposes of an energy audit are as below:

A. to analyze the energy flows in a building

B. to understanding energy dynamics.

C. opportunities to reduce the amount of energy input and savings.

D. to prioritize the energy uses according to the greatest to least cost.

TYPES OF ENERGY AUDITING:

Based on available resources, the size and type of building, there are two types in general:

a. Preliminary Energy Audit

b. Mini -Audit

c. Detailed –Audit.

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GENERAL ENERGY AUDITING PROCESS:

1) Walk-Through Audit (WTA): As the name suggests, this audit consists of a walk-through inspection of a facility to identify maintenance, operational or deficient equipment issues and also to identify areas that need further evaluation.

2) Energy Diagnosis: This audit includes performing economic calculations and may include using some metering devices to identify actual energy consumption and losses

3) Investment Grade Audit (IGA): this audit is a detailed account of energy use, including a quantitative study of the implementation with detailed investments and operational and maintenance costs and an analysis of the investment model.

CONCENTRATED AREAS OF THE PRESENT STUDY:

1. Electrical Energy Audit of constructed area

Audit of Electrical system covers aspects such as

i) Lighting (including adequacy)

Ii) Air Conditioning (including adequacy)

Iii) Power Quality (including Power Factor and harmonics)

iv) O&M aspects

V) Cost Benefit Analysis for recommendation

2. Energy auditing of water supply

It involves various measurements and analysis to assess the loss and the potential for energy efficiency improvements in the study area

Measurement involves:

I) Specification of pumps and motors

ii) Number of bore wells

iii) Number of pumps in action

iv) Power consumption and motor electrical parameters

v) Pipeline status

OBJECTIVES:

- To obtain vital information base for overall energy conservation
- Programme covering essentially energy utilization
- Evaluation of energy conservation measures
- Climate protection and cost Savings.

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STUDY AREA

(PRESIDENCY UNIVERSITY CAMPUS BANGALORE)

- The campus is spread over 64 acres and the campus is being developed in phases and current development is across a total of 25 acres.
- Climatic condition:
- Mostly cloudy
- Humid
- Average temperature 26C
- We are divided campus into two blocks such that management block, engineering block.
- The data obtained on surveying of:
- 1) Electricity

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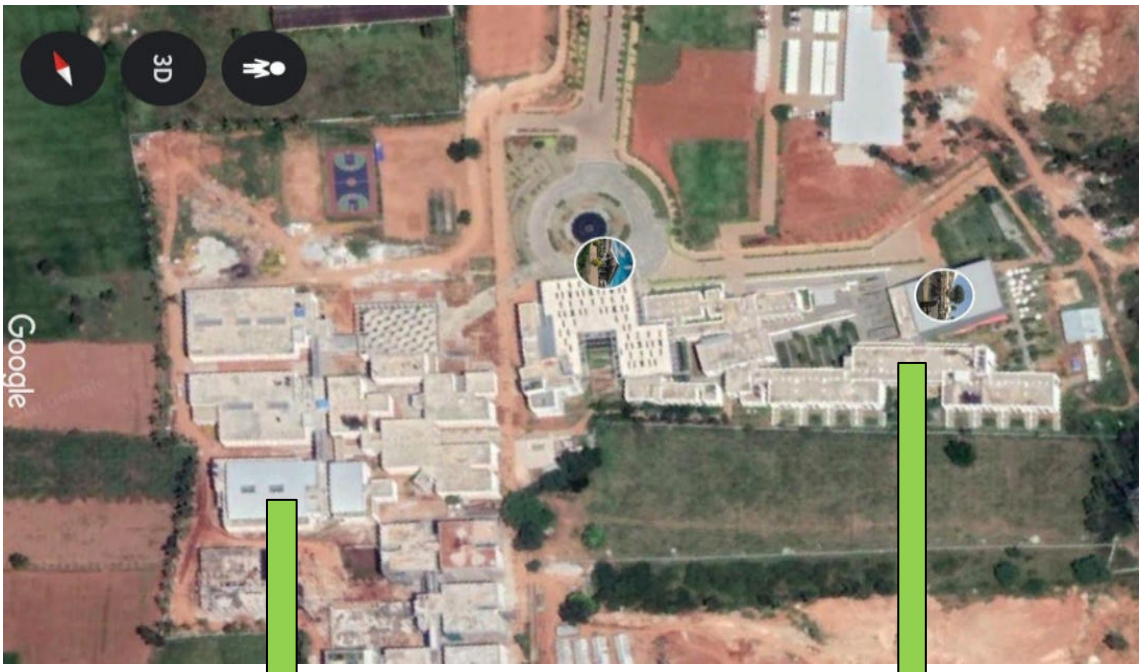
- **2) Water**



ENGINEERING BLOCK

MANAGEMENT BLOCK

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COLLECTION OF DATA ABOUT ELECTRICITY AND WATER

1) ELECTRICITY:

i) Campus monthly electricity bill is 6, 40,000 Rs and 60,000 units.

ii) Total current required for the campus 400Kva.

iii) Management block requires 180Kva.

iv) Engineering block requires 200Kva.

V) Auditorium requires 20Kva. When auditorium is running the lab lightings will be off.

Vi) For systems 120Kva.

vii) For server 20Kva.

viii) For lighting 5Kva.

ELECTRICITY BILL

MONTHS	RUPEES
JAN	3,55,938.00
FEB	4,24,047.00
MAR	5,18,637.00
APRIL	5,51,423.00
MAY	4,42,927.00
JUNE	4,14,528.00
JULY	4,07,338.00
AUGUST	6,11,816.00
SEP	3,28,838.00
OCT	6,07,770.00
NOV	5,55,853.00
DEC	6,10,000.00

EXISTING BACKUP CURRENT (in terms of KVA)

▶ Diesel Generators (or) UPS:

i) There are total of 2 diesel generators situated in the management block and one more is yet to be accommodated, both UPS combined has the capacity of generating 250KVA of current . Monthly diesel requirement value is of 2, 60,000 rupees.

▶ Transformer:

i) One step down transformer, steps down from 11000 volts to 433 volts has a capacity of 500 kva

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2) WATER SUPPLY:

i) We have four bore wells in the campus and one sump.

ii) Two filters are used for the filtration of the water it filters 20,000 liters RO for one hour.

iii) We have 18 syntax in the campus.

iv) In that management block have 11 syntax, engineering block as 6 and new block as 1.

WATER REPORT OF THE CAMPUS

WATER REPORT OF THE CAMPUS

HARDNESS OF WATER [TAP WATER]
PROCEDURE:
***HARRDNESS:1) EDTA solution in burette**
2) In conical flask 25 ml of water sample + 5 ml of buffer solution
3) Indicator: EBT indicator
4) End point : Wine red to blue

***PH: Using pH strip we will observe that it is Acidic or basic**

***RESULT:**
HARDNESS : 440ppm
PH : 7

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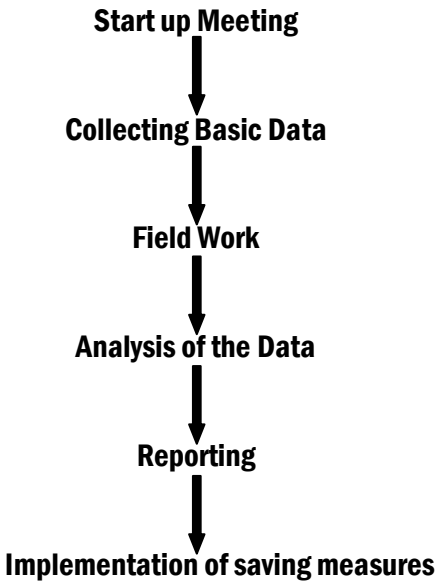
SURVEYING

1) ELECTRICITY:

ENERGY SURVEY

- **By process and equipment**
- **Measurement of energy use parameters**
- **Review of equipment operating characteristics**
- **Evaluations of efficiency**

ENERGY AUDIT PROCEDURE IN GENERAL



We are divide campus into two main blocks:

1) Management block

2) Engineering block

1) MANAGEMENT BLOCK

*LOAD IN MANAGEMENT BLOCK (50 KVA required)

MANAGEMENT BLOCK

i) No of lights = 300 fittings.

ii) No of fans = 160

iii) No of projectors = 35

*LOAD IN LABS

i) No of AC =11

ii) No of systems = 210

COMPUTER LAB

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LOAD IN AUDITORIUM LIGHTINGS: (20KVA required)

i) Ordinary lighting = 9

ii) Stage LED (spot) lighting = 7

iii) Stage focus lighting = 17

iv) No of AC = 2AH

2) ENEGINEERING BLOCK:

MECHANICAL LAB

***LOAD IN ENGINEERING BLOCK**

i) No of lights = 567 fittings

ii) No of fans = 378

iii) No of wall mounts = 126

iv) No of projectors = 63

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SINGAL LAB

*LOAD IN LABS

i) No of systems = 310

ii) No of AC = 30

COMPUTER LAB

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EVENTS AND BILL AMOUNT INIDIVIDUAL MONTHS

▶ JANUARY (3,55,938.00rs):

- Power demand is below average
- Registration and commencement of classes 4th/5th semesters and 2nd semester (All programs)
- processing of results

➢ FEBRAURY(4,24,046.00rs):

- Power demand is average
- Farewell for students of 4th semester
- Club activity #4 and Ethnic day
- Mahashivaratri holiday
- Test 01

➢ MARCH(5,18,637.00rs):

- Power demand is above average
- SOE conference
- Mid Term Examinations for SOL and SOM
- Cultural Fest MERAKI 2018
- TEST 02

➢ APRIL(5,51,423.00rs):

- Power demand is above average

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- **TEST 02 (continuation)**
- **Good Friday (holiday)**

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RR No.	Account ID	Bill No.	Billing Period	Bill Date	Due Date	Disconnection Date
4425878221 (YHT212)	1089020029	**108905722272**	01-04-2018 - 01-05-2018	01-05-2018	15-05-2018	31-05-2018

Name & Address:	Type	Educational Institutions - HT2C	Wheeling Energy	0
AH Memorial Education Trust No 21/1, Dibbur Village Hessaraghatta Hobli Bangalore North Taluk BANGALORE, KAR -560084	Tariff	1HT2C2	High Cost Energy	
	Contract Demand(KVA)	200	Special Energy	
	75% of CD (KVA)	150	Base Consumption	
	Recorded Demand (KVA)	340	Power Cut	
	Billing Demand (KVA)	340	Energy Entitlement Demand Entitlement	

Description	Date	KWH Meter	KVAH Meter	MD meter	PF
Present Reading	01-05-2018	764.02	830.12	.17	0.84
Previous Reading	01-04-2018	735.59	794		
Difference		28.03	36.12	.17	
Meter Constant		2000	2000	2000	
Consumption		56060	72240	340	
Loss/Add Consumption		0	0		
Net Consumption		56060	72240	340	0.84

Your Detailed Bill Description	Amount (Rs.)
Demand Charges: 200.00 KVA at Rs200.00 per kVA	40,000.00
Energy Charges: First 58,060.00 kWh at Rs7.40 per kWh	429,644.00
Excess Load/MD Penalty: 140.00 kVA at Rs400.00 per kVA	56,000.00
Interest on Revenue	0.00
Interest on Tax	0.00
Tax	25779.64
Current Bill Amount	**551422.64**
Arrears	**0.00**
Bill Correction	**0.00**
Bill rounding adjustment	0.36
Net Payable Amount	**551423.00**
Rupees Five Lakh Fifty-One Thousand Four Hundred Twenty-Three Only	

