

**CSIBER TRUST'S**  
**College of Non-Conventional**  
**Vocational Courses for Women**  
**(CNCVCW)**  
**GREEN INITIATIVE REPORT**  
**2016-17 TO 2020-21**



**Certified by**  
**Er. D.S. Mali**  
**Head of Department,**  
**Dept. of Environment Management,**  
**CSIBER, Kolhapur**

**June, 2022**



Website: [www.cncvcw.edu.in](http://www.cncvcw.edu.in)

Ph.No.:(0231) 2535405

CHH.SHAHU INSTITUTE OF BUSINESS EDUCATION & RESEARCH TRUST'S  
**COLLEGE OF NON-CONVENTIONAL VOCATIONAL COURSES FOR WOMEN**

Affiliated to Shivaji University, Kolhapur, Maharashtra, India

University Road, Kolhapur – 416 004

Accredited by NAAC with B Grade (3<sup>rd</sup> Cycle)

Dr. R. A. SHINDE

Secretary & Managing Trustee

Ref. No. CNCVCW/2021-22/

Date: 17/06/2022

### Certificate

This is to certify that Green Initiative Report for the academic year 2016-17 to 2020-21 of the “College of Non-Conventional Vocational Courses for Women (CNCVCW), Kolhapur” has been prepared by us based on the document submitted by College of Non-Conventional Vocational Courses for Women (CNCVCW), Kolhapur.

Prepared by,

Ms. Anagha A. Raut  
(M.Sc. Env't. Science SET)  
Dept. Of Environment Science,  
College of Non-Conventional  
Vocational courses for Women,  
Kolhapur

Ms. Sayali A. Chavan  
(M.Sc. Env't. Science SET)  
Dept. Of Environment Science,  
College of Non-Conventional  
Vocational courses for Women  
Kolhapur

Ms. Pooja S. Sarolkar  
(M.Sc. Env't. Science & Safety)  
Dept. Of Environment Science,  
College of Non-Conventional  
Vocational courses for Women  
Kolhapur

Certified by

Er. D.S. Mali  
Head of Department,  
Dept. of Environment Management,  
CSIBER, Kolhapur

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**GREEN INITIATIVE REPORT  
FOR THE YEAR 2016-17 TO 2020-21**

**CSIBER TRUST'S**

**College of Non-Conventional Vocational Courses for Women (CNCVCW)**

**1.0 PREAMBLE:** Increase in world population, increase in economic activities in the past few decades, enormous advancement in science & technology & globalization are leading to change in the ecosystem. Apart from these 'controllable factors, viz. earthquakes, floods, tsunamis, volcanic eruptions, wildfire, hurricanes etc. are creating severe impact on the earth's eco system. Of these controllable & uncontrollable factors cause an undesirable change in the physical, chemical & biological characteristics of the eco- system, especially air, water, land etc. These, in turn adversely affect the human population, wild life, historical & cultural assets.

There is an increasing awareness among the people, the management and workers of companies and the government and other authorities the world over and also in India, of the adverse impact caused due to degradation of the environment with air, water and solid pollution, noise pollution and destruction of natural resources and bio-spheres. The effects are very apparent having profound impact in industrial belts, urban areas, rural areas, forest and virgin lands and open oceans. In many places the health and well being and the very survival of living beings-animals, fishes, plants and humans has been threatened. The problem has reached such astronomical proportions that ultimately all the nations of the world have come together, keeping aside their differences of opinion, divergent viewpoints & conflicting interests and met at the Earth Summit 1992 at Rio de Janeiro in Brazil.

**'Green Auditing' – Conceptual Frame Work**

'Sustainable use' as per section 2 (0) of the Biological Diversity Act, 2002, means 'the use of components of biological diversity in such manner and at such rate that does not lead to the decline of the biological diversity; thereby maintaining its potential to meet the needs & aspirations of present & future generations.

The main emphasis is on 'sustainable use' of the components of ecological diversity. Such sustainable use can be ensured by 'auditing' the use of ecological components. Measuring & accounting these 'components' is a prerequisite to any audit. In fact audit

is underlined as 'regular & systematic review & appraisal of the factors & forces that contribute to realization of the objectives.

Green audit is carried out with the objective of providing comprehensive tool to safeguard the environment by adopting the concept of conservation of natural resources particularly water and energy.

In keeping with the need of the National interest Swatch Bharat, CNCVCW is well aware of the environmental issues and defined its Environmental Policy and Mission.

## **2.0 ENVIRONMENTAL POLICY OF THE INSTITUTE:**

***“CLEAN CAMPUS AND GREEN CAMPUS”.***

## **2.0 ENVIRONMENTAL POLICY OF COLLEGE:**

**“Green energy a step towards sustainable development”**

### **Environmental mission:**

1. Creating awareness among students and teachers in terms of plastic free campus, energy conservation, rain water harvesting and environmental and social outreach programmes.
2. College seeks to reduce consumption of resources, reuse where ever possible and recycle the same.
3. Implementation of proper principles of solid waste management and reduction of environmental pollution.



### **3.0. COLLEGE PROFILE:**

The institute has been named after Rajarshi Shahu Maharaj of Kolhapur, who was known for love and affection for the lowest and loneliest of his subjects. He was instrumental in spreading education and message of equality amongst the people in the beginning of the 20th century.

Imparting management education in the Shivaji University commenced in the late sixties with a provision for very limited years. However, the demand for management and social work education was large and growing continuously. With a view to cater to the needs of this growing demand, Prof. Dr. A. D. Shinde, the renowned chartered accountant and former dean of the faculty of commerce and management, Shivaji university, Kolhapur, established this institute: Chhatrapati Shahu Institute of Business Education and Research (CSIBER) in July 1976 with active support of the Chief Minister of Maharashtra Honourable (late) Shri Vasantraodada Patil and Honourable (late) ShriShripatraoji Bondre.

#### **Vision:**

- To promote equal opportunities in higher education for women student community.
- To educate & prepare girls, student community for vocational & professional excellence to face the need of changing economic condition & business policies of the government.

#### **Mission statements:**

- Adopting variety of modern pedagogues.
- Prepare women student academically.
- Facilitate women in understanding, developing interaction and applying core and specialized concepts and practices.
- Update women in a different vocations and professions to face the future challenges of market by providing them laboratory and field practical training.

**GOALS:**

- Promoting sense of belongingness, confidence and fulfil the expectations of women community and society at large.
- Imparting high quality value-based career-oriented education to women students and encouraging to them self-employment.
- Developing a systematic approach in solving the problems at specific and universal context. Encouraging on team spirit and team work

### 3.1.COLLEGE ORGANOGRAM:

College of Non-Conventional Vocational Courses for Women,Kolhapur.