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RR No.	Billing Period	Due Date	Disconnection Date	Bill No.	Account ID	Amount Payable
4425878221 (YHT212)	01-04-2018 - 01-05-2018	15-05-2018	31-05-2018	108905722272	1089020029	Rs. 551423.00

Name of the Bank	Branch	Cheque/DD No.	Cheque/DD Date	Amount (Rs.)	Amount in Rupees

1089020029

Receipt No. *Date* *Cashier Signature*

- **Blood Donation camp And Camp activity #5**
- **Ambedkar jayanti (holiday)**
- **International Conference SOM**
- **National Workshop on Social Media For Libraries**

➢ MAY(4,42,927.00rs):

- **Power demand is below average**
- **May day (holiday)**
- **Declaration of eligibility list for end term finals for all Programs**

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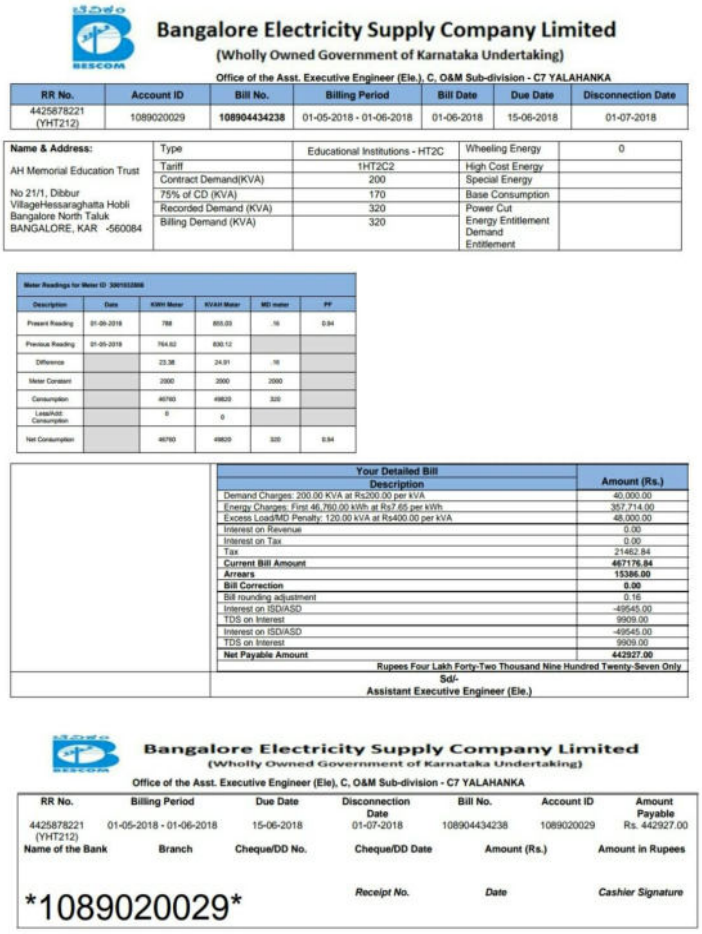
- **End term final Examinations for all Programs**



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RR No.	Account ID	Bill No.	Billing Period	Bill Date	Due Date	Disconnection Date
4425878221 (YHT212)	1089020029	108904434238	01-05-2018 - 01-06-2018	01-06-2018	15-06-2018	01-07-2018

Name & Address:	Type	Educational Institutions - HT2C	Wheeling Energy	0
AH Memorial Education Trust No 21/1, Dibbur VillageHessaraghatta Hobli Bangalore North Taluk BANGALORE, KAR -560084	Tariff	1HT2C2	High Cost Energy	
	Contract Demand(KVA)	200	Special Energy	
	75% of CD (KVA)	170	Base Consumption	
	Recorded Demand (KVA)	320	Power Cut	
	Billing Demand (KVA)	320	Energy Entitlement Demand Entitlement	

Description	Date	KWH Meter	KVAH Meter	MD meter	PF
Present Reading	01-06-2018	788	855.03	.16	0.94
Previous Reading	01-05-2018	764.82	830.12		
Difference		23.38	24.91	.16	
Meter Constant		2000	2000	2000	
Consumption		46760	49820	320	
Less/Add Consumption		0	0		
Net Consumption		46760	49820	320	0.94

Your Detailed Bill Description	Amount (Rs.)
Demand Charges: 200.00 KVA at Rs200.00 per kVA	40,000.00
Energy Charges: First 46,760.00 kWh at Rs7.65 per kWh	357,714.00
Excess Load/MD Penalty: 120.00 kVA at Rs400.00 per kVA	48,000.00
Interest on Revenue	0.00
Interest on Tax	0.00
Tax	21462.84
Current Bill Amount	**467176.84**
Arrears	**15386.00**
Bill Correction	**0.00**
Bill rounding adjustment	0.16
Interest on ISD/ASD	-49545.00
TDS on Interest	9909.00
Interest on ISD/ASD	-49545.00
TDS on Interest	9909.00
Net Payable Amount	**442927.00**
Rupees Four Lakh Forty-Two Thousand Nine Hundred Twenty-Seven Only	

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RR No.	Billing Period	Due Date	Disconnection Date	Bill No.	Account ID	Amount Payable
4425878221 (YHT212)	01-05-2018 - 01-06-2018	15-06-2018	01-07-2018	108904434238	1089020029	Rs. 442927.00

Name of the Bank	Branch	Cheque/DD No.	Cheque/DD Date	Amount (Rs.)	Amount in Rupees

1089020029

Receipt No. *Date* *Cashier Signature*

- **Makeup Examinations for 1st/3rd/5th semesters**
- **Industrial practice for 4th semester**
- **End of Even semester**
- **Summer term Registration and commencement of classes**

➢ **JUNE(4,14,428.00rs):**

- **Power demand is average**
- **Declaration of results of all programs**
- **World environmental day**

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RR No.	Account ID	Bill No.	Billing Period	Bill Date	Due Date	Disconnection Date
4425878221 (YHT212)	1089020029	108902047132	01-06-2018 - 01-07-2018	01-07-2018	15-07-2018	31-07-2018

Name & Address:				
AH Memorial Education Trust No 21/1, Dibbur VillageHessaraghatta Hobli Bangalore North Taluk BANGALORE, KAR -560084	Type	Educational Institutions - HT2C	Wheeling Energy	0
	Tariff	1HT2C2	High Cost Energy	
	Contract Demand(KVA)	200	Special Energy	
	85% of CD (KVA)	170	Base Consumption	
	Recorded Demand (KVA)	180	Power Cut	
	Billing Demand (KVA)	180	Energy Entitlement Demand Entitlement	

Meter Readings for Meter ID :3001032808

Description	Date	KWH Meter	KVAH Meter	MD meter	PF
Present Reading	01-07-2018	811.34	879.32	.09	0.95
Previous Reading	01-06-2018	788	855.03		
Difference		23.34	24.29	.09	
Meter Constant		2000	2000	2000	
Consumption		46680	48580	180	
Lead/Add Consumption		0	0		
Net Consumption		46680	48580	180	0.95

Your Detailed Bill Description	Amount (Rs.)
Demand Charges: 180.00 KVA at Rs200.00 per kVA	36,000.00
Energy Charges: First 46,680.00 kWh at Rs7.65 per kWh	357,102.00
Interest on Revenue	0.00
Interest on Tax	0.00
Tax	21426.12
Current Bill Amount	**414528.12**
Arrears	**1042528.00**
Bill Correction	**-1042528.00**
Bill rounding adjustment	-0.12
Net Payable Amount	**414528.00**
Rupees Four Lakh Fourteen Thousand Five Hundred Twenty-Eight Only	

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RR No.	Billing Period	Due Date	Disconnection Date	Bill No.	Account ID	Amount Payable
4425878221 (YHT212)	01-06-2018 - 01-07-2018	15-07-2018	31-07-2018	108902047132	1089020029	Rs. 414528.00

Name of the Bank	Branch	Cheque/DD No.	Cheque/DD Date	Amount (Rs.)	Amount in Rupees

1089020029

Receipt No. *Date* *Cashier Signature*

➢ JULY(4,07,338.00rs):

- **Power demand is below average**
- **Declaration of eligibility list for summer term and End term final Examination**
- **Summer term final Examinations and Makeup Examinations**
- **Results**

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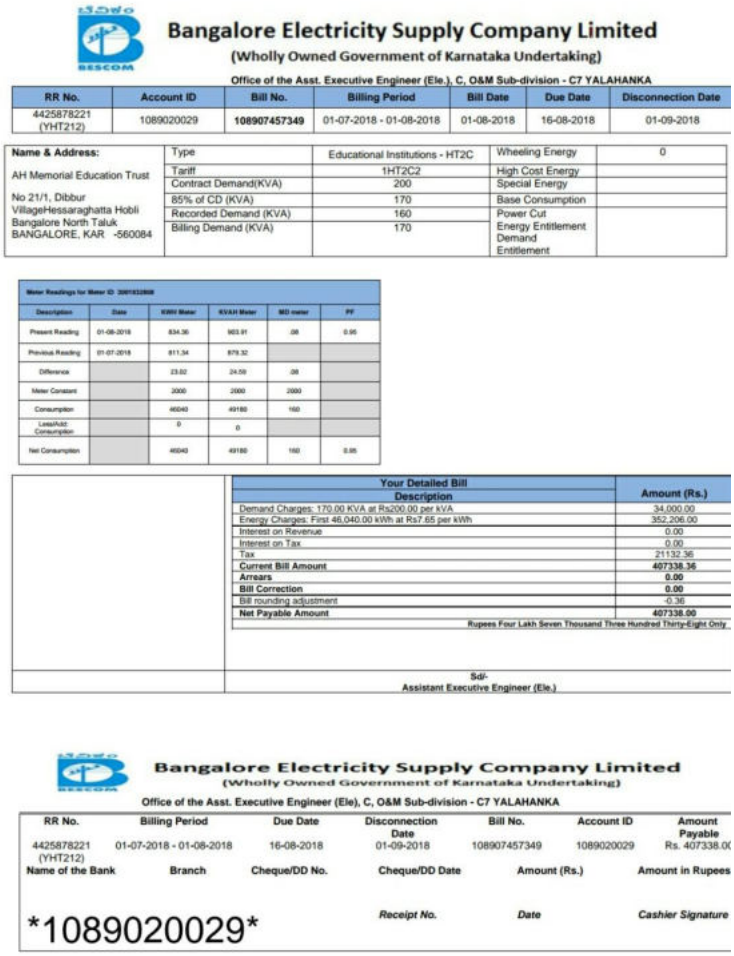

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RR No.	Account ID	Bill No.	Billing Period	Bill Date	Due Date	Disconnection Date
4425878221 (YHT212)	1089020029	108907457349	01-07-2018 - 01-08-2018	01-08-2018	16-08-2018	01-09-2018

Name & Address:	Type	Educational Institutions - HT2C	Wheeling Energy	0
AH Memorial Education Trust	Tariff	1HT2C2	High Cost Energy	
	Contract Demand(KVA)	200	Special Energy	
No 21/1, Dibbur VillageHessaraghatta Hobli Bangalore North Taluk BANGALORE, KAR -560084	85% of CD (KVA)	170	Base Consumption	
	Recorded Demand (KVA)	160	Power Cut	
	Billing Demand (KVA)	170	Energy Entitlement Demand Entitlement	

Description	Date	KWH Meter	KVAH Meter	MD meter	PF
Present Reading	01-08-2018	834.36	903.91	.08	0.95
Previous Reading	01-07-2018	811.34	879.32		
Difference		23.02	24.59	.08	
Meter Constant		2000	2000	2000	
Consumption		46040	49180	160	
Loss/Add Consumption		0	0		
Net Consumption		46040	49180	160	0.95

Your Detailed Bill Description	Amount (Rs.)
Demand Charges: 170.00 KVA at Rs200.00 per kVA	34,000.00
Energy Charges: First 46,040.00 kWh at Rs7.65 per kWh	352,206.00
Interest on Revenue	0.00
Interest on Tax	0.00
Tax	21132.36
Current Bill Amount	**407338.36**
Arrears	**0.00**
Bill Correction	**0.00**
Bill rounding adjustment	-0.36
Net Payable Amount	**407338.00**
Rupees Four Lakh Seven Thousand Three Hundred Thirty-Eight Only	

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RR No.	Billing Period	Due Date	Disconnection Date	Bill No.	Account ID	Amount Payable
4425878221 (YHT212)	01-07-2018 - 01-08-2018	16-08-2018	01-09-2018	108907457349	1089020029	Rs. 407338.0

Name of the Bank	Branch	Cheque/DD No.	Cheque/DD Date	Amount (Rs.)	Amount in Rupees

1089020029

Receipt No. *Date* *Cashier Signature*

- **AUGUST(6,11,816.00rs):**

- **Power demand is above average**
- **Registration and orientation of 1st semester MBA , SOM**
- **Commencement of classes of 3rd semester MBA, SOM and 3rd/5th/7th semester of all SOE and SOL**
- **Bakrid (holiday)**
- **Varamahalakshmi (holiday)**

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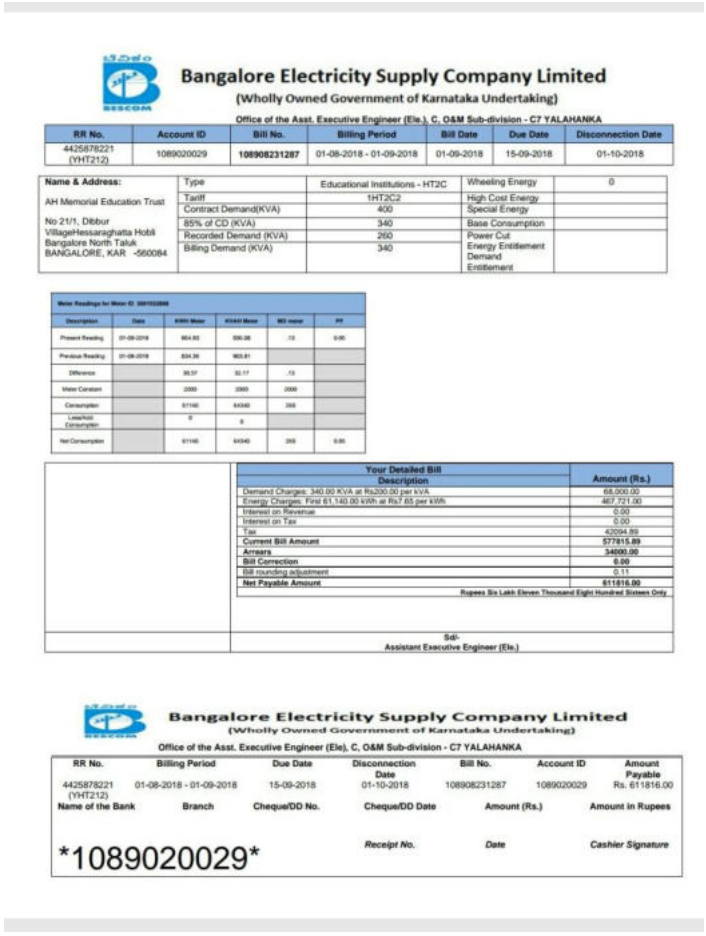

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RR No.	Account ID	Bill No.	Billing Period	Bill Date	Due Date	Disconnection Date
4425878221 (YHT212)	1089020029	108908231287	01-08-2018 - 01-09-2018	01-09-2018	15-09-2018	01-10-2018

Name & Address:				
AH Memorial Education Trust No 21/1, Dibbur VillageHessaraghatta Hobli Bangalore North Taluk BANGALORE, KAR -560084	Type	Educational Institutions - HT2C	Wheeling Energy	0
	Tariff	1HT2C2	High Cost Energy	
	Contract Demand(KVA)	400	Special Energy	
	85% of CD (KVA)	340	Base Consumption	
	Recorded Demand (KVA)	260	Power Cut	
	Billing Demand (KVA)	340	Energy Entitlement Demand Entitlement	

Description	Date	KWH Meter	KVAH Meter	MD meter	PF
Present Reading	01-09-2018	804.93	930.06	.13	0.95
Previous Reading	01-08-2018	834.36	963.81		
Difference		30.57	32.17	.13	
Meter Constant		2000	2000	2000	
Consumption		61140	64340	260	
Less/Add Consumption		0	0		
Net Consumption		61140	64340	260	0.95

Your Detailed Bill Description	Amount (Rs.)
Demand Charges: 340.00 KVA at Rs200.00 per kVA	68,000.00
Energy Charges: First 61,140.00 kWh at Rs7.65 per kWh	467,721.00
Interest on Revenue	0.00
Interest on Tax	0.00
Tax	42094.89
Current Bill Amount	**577815.89**
Arrears	**34000.00**
Bill Correction	**0.00**
Bill rounding adjustment	0.11
Net Payable Amount	**611816.00**
Rupees Six Lakh Eleven Thousand Eight Hundred Sixteen Only	

Sd/-
Assistant Executive Engineer (Ele.)

Bangalore Electricity Supply Company Limited
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Office of the Asst. Executive Engineer (Ele), C, O&M Sub-division - C7 YALAHANKA

RR No.	Billing Period	Due Date	Disconnection Date	Bill No.	Account ID	Amount Payable
4425878221 (YHT212)	01-08-2018 - 01-09-2018	15-09-2018	01-10-2018	108908231287	1089020029	Rs. 611816.00

Name of the Bank	Branch	Cheque/DD No.	Cheque/DD Date	Amount (Rs.)	Amount in Rupees

1089020029

Receipt No. *Date* *Cashier Signature*

- **SEPTEMBER(3,28,838.00rs):**

- **Power demand is below average**
- **Ganesh chaturthi (holiday)**
- **Fresher's day celebration**
- **Teachers day**
- **End term Examination 7th semester of all programs of SOE**
- **Muharram (holiday)**
- **Test 01 for1st/3rd/5th/7th for SOE all programs**

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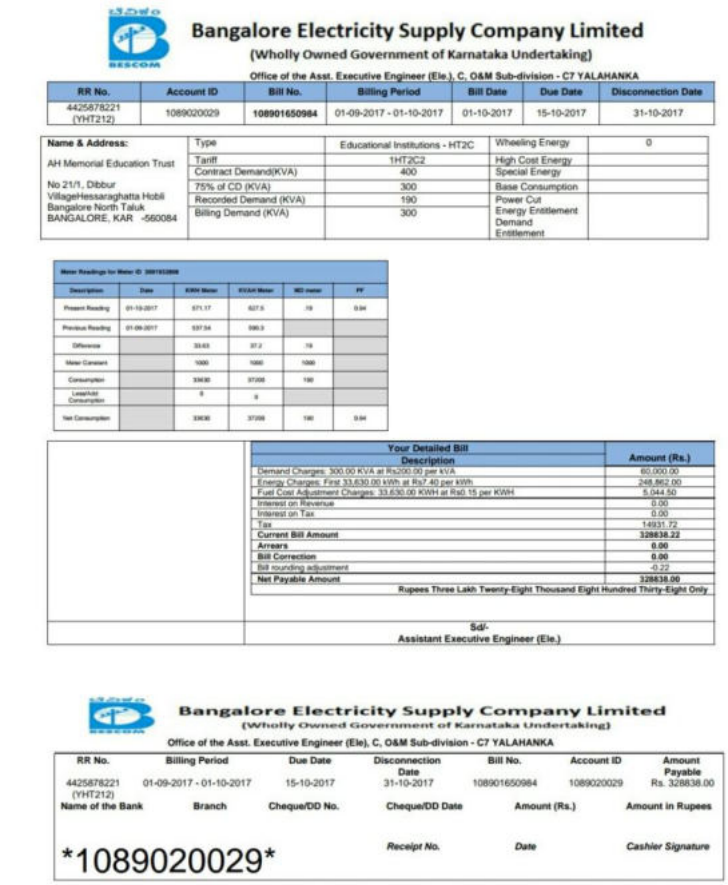

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RR No.	Account ID	Bill No.	Billing Period	Bill Date	Due Date	Disconnection Date
4425878221 (YHT212)	1089020029	108901650984	01-09-2017 - 01-10-2017	01-10-2017	15-10-2017	31-10-2017

Name & Address:				
AH Memorial Education Trust No 21/1, Dibbur VillageHessaraghatta Hobli Bangalore North Taluk BANGALORE, KAR -560084	Type	Educational Institutions - HT2C	Wheeling Energy	0
	Tariff	1HT2C2	High Cost Energy	
	Contract Demand(KVA)	400	Special Energy	
	75% of CD (KVA)	300	Base Consumption	
	Recorded Demand (KVA)	190	Power Cut	
	Billing Demand (KVA)	300	Energy Entitlement Demand Entitlement	

Description	Date	KWH Meter	KVAH Meter	MD meter	PF
Present Reading	01-10-2017	571.17	627.5	19	0.94
Previous Reading	01-09-2017	537.54	590.3		
Difference		33.63	37.2	19	
Meter Constant		1000	1000	1000	
Consumption		33630	37200	190	
Lease/Add Consumption		0	0		
Net Consumption		33630	37200	190	0.94

Your Detailed Bill Description	Amount (Rs.)
Demand Charges: 300.00 KVA at Rs200.00 per kVA	60,000.00
Energy Charges: First 33,630.00 kWh at Rs7.40 per kWh	248,862.00
Fuel Cost Adjustment Charges: 33,630.00 KWH at Rs0.15 per KWH	5,044.50
Interest on Revenue	0.00
Interest on Tax	0.00
Tax	14931.72
Current Bill Amount	**328838.22**
Arrears	**0.00**
Bill Correction	**0.00**
Bill rounding adjustment	-0.22
Net Payable Amount	**328838.00**
Rupees Three Lakh Twenty-Eight Thousand Eight Hundred Thirty-Eight Only	

Sd/-
Assistant Executive Engineer (Ele.)

Bangalore Electricity Supply Company Limited
(Wholly Owned Government of Karnataka Undertaking)
Office of the Asst. Executive Engineer (Ele), C, O&M Sub-division - C7 YALAHANKA

RR No.	Billing Period	Due Date	Disconnection Date	Bill No.	Account ID	Amount Payable
4425878221 (YHT212)	01-09-2017 - 01-10-2017	15-10-2017	31-10-2017	108901650984	1089020029	Rs. 328838.00

Name of the Bank	Branch	Cheque/DD No.	Cheque/DD Date	Amount (Rs.)	Amount in Rupees

1089020029

Receipt No. *Date* *Cashier Signature*

➢ OCTOBER(6,07,770.00rs):

- **Power demand is above average**
- **Gandhi jayanthi (holiday)**
- **Mahalaya amavasya(holiday)**
- **Vijayalakshmi (holiday)**
- **Mahanavami (holiday)**
- **Midterm examination for 1st/3rd/5th/7th semester of all programs of SOL and MBA,SOM**
- **Valmiki jayanti (holiday)**

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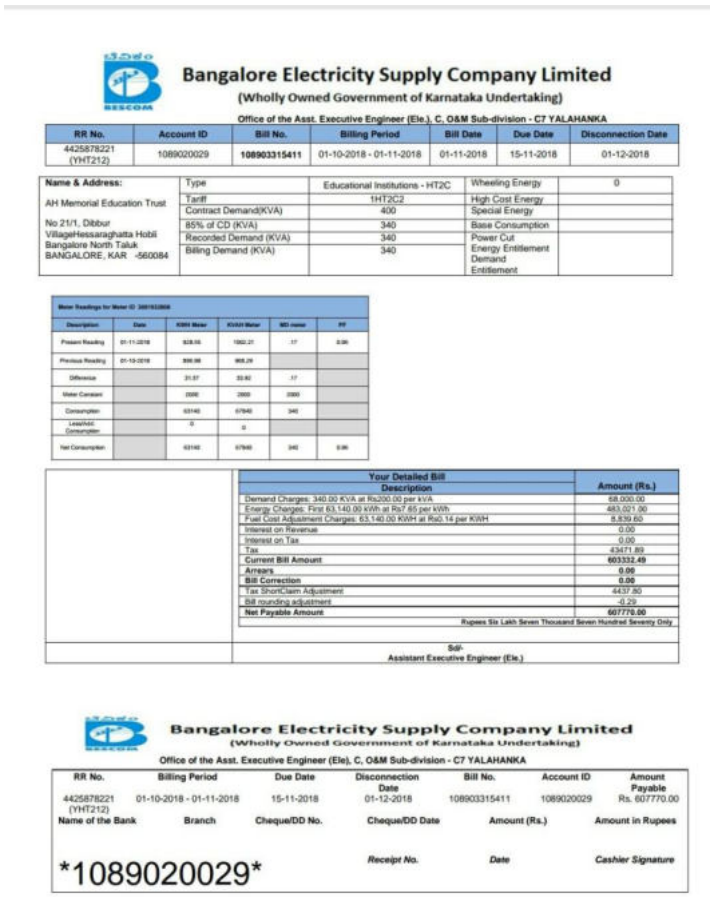

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RR No.	Account ID	Bill No.	Billing Period	Bill Date	Due Date	Disconnection Date
4425878221 (YHT212)	1089020029	108903315411	01-10-2018 - 01-11-2018	01-11-2018	15-11-2018	01-12-2018

Name & Address:	Type	Educational Institutions - HT2C	Wheeling Energy	0
AH Memorial Education Trust No 21/1, Dibbur VillageHessaraghatta Hobli Bangalore North Taluk BANGALORE, KAR -560084	Tariff	1HT2C2	High Cost Energy	
	Contract Demand(KVA)	400	Special Energy	
	85% of CD (KVA)	340	Base Consumption	
	Recorded Demand (KVA)	340	Power Cut	
	Billing Demand (KVA)	340	Energy Entitlement Demand Entitlement	

Description	Date	KWH Meter	KVAH Meter	MD reset	PF
Present Reading	01-11-2018	828.55	1062.21	.17	0.96
Previous Reading	01-10-2018	690.98	868.29		
Difference		31.57	32.92	.17	
Meter Constant		2000	2000	2000	
Consumption		63140	67940	340	
Less/Add Consumption		0	0		
Net Consumption		63140	67940	340	0.96

Your Detailed Bill Description	Amount (Rs.)
Demand Charges: 340.00 KVA at Rs200.00 per kVA	68,000.00
Energy Charges: First 63,140.00 KWh at Rs7.85 per kWh	483,021.90
Fuel Cost Adjustment Charges: 63,140.00 KWH at Rs0.14 per KWH	8,839.60
Interest on Revenue	0.00
Interest on Tax	0.00
Tax	43471.89
Current Bill Amount	**603332.49**
Arrears	**0.00**
Bill Correction	**0.00**
Tax ShortClaim Adjustment	4437.80
Bill rounding adjustment	-0.29
Net Payable Amount	**607770.00**
Rupees Six Lakh Seven Thousand Seven Hundred Seventy Only	

Sd/-
Assistant Executive Engineer (Ele.)

Bangalore Electricity Supply Company Limited
(Wholly Owned Government of Karnataka Undertaking)
Office of the Asst. Executive Engineer (Ele), C, O&M Sub-division - C7 YALAHANKA

RR No.	Billing Period	Due Date	Disconnection Date	Bill No.	Account ID	Amount Payable
4425878221 (YHT212)	01-10-2018 - 01-11-2018	15-11-2018	01-12-2018	108903315411	1089020029	Rs. 607770.00

Name of the Bank	Branch	Cheque/DD No.	Cheque/DD Date	Amount (Rs.)	Amount in Rupees

1089020029

Receipt No. *Date* *Cashier Signature*

- **NOVEMBER(5,55,853.00rs):**

- **Diwali vacations**
- **Pre registration : professional practice 2**
- **Id e milad (holiday)**
- **Test 02 for 1st/3rd/5th/7th semesters of all programs of SOE**
- **Kanakadasa jayanti (holiday)**

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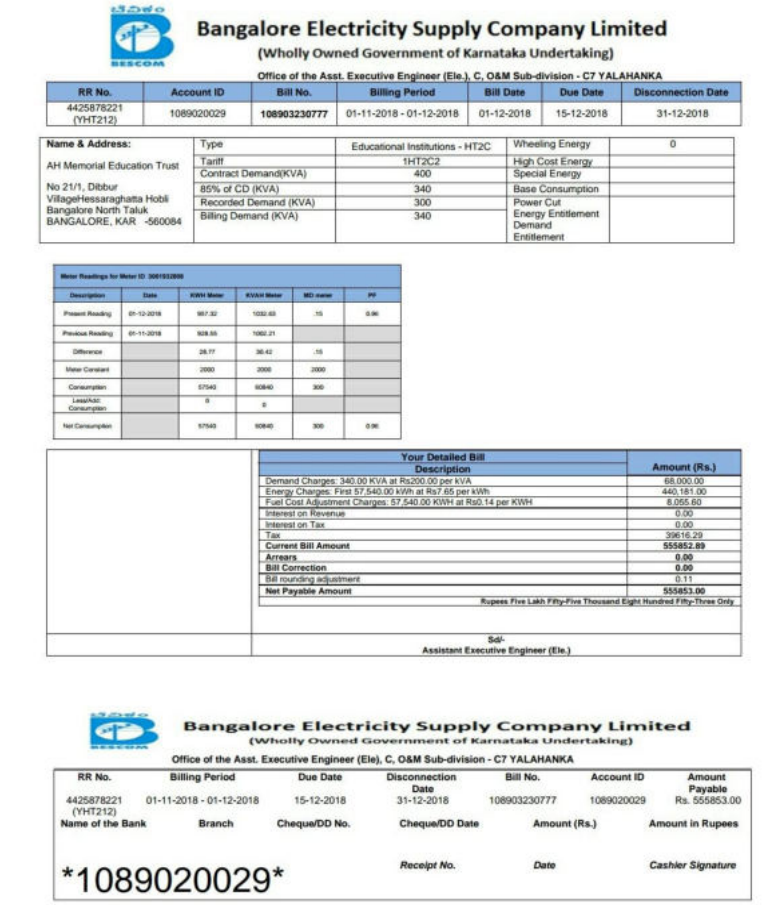

Bangalore Electricity Supply Company Limited

(Wholly Owned Government of Karnataka Undertaking)

Office of the Asst. Executive Engineer (Ele.), C, O&M Sub-division - C7 YALAHANKA

RR No.	Account ID	Bill No.	Billing Period	Bill Date	Due Date	Disconnection Date
4425878221 (YHT212)	1089020029	108903230777	01-11-2018 - 01-12-2018	01-12-2018	15-12-2018	31-12-2018

Name & Address:	Type	Educational Institutions - HT2C	Wheeling Energy	0
AH Memorial Education Trust No 21/1, Dibbur VillageHessaraghatta Hobli Bangalore North Taluk BANGALORE, KAR -560084	Tariff	1HT2C2	High Cost Energy	
	Contract Demand(KVA)	400	Special Energy	
	85% of CD (KVA)	340	Base Consumption	
	Recorded Demand (KVA)	300	Power Cut	
	Billing Demand (KVA)	340	Energy Entitlement Demand Entitlement	

Meter Readings for Meter ID: 3061932808

Description	Date	KWH Meter	KVAH Meter	MD meter	PF
Present Reading	01-12-2018	967.32	1032.63	.15	0.96
Previous Reading	01-11-2018	928.55	1002.21		
Difference		38.77	30.42	.15	
Meter Constant		2000	2000	2000	
Consumption		57540	60840	300	
Less/Add: Consumption		0	0		
Net Consumption		57540	60840	300	0.96

Your Detailed Bill Description	Amount (Rs.)
Demand Charges: 340.00 KVA at Rs200.00 per kVA	68,000.00
Energy Charges: First 57,540.00 kWh at Rs7.65 per kWh	440,181.00
Fuel Cost Adjustment Charges: 57,540.00 KWH at Rs0.14 per KWH	8,055.60
Interest on Revenue	0.00
Interest on Tax	0.00
Tax	39616.29
Current Bill Amount	**555852.89**
Arrears	**0.00**
Bill Correction	**0.00**
Bill rounding adjustment	0.11
Net Payable Amount	**555853.00**

Rupees Five Lakh Fifty-Five Thousand Eight Hundred Fifty-Three Only

Sd/-
Assistant Executive Engineer (Ele.)

Bangalore Electricity Supply Company Limited

(Wholly Owned Government of Karnataka Undertaking)

Office of the Asst. Executive Engineer (Ele), C, O&M Sub-division - C7 YALAHANKA

RR No.	Billing Period	Due Date	Disconnection Date	Bill No.	Account ID	Amount Payable
4425878221 (YHT212)	01-11-2018 - 01-12-2018	15-12-2018	31-12-2018	108903230777	1089020029	Rs. 555853.00

Name of the Bank	Branch	Cheque/DD No.	Cheque/DD Date	Amount (Rs.)	Amount in Rupees

1089020029

Receipt No. *Date* *Cashier Signature*

- **DECEMBER(6,10,000.00rs):**

- **Registration for makeup Examination**
- **Inter college fest CEREBRUM (SOM)**
- **Inter college fest EQUIIP (SOE)**
- **Declaration of eligibility list**
- **End term final examination for 3rd/5th/7th semesters of all programs of SOE,SOL,SOM,MBA**

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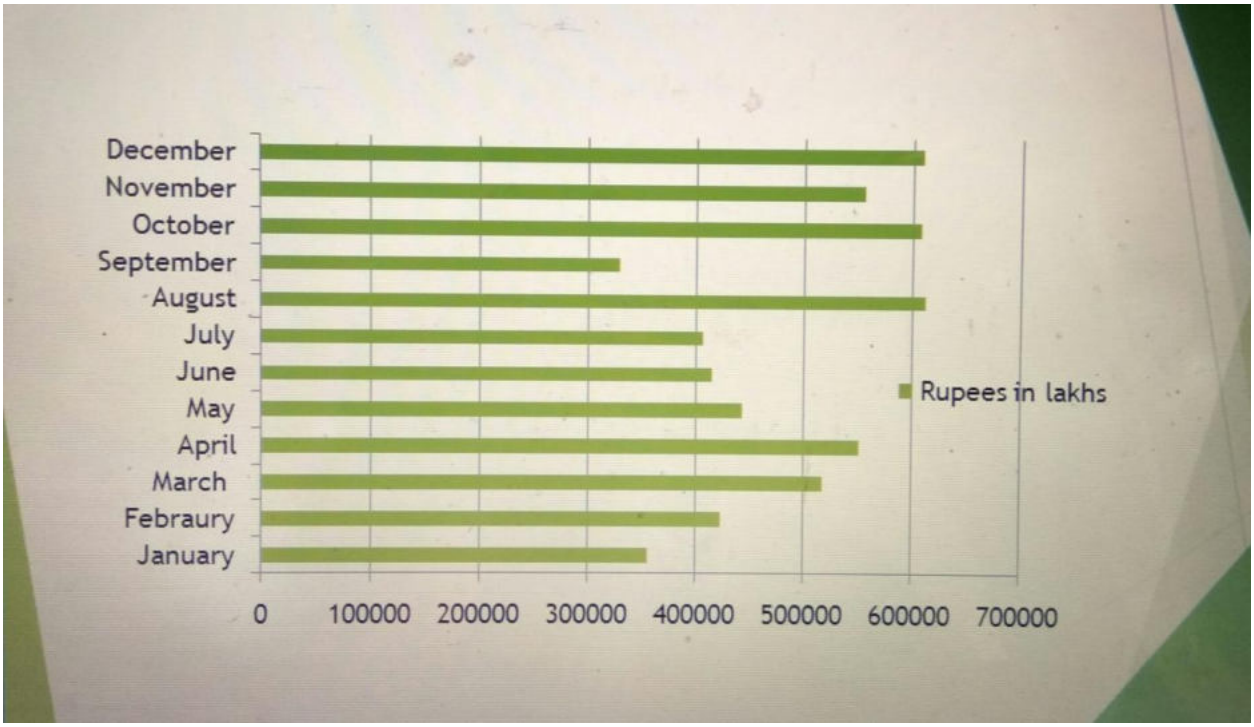
ANNUAL ENERGY GENERATION (2018)

GRAPHICAL REPRESENTATIONOF ELECTRICITY BILL:



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CONCLUSION

- Energy audit is the most important factor to save the electricity and we study the overall layout of the two blocks of Presidency campus and we are hereby are reposing a plan for SOLAR POWER for 200KVA capacity which would cost about Rs 80 lakh to 1 crore,Which will include descent panels and European inverter.

SOLAR PANELS AND SOLAR SYSTEM

- The system will have hot dip galvanized steel structures and earthlings including surge arrestors. Also, most of the inverters provide remote monitoring facilities along with anti dust coating for the panels.
- Basically we going with the roof top mould will be a good idea by making up the good use of all the blank space and abundant sunlight on the roof of both the blocks.
- Maintenance is 1.0% of project cost, with 5% annual escalation; we get return in less than 7 years depending upon state policies.

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REFERENCE

i) Ariyo F. K., Omoigui M. O. (2012) Investigation of Nigerian 330kV Electrical Network with Distributed Generation Penetration-Part I: Basic Analyses. International Journal of Energy and Power Engineering. Vol. 1, No. 1, pp1-19

ii)http://www.tangedco.gov.in/template1.php?cid=0&subcid=184

iii)www.wikipedia.com

iv) www.aeecenter.org

v) Google search

vi) www.IEEEexplore.org

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GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS	**PRESIDENCY UNIVERSITY BENGALURU** **Presidency University Environmental Cell (PUEC)**	

Ref. No. PU/PUEC/19-20/Report/01 DATE: 20 Oct 2019

TITLE OF INVITED TALK: WATER CONSERVATION

RESOURCE PERSON: Mr. BHAVAN KUMAR, ASST. PROFESSOR, CIVIL DEPT, PRESIDENCY UNIVERSITY.
ORGANIZING INSTITUTION: CAMBRIDGE INSTITUTE OF TECHNOLOGY
DATE: 19/10/2019
PLACE: BENGALURU, KARNATAKA.

Abstract of the invited talk:

Water conservation includes all the policies, strategies and activities to sustainably manage the natural resource of fresh water, to protect the hydrosphere, and to meet the current and future human demand. Population, household size and growth and affluence all affect how much water is used. Factors such as climate change have increased pressures on natural water resources especially in manufacturing and agricultural irrigation. Many countries have already implemented policies aimed at water conservation, with much success. Ensuring the availability of water for future generations where the withdrawal of freshwater from an ecosystem does not exceed its natural replacement rate. Habitat conservation where minimizing human water usage helps to preserve freshwater habitats for local wildlife and migrating waterfowl, but also water quality.

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CAMBRIDGE INSTITUTE OF TECHNOLOGY

K.R.Puram , Bengaluru-560 036.

| Approved by AICTE, New Delhi | Permanently Affiliated to VTU Belagavi | Recognized by Govt. of Karnataka | Accredited by NBA & NAAC | An ISO 9001:2008 Certified Institute

Dr. Suresh.L M.E.,Ph.D
Principal
principal@cambridge.edu.in

Phone : 25618798/25618799
Fax : 080-25618789

Date : 19-10-2019

To,

Bhavan Kumar.
Assistant Professor,
Presidency University.
Bangalore.

Dear Sir,

I am extremely happy for sparing your valuable time and enlightening our student's on water conservation.

We look forward to have you again in the future. Thank you.

Sincerely,

HOD

Dept of Civil Engineering

Head of the Department
Department of Civil Engineering
Cambridge Institute of Technology
K.R. Puram, Bengaluru - 560 036

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Private University Estd. in Karnataka State by Act No. 41 of 2013

Ref. No. PU/PUEC/19-20/Report/02 DATE: 28 OCTOBER 2019

A BRIEF REPORT ON THE SWATCH BHARAT ACTIVITY

As a part of Swatch Bharat Activity, The Presidency University conducted No Plastic Drive by the Environment Cell & a Cleanliness Drive by NSS unit of the University on 26th October 2019. Around 100 student volunteers participated in the event with a short drive to achieve the sustainable environmental outcome. These efforts were supported by the Rajanukunte Panchayat Office which provided us the Truck as well as the personnel for the cleaning effort. Also endorsed by Rajankunte Police Station and BESCOM. The entire activity covered the area from The Presidency University Campus upto Rajanukunte Main Road.

Ref. No. PU/PUEC/19-20/Report/03 DATE: 26 OCTOBER 2019

A BRIEF REPORT ON THE INVITED TALK

Speaker: Sri. D.R. Kumaraswamy

Designation and Affiliation: Rtd. Chief Environmental Officer, Karnataka State Pollution Control board, Bengaluru

Topic: Environmental education and sensitization of students on the need for healthy environment

Presidency University Environmental Cell in collaboration with Department of Chemistry has invited Sri. D.R. Kumaraswamy, Rtd. Chief Environmental Officer, Karnataka State Pollution Control board, Bengaluru for delivering an invited talk on the topic "Environmental education and sensitization of students on the need for healthy environment" on 26.10.19 for first semester Chemistry cycle B.Tech. students. The Chairperson of PUEC and vice-chancellor, Dr. Radha Padmanabhan has addressed the gathering. She introduced PUEC with the emphasis on "Say No to Plastic". Students took oath on "they will not use plastic". Sri. D.R. Kumaraswamy, Karnataka State Pollution Control Board educated the students about the environmental pollution and its various aspects with all the rules made by KSPCB.

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Ref. No. PU/PUEC/19-20/Report/04 DATE: 14 December 2020

REPORT on JUGAAD

Coordinators: Dr. Gokulakrishnan,
Dr. Saravanan Chandrasekaran, Environment Cell
Presidency University

Event Description:

Every day we use a variety of products to fulfill our basic needs. Most of these products and their packaging are wasted and dumped in bins, which spoils environment. There is a pressing need to focus on the things we ourselves can do to change our place better. Most simple practice is to reduce consumption by reuse. By reusing what's thrown as waste, we conserve natural resource, save energy and protect environment from pollution.

Environmental Cell of The Presidency University conducted an exciting competition "JUGAAD" on for all the school across the campus to transform waste in to a valuable product.Students were asked to form a team of four and gather what's being commonly considered as waste and "transform it innovatively" into useful product. The exhibition of the innovative products was fixed on 14. 12. 2019 at 11 – 12 pm. The registration procedure was made simple by creating a "Jugaad" Whatsapp group wherein students can join as a team by scanning the QCR code.

A review meeting was conducted on 27. 11. 2019 in which Dr. Gokulakrishnan presented the event flyer to the cell members and received feedback on the execution of the event. Registration deadline was fixed on 10. 12. 2019. It was decided that Dr. Saravanan of Chemistry Department shall be a part in coordinating the event.

Announcement:

The flyer (Annexure 1) was circulated to all the schools of the campus through Ms. Sreeleakha, Dean, Students Affair. Dr. Gokulakrishnan and Dr. Mani went in person to School of Design, School of Law and School of Commerce to promote the event and

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attract student participants.

Registration:

A total of 25 teams registered for the event on registration deadline 10. 12. 2019. (Registration list with Team ID – Annexure II)

Budget:

Total amount of 5623 was approved by Vice Chancellor madam towards expenditure on printing charges for flyers and certificates and prizes. (Annexure III)

Judges:

Dr. Gokulakrishnan invited the following members to evaluate the student innovations after approval from Vice Chancellor madam.

Dr. Neeti Sethi Bose, Dean, School of Design. Dr.

Joel Hemanth, Associate Dean, SOE

Dr. Shrishail B Anadinni, HoD, Civil Engineering Department. Dr.

Anu Sukhdev, HoD, Chemistry Department

Dr. Jagdish H Godihal, Professor, Civil Engineering Department.

Evaluation Criteria:

The teams were evaluated by the above Judges based on the following criteria:

1. The source of the product: The raw material or the base should be waste/unusable. (25 points)

2. More with less: Resource Utilization- Product should be with minimum resource (25 points)

3. Good looking: The product need not be very beautiful or artistic but a fairly good looking one (20 points)

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4. Presentation. The way the team members explain how they transformed the waste in to their final valuable product (20 points)

5. A video presentation of the product (10 points)

Results:

1. Out of 25 teams that registered, 20 teams presented their products on 14.12.2019.

2. The evaluation by the following Judges began at 11.30 and ended at 12.40 pm.

3. Post evaluation, the following are the top three teams of the event.

TEAM ID	TEAM MEMBERS	TOTAL SCORE (out of 500)	RANK
PUENVT 1	ADITYA 20191COM0003 HEMANTH 20191ISE0064 HARI J 20191ECE0391 SWETHA A NAIR 2019IST0157 HARSHITH SN 20191ECE0129	361	1
PUENVT 6	CHAITHRA L .M 20191CSE0086 HARSHITA HARISH 20191CSE0191 NIDHI G.G 20191CSE0382 NANDINI .P 20191ISE0111 HARSHINII .S 20191ECE0128	310	2
PUENVT 20	20192MBA0545 SAQLAIN 20192MDM0013 VASIF 20192MBA0585 SWAPNA 20192MBA0583 SUMANTH	307	3

4. Of 20 teams that participated, 14 teams have uploaded a video description of their innovation.

5. Final Scores of all Teams:

Team ID	Total (Out of 500)	RANK
PUENVT 1	361	**1**
PUENVT 2	ABSENT	**ABSENT**

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PUENVT 3	214	**17**
PUENVT 4	265	**12**
PUENVT 5	273	**7**
PUENVT 6	310	**2**
PUENVT 7	291	**5**
PUENVT 8	289	**6**
PUENVT 9	304	**4**
PUENVT 10	200	**19**
PUENVT 11	232	**15**
PUENVT 12	281	**8**
PUENVT 13	248	**13**
PUENVT 14	230	**16**
PUENVT 15	ABSENT	**ABSENT**
PUENVT 16	ABSENT	**ABSENT**
PUENVT 17	275	**10**
PUENVT 18	276	**9**
PUENVT 19	281	**8**
PUENVT 20	307	**3**
PUENVT 21	260	**11**
PUENVT 22	ABSENT	**ABSENT**
PUENVT 23	247	**14**
PUENVT 24	220	**18**
PUENVT 25	ABSENT	**ABSENT**

Evaluation sheets of Judges (Annexure IV)

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PRESIDENCY GROUP OVER 40 YEARS OF LEARNING WISDOM

IDSA Department of Student Affairs Presidency University, Bangalore

Distribution of Certificates and Prizes:

The results were announced on 22nd December 2019. The certificates and prizes for the winning teams were distributed on 24th December 2019. Photographs (Annexure VI)

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Student Feedback:

Event Feedback was collected from students in the form of questionnaire. Overall rating is Excellent (9-10 in a 10 point scale) on several criteria. Annexure (VII).

Acknowledgement:

I sincerely thank Chancellor Sir Dr. Nissar Ahmed for this opportunity. I sincerely thank Vice Chancellor madam Dr. Radha Padhmanabhan for active support and encouragement to execute the event. I am grateful to all the Judges for their valuable service and fair evaluation.

Special thanks to Dr. Saravanan for his signification contribution in helping coordinate the event. Thanks to Dr. Ishwara Bhat, Dr. Mani and Dr. Amita for valuable suggestions and promotion of the event. Thanks to all the members of the cell for helping in promotion of the event.

Finally, thanks to all the participants of Jugaad for active involvement and display of amazing innovations that made the event a grand success.

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Ref. No. PU/PUEC/19-20/Report/05 DATE: 14 DECEMBER 2019

A BREIF REPROT ON THE INVITED TALK ORGANISED ON

14th DECEMBER 2019

Speaker: Sri. Rajeeva Deekshit

Designation and Affiliation: CMD – M/s. Pyro Ecogreen Technologies Pvt. Ltd. – Bengaluru.

Topic: Energy-Saving Clean Technologies for Surface Treatment and Metal Finishing

Occasion: World Energy Conservation Day Celebration

Environmental cell of the Presidency University celebrated World Energy Conservation Day on 14th December 2019 in the University campus. As a part of the celebration, Presidency University Environmental Cell (PUEC) in collaboration with Department of Chemistry has invited Sri. Rajeeva Deekshit. Chief Managing Director (CMD), Pyro Ecogreen Technologies Pvt. Ltd. – Bengaluru for delivering an invited talk on the topic "*Energy-Saving Clean Technologies for Surface Treatment and Metal Finishing*" on 14 December 2019 from 9:30 am to 11:00 am, for the first semester Chemistry cycle B.Tech. students of sections CC02-04, CC07-09, CC13-15 and CC-19. The speaker Sri. Rajeeva Deekshit arrived to the campus at 9:10 am. The program started at 9:30 am with a brief introduction of the speaker, in the Presidency University Auditorium where in around 275 students, Dr. Joel Hemanth, Dean, faculties of department of Chemistry, faculties from other departments and PUEC members were gathered. The programme coordinator of this talk and Dr. C.S. Ramesh, Dean, R&IC has addressed the gathering.

Sri. Rajeeva Deekshit started his talk on Waste to Wealth topic and educated the students on the importance of water usage. He explained how we are wasting energy, food and water, the quantity of water used to produce fruits, chocolate, coffee beans, chicken, etc. Speaker started to explain about industrially important methods how efficiently clean the rust, scales from cylinders, railway clip, diesel engine cylinder head, and stainless steel conveyor chain. During his presentation, he mentioned that he has developed various eco-friendly methods for all the above process and he shown some pictures and videos of the process. Also, he explained how to clean and reuse the water filtering units, SS filter mesh, water filter in swimming pool and used hand cloves by eco-friendly methods. Speaker also shown some of the videos and pictures on how to recover and reuse aerospace materials, coated polymer materials from the paper cups, silicon coated paper (release paper), glass wool and metal

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from grinding sludge. He also mentioned that we can use the above techniques to restore the antique and historically important buildings and materials.

Sri. Rajeeva Deekshit encouraged the students to utilize the opportunities and asked the students to discuss with teachers and friends to improve their knowledge in their core subjects.

The lecture was very effective and thought provoking. The response from the students was good. At the end of the talk, vote of thanks to the speaker, faculties, management and the students was given by Dr. Amita Somya, coordinator, PUEC.

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Ref. No. PU/PUEC/19-20/Report/06 DATE: 08 JUNE 2020

A BRIEF REPORT ON WORLD WATER DAY ACTIVITY

Every year World Water Day is celebrated on 23rd March globally. In lieu of this, Presidency University Environment Cell (PUEC) conducted a Video making competition on water related issues for the students. Students participated enthusiastically and 15 teams registered for the event. Videos on the water crisis, water conservation, the use of water for the agriculture sector etc were made and presented by students to the jury. Of the15 teams, 3 best teams were selected and the results were announced over a Zoom online meeting by the Vice-Chancellor and Chairperson of PUEC, Dr. Radha Padmanabhan on 8th of June, 2020. The meeting was convened by the coordinator of PUEC, Dr. Amita Somya. The Director of DSA, Dr. Snehaprabha, PUEC members; Dr. Saravanan C, Dr. Gokulakrishnan S, Dr. Venkatesh Raju, Dr. Shilpa N, Mr. Santhosh M.B. and student participants attended the online event

The winners are listed below.

S.N.	Team No.	Name of the Team Members with ID No.	Position secured
1	Team-14	Adarsh Muraleedharan 20181CSE0021	1st
2	Team-02	T R G Sahiti Priya20191ECE0322 Surabhi s Pramod 20191CCE0071 Shreya Balachandra Naik 20191COM0188 Supritha B 20191CSE0603	2nd
3	Team-09	Komal Nagar 20181ECE0049	3rd

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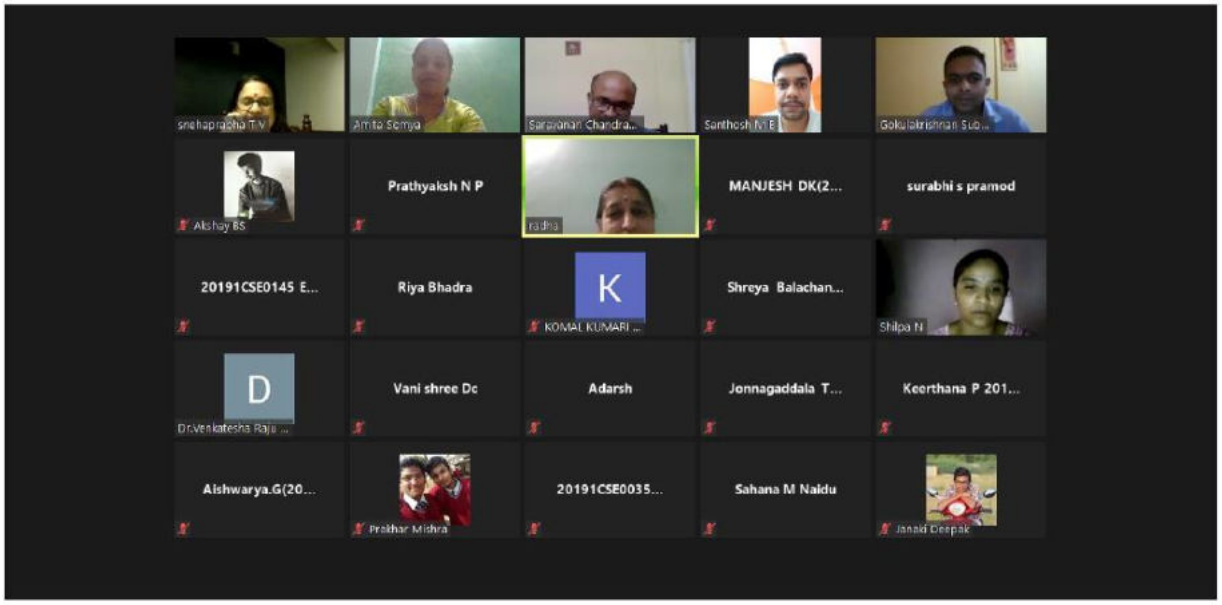

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Ref. No. PU/PUEC/19-20/Report/07 DATE: 08 JUNE 2020

Title of project- Monitoring of Waste Water Quality of Vrishubavathi Valley, Karnataka Bangalore.

Date of submission: 10/1/2019

Students involved- batch, ID/Roll No., Branch, Year

Honey Sudilal 2016CVE120
Sahana P 2016CVE077
Alokh A Reddy 2016CVE086
Shashikumar 2017LCV037

Project Guide- Dr. Venkatesha Raju K

Abstract- Vrishabhavathi river is a tertiary tributary of river Cauvery, passing through many thickly populated residential and industrial areas in Bangalore city, India. This river has taken the wrath of industrial and domestic effluents over half a century and hence has been considerably polluted. The present paper is aimed at determining the suitability of the river water for agricultural purposes by finding out the effect of the use of river water and sediment on the growth of French beans compared to a control with loamy soil and bore-well water free from heavy metals and organic matter. No heavy metal was present in the edible part of the plant. It was observed that the height of plants, number of leaves, number of flowers, number of pods and biomass were all more than that with control for all combinations with river water and sediment. The results have been statistically analysed and presented in the paper. All the parameters studied were highly influenced by either river water with loamy soil or reduced composition of sediment soil with river water over river water with sediment or the control. It is concluded that this river water and sediment might be used as a source of fertilizer for better growth of plants. Presence of heavy metals though high in water and sediment does not enter the food chain and hence poses no threat data.

The water quality indices have risen alarmingly and it has been found that nearly 67% of the samples are non-potable and it is seen that this number has risen sharply from 50 % non-portability from 2006. This clearly shows that there is a massive deterioration of water quality in the study span of 8 years, clearly reflecting the unabated and huge increase in the concentration of pollutants from municipal, industrial and agricultural sources that have been making their way to the groundwater of Vrishabhavathi valley basin. The results imply that the groundwater of all the affected areas are completely unfit for human consumption and needs appropriate treatment.

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Outcome of the Project- This student research work was accepted and published in Indian Journal of Environmental Protection and will be published in July-2020 volume.

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IJEP 40 (7) : 769-774 (2020)

A Survey On Sewage And Borewell Water Quality Of Vrishabhavathi River Basin

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The present work aims to study the contamination status of the Vrishabhavathi sewage water and also the deterioration of surrounding groundwater quality. An erstwhile freshwater stream, now carrying huge amounts of industrial, agricultural and domestic effluents from the western part of Bangalore metropolis. There are three sewage water and the same number of groundwater samples of three different locations were collected from the Vrishabhavathi basin during post-monsoon season 2018. All the six samples were analysed for around 16 physico-chemical parameters. Both the categories of samples exhibit slightly alkaline pH with high dissolved solids and turbidity. The high level of chloride, phosphate, BOD, COD concentration in sewage water clearly indicating the extensive influx of water pollutants from both point and non-point sources leading to further deterioration of sewage water. The total hardness, total alkalinity, turbidity and phosphate concentration of borewell samples were exceeding the standard limits of BIS, revealing that the leaching of sewage into groundwater aquifers is at an alarming rate in Vrishabhavathi basin. The dissolved solids concentration and alkaline state of the borewell water may become unfit for irrigation in Vrishabhavathi river stretch, since it may lead agricultural soil to be saline and toxic over a period of time.

KEYWORDS

Physico-chemical, Vrishabhavathi, Sewage, Borewell, Concentration

1. INTRODUCTION

Rivers are vital and vulnerable freshwater systems that are critical for the sustenance of all life. However, the declining quality of the water in these systems threatens their sustainability and is, therefore, a cause for concern. Rivers are waterways of strategic importance across the world, providing main water resources for domestic, industrial and agricultural purposes [1]. Urban cities growing at greater speed and reaching saturation level leading to the deterioration of the environmental quality and dearth of recourses [2]. Bangalore city has meager water resource in its neighbourhood, being a part of semi-arid peninsular India. The undulating topography of the city has been meticulously managed in the past, to build a chain of water storage lakes in the valley areas. But these days lack of access to freshwater supply in the city is due to the influx of sewage and inappropriate management of water resources [3].

Vrishabhavathi river is a constituent of the Arkavathi river basin, Bangalore urban and Ramanagara district and covers a catchment area of around 381.465 km^2, representing seasonally dry tropical climate. This river is the main surface water source which is tributary of river Arkavathi, which joins the Cauvery river [4]. The Vrishabhavathi river, once used as a major source of water is now entirely contaminated from the household, agricultural and industrial wastes [5]. While the original river has dried up, at present, it is carrying sewage and industrial effluents from more than 100 industries of various kinds. The wastewater flows into the Vrishabhavathi valley is about 300 million litres per day. It receives improperly treated and/or untreated effluents and domestic wastewater from the Bangalore Water Supply and Sewerage Board (BWSSB) treatment plant, containing various organic materials, toxic elements and pathogens [6]. As surface water is accessible for irrigation in the study area, it is highly polluted with waste effluents and groundwater is the most utilized source in the area. A majority of the farmers own both dug wells and borewells for irrigating various crops [5].

In recent years, pollution of groundwater in the Vrishabhavathi locality has emerged as a severe environmental issue, constraining its use drastically. What is very alarming, is the massive deterioration of the water quality, with every passing day due to huge amounts of pollutants from all three major sources of water pollution [7]. In this context, the present study which aims at assessing the present pollution levels sewage and groundwater and making a comparison with similar studies carried out by the various researchers, focusing on the drastic deterioration of quality in

Table 1. *Sampling locations alongwith geo-coordinate*

Sampling location	Sample	Geo-coordinates	
		Latitude	Longitude
Nagarabhavi	Sewage 1	12°57′29.1"N	77°30′42.4"E
	Borewell 1	12°57′29.3"N	77°30′42.7"E
Kengeri	Sewage 2	12°57′28.1"N	77°30′40.9"E
	Borewell 2	12°54′21.4"N	77°28′44.5"E
Kumbalagodu	Sewage 3	12°54′24.5"N	77°28′44.1"E
	Borewell 3	12°52′19.4"N	77°26′54.2"E

Vrishabhavathi river, assumes great importance. Physico-chemical properties of the water get varied season-wise and in addition, anthropogenic activities, such as agriculture, urbanization, domestic sewage, etc., in the river catchment area result in the deterioration of water quality [8]. Temperature, turbidity, nutrients, hardness, alkalinity and dissolved oxygen are some of the important factors that play a vital role for the growth of living organisms in the water body [9]. Water quality index provides a nominal number that represents overall water quality at a certain location and time based on certain water quality parameters.

2. MATERIAL AND METHOD

2.1 Study area

Greater Bangalore with an area of 741 km^2 lies between the latitudes 12°39′00'' to 13°13′00'' N and longitude 77°22′00'' to 77°52′00'' E. The Vrishabhavathi tributary carries polluted effluents from Peenya and Rajajinagar industrial areas, domestic sewage effluents of both treated and untreated water, directly discharged into it from a large part of city. It also carries industrial effluents alongwith Bangalore-Mysore state highway factories and Bidadi industrial area. The Vrishabhavathi river drains an aerial extent of 545 km^2 before it joins the Suvarnamukhi river at Bhadragundadoddi of Kanakapura taluk, Bangalore district. The summer temperature ranges from 18-38°C, while the winter ranged between 12-26°C [10]. The Vrishabhavathi stretch between Nagarabhavi to Kumblugodu of around 25 km was taken as a study area for the present research project.

2.2 Sample analysis

There are six sampling locations selected based on the proximity to industrial, agriculture and sewage treatment plant. Geo-coordinates, like latitude and longitude were also fixed for all the sampling points (Table 1). Sampling was carried out during post-monsoon 2018 (November and December). Total six sewage and six borewell samples were collected from three different locations each for two times. The pre-cleaned 2 L capacity of plastic cans were used to collect water samples. The sewage samples were collected from the mid of the stream by using rope and bucket on crossing bridge. The 300 mL glass bottles were used to collect a sample for DO and BOD analysis separately. After sampling, all the samples were transported to

Table 2. *Physico-chemical parameters and method of analysis and instrument used for analysis*

Physico-chemical parameters	Method of analysis	Analytical instruments
pH	Electrode	pH meter
Conductivity (EC)	Electrode	Conductivity method
Turbidity	Nephelometric	Nephelometer
Total dissolved solids (TDS)	Electrode	Conductivity method
Total suspended solids (TSS)	Gravimetric	Calculation
Total hardness (TH)	Titrimetric	Titration unit
Calcium hardness	Titrimetric	Titration unit
Magnesium hardness	Titrimetric	Titration unit
Total alkalinity (TA)	Titrimetric	Titration unit
Chloride	Argentometric	Titration unit
Sulphate	Barium chloride	Spectrophotometer
Nitrate	P.D.A	Spectrophotometer
Phosphate	Stannous chloride	Spectrophotometer
Dissolved oxygen (DO)	Wrinkler's	Titration unit
Biological oxygen demand (BOD)	Reflux ion	Titration unit
Chemical oxygen demand (COD)	Reflux ion	Titration unit

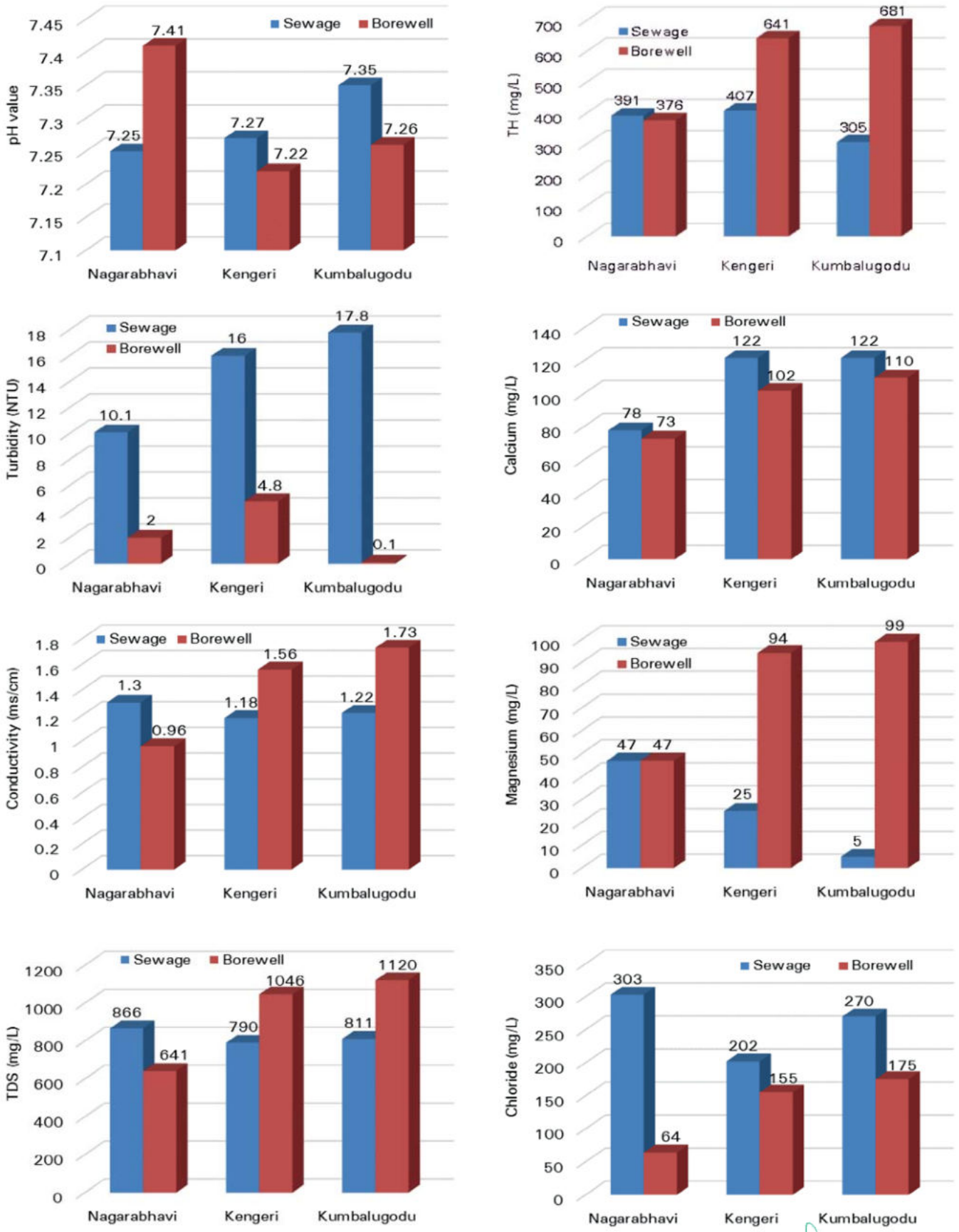

Figure 1. *Bargraphs showing concentration of physico-chemical parameters in sewage and borewell water samples*

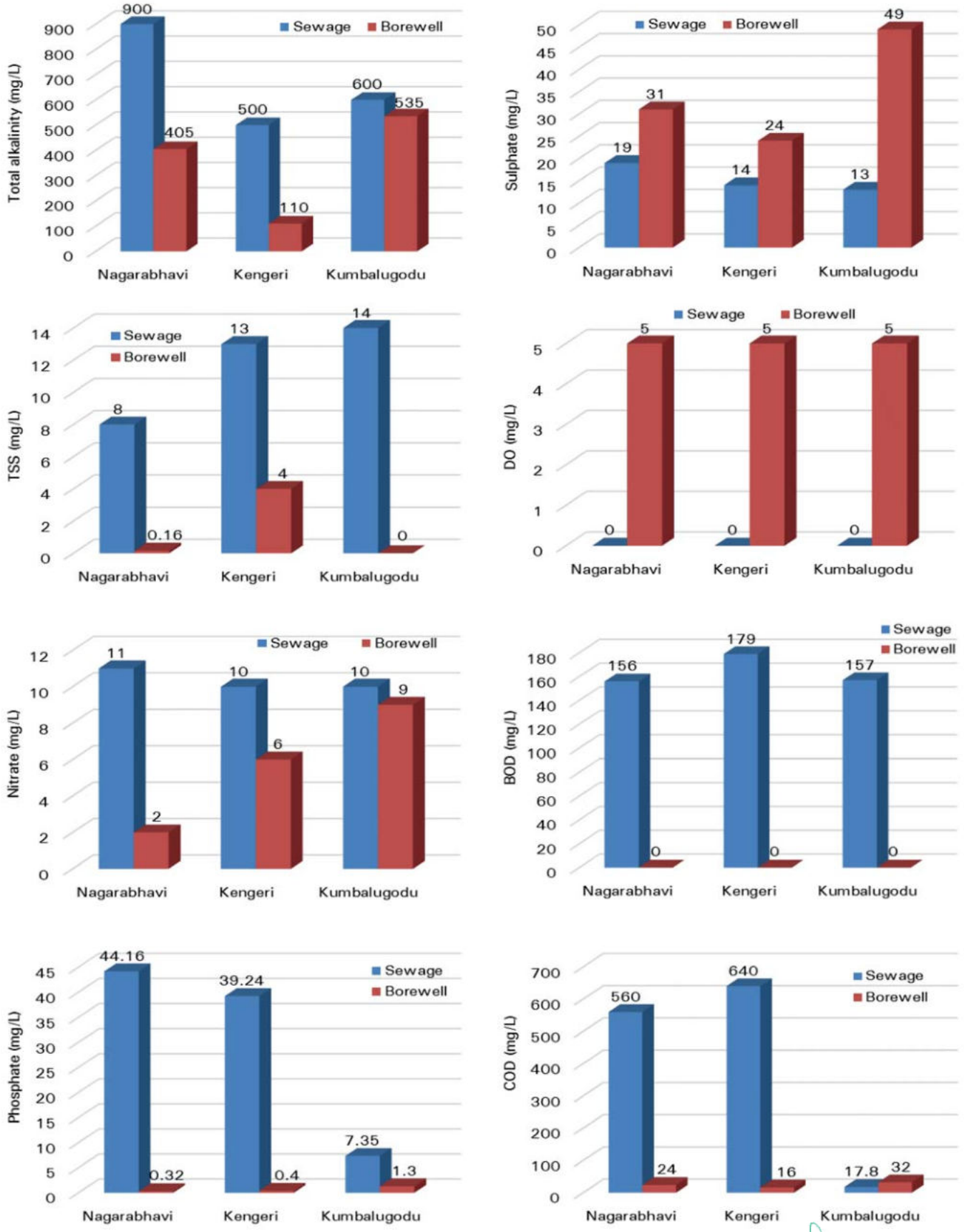

Figure 2. *Bargraphs showing concentration of physico-chemical parameters in sewage and borewell water samples*

Table 3. *Mean concentration of physico-chemical parameter*

Parameter	Sewage 1	Sewage 2	Sewage 3	Borewell 1	Borewell 2	Borewell 3
Turbidity (NTU)	10.1	16.0	17.8	0.2	**4.8**	0.1
pH (units)	7.25	7.27	7.35	7.41	7.22	7.26
EC (mS/cm)	1.30	1.18	1.22	0.96	1.56	1.73
TDS (mg/L)	866	790	811	641	1046	1120
TH (mg/L)	391	407	305	376	641	681
Calcium (mg/L)	78	122	122	73	102	110
Magnesium (mg/L)	47	25	<5	47	94	99
Chloride (mg/L)	303	202	270	64	155	175
TA (mg/L)	900	500	600	405	110	535
Nitrate (mg/L)	11	10	10	<2	6	9
Sulphate (mg/L)	19	14	13	31	24	49
TSS (mg/L)	8	13	14	0.16	4	0
DO (mg/L)	-	-	-	-	-	-
BOD (mg/L)	156	179	157	-	-	-
COD (mg/L)	560	640	17.8	24	16	32
Phosphate (mg/L)	44.16	39.24	7.35	0.32	0.4	1.3

the laboratory immediately for error free analysis. There are around 16 various physico-chemical parameters including pH, temperature, turbidity, electrical conductivity, total dissolved solids, total hardness, calcium hardness, magnesium hardness, total alkalinity, sodium, potassium, sulphates, phosphates, nitrates, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand analysed using standard methods (Table 2) [11]. The analytical results were compared with the Bureau of Indian Standards (BIS) to comprehend the borewell water quality [12].

3. RESULT AND DISCUSSION

3.1 Analytical result

The results obtained from the analysis for sewage and borewell samples are tabulated in table 3. The concentration of all the 16 parameters, which are used to determine water and wastewater quality and also temporal variation was interpreted through a bar graph as shown in figures 1 and 2.

3.1.1 pH: It was recorded faintly alkaline in both the sewage and borewell samples with 7.26 and 7.42, respectively. Normally pH level will be less in colder seasons due to less microbial activity in the water bodies [13].

3.1.2 Turbidity: The concentration ranges between 10.1-17.8 in sewage and 0.1-4.8 in borewell samples. Turbidity is due to clay, silt, organic and inorganic matter and microscopic organisms [9]. Kengeri bore well sample as crossed the drinking water standard limits.

3.1.3 Electrical conductivity and total dissolved solids : Highest concentration recorded for borewell samples than sewage was 1.73 mS/cm and 1120 mg/L and 1.22 mS/cm and 866 mS/cm, respectively. But Nagarabhavi sewage showed slight higher concentration than borewell. Increasing levels of conductivity and cations are the products of decomposition and mineralization of organic materials [14].

3.1.4 Calcium, magnesium and total hardness : The principal hardness causing cations are the divalent calcium, magnesium, strontium, ferrous iron and manganous ions. Total hardness (681 mg/L) and Mg hardness (99 mg/L) recorded maxima for borewell samples, while Ca hardness (122 mg/L) recorded highest for sewage samples. All three types of hardness in groundwater exceeded the permissible limit.

3.1.5 Chloride : It occurs naturally in all types of waters. Sewage samples recorded 202-303 mg/L, while borewell samples showed significant concentration ranges from 64-175 mg/L indicating organic compounds. The high concentration of chlorides is considered to be the indicators of pollution due to organic wastes of animal or industrial origin [15].

3.1.6 Total alkalinity: The maximum concentration found in Nagarabhavi sewage sample (900 mg/L) and decreased with successive sampling stations. In the case of borewell, Nagarabhavi and Kumblugodu samples exceeded the standard limit, that is 200 mg/L.

3.1.7 Nitrate and phosphate: The determination of nitrate and phosphate are important in assessing the potential biological productivity of surface waters. Very significant concentration recorded for nitrates and phosphates both in sewage (11 mg/L and 44 mg/L) and borewell samples (9 mg/L and 1.3 mg/L). Increasing concentration of phosphorus and nitrogen compounds in surface water bodies leads to eutrophication [16]. All three borewell samples exceeded the standard limits.

3.1.8 Sulphate: The sulphate content of natural waters is an important consideration in determining their suitability for public and industrial supplies. It was recorded highest for borewell (24-49 mg/L) than sewage (13-19 mg/L).

3.1.9 Dissolved oxygen, biological oxygen demand and chemical oxygen demand : DO values were found to be zero and higher values for BOD and COD in sewage samples clearly indicating sewage stream has enriched with organic load and harmful inorganic compounds- There is a higher extent of correlation among DO, BOD and COD which decides the health of aquatic body [17].

4. CONCLUSION

Various chemical parameters of the water and wastewater samples showed distinct, spatial variations in the study period. The present study clearly revealing that the Vrishabhavathi river is completely deteriorated in terms of physico-chemical parameters. The non-point sources of water pollutants are playing a major role in augmenting the organic and inorganic load in the sewage stream. The borewell water also declining at an alarming rate and might affect the users in the catchment area significantly. The existing government sewage treatment plants to be run efficiently to curb further worsening of the stream water quality. Irrigation water quality for the downstream stretch of the Vrishabhavathi basin should be monitored frequently since sewage and borewell water are used for irrigation.

REFERENCES

1. Faith, Ngwenya. 2006. Water quality trends in the Ecrste river, Western Cape, 1990-2005. A mini thesis submitted in partial fulfillment of the requirements for the degree of Magister Scientiae, Integrated Water Resources Management in the Faculty of Natural Science, University of the Western Cape. pp. 41.
2. Asadi, S.S. 2007. Remote sensing and GIS techniques for evaluation of groundwater quality in Municipal Corporation of Hyderabad (zone-5). *Int. J. Env. Res. Public Health.* 4:4552.
3. Shankar, B.S. and N. Balaubramanya. 2008. Assessment of pollution potential of the groundwater of Vrishabhavathi valley basin in Bangalore, Karnataka. *Indian J. Eng. Sci. and Tech.,* 2:43-48.
4. Shankar, B.S. and Latha Sanjeev. 2008. Assessment of water quality index for the ground waters of an industrial area in Bangalore. *Env. Eng. Sci.,* 25:911-915.
5. Jayadev and E.T. Puttaiah. 2013. Studies on heavy metals contamination in Vrishabhavathi river water and groundwater of the surrounding river. *Int. J. Scientific and Eng. Res.,* 4:2229-5518.
6. Praveen. 2005. Drinking water in urban areas : Why and how is it getting worse? Drinking water supply of IWWI-Tata partners meet. Anand. Proceedings, pp 24-26.
7. Shankar, B.S., N. Balasubramanya and M.T. Marutheesha Reddy. 2008. Hydrological assessment of the pollutants in ground waters of Vrishabhavathi valley basin in Bangalore. *J. Env. Sci. and Eng.,* 50:97-102.
8. Ahipahty, M.V. and E.T. Puttaiah. 2006. Ecological characteristics of Vrishabhavathi river in Bangalore. *Env. Geology.* 49:1217-1222.
9. Venkatesha Raju, K., R.K. Somashekar and K.L. Prakash. 2010. Study of seasonal and spatial variation in surface water quality of Cauvery river stretch in Karnataka. *J. Eco., The Nat. Env.,* 2:001-009.
10. BWSSB. 2006. Handbook of statistics. Bangalore Water Supply and Sewerage Board. pp 103.
11. APHA. 2015. Standard methods for the examination of water and wastewater (16th edn). American Public Health Association, Washington, D.C.
12. BIS. 2012. Indian standard drinking water specification. IS:10500. Bureau of Indian standards, New Delhi.
13. Chetana, S.A. and R.K. Somasekhar. 1997. Ecological study on the riverine ecosystem of Karnataka. I. Physico-chemical characteristics of river Cauvery. *J. Env. Poll.,* 4:57-63.
14. Abida, B. and Harikrishna. 2008. Study on the quality of water in some streams of Cauvery river. *E-J. Chemistry.* 5:377-384.
15. Rajkumar, S., *et al.* 2004. Water quality of Kodaikanal lake Tamil Nadu in relation to physico-chemical and bacteriological characteristics. Capital Publishing Company. pp 339-346.
16. Singh, K.P., *et al.* 2004. Impact assessment of treated/untreated wastewater toxicants discharged by sewage treatment plants on health, agricultural and environmental quality in the wastewater disposal area. *Chemosphere.* 55:227-255.
17. King, J.M., *et al.* 2003. River rehabilitation literature review : Case studies and emerging principles. WRC report no.1161/1/03.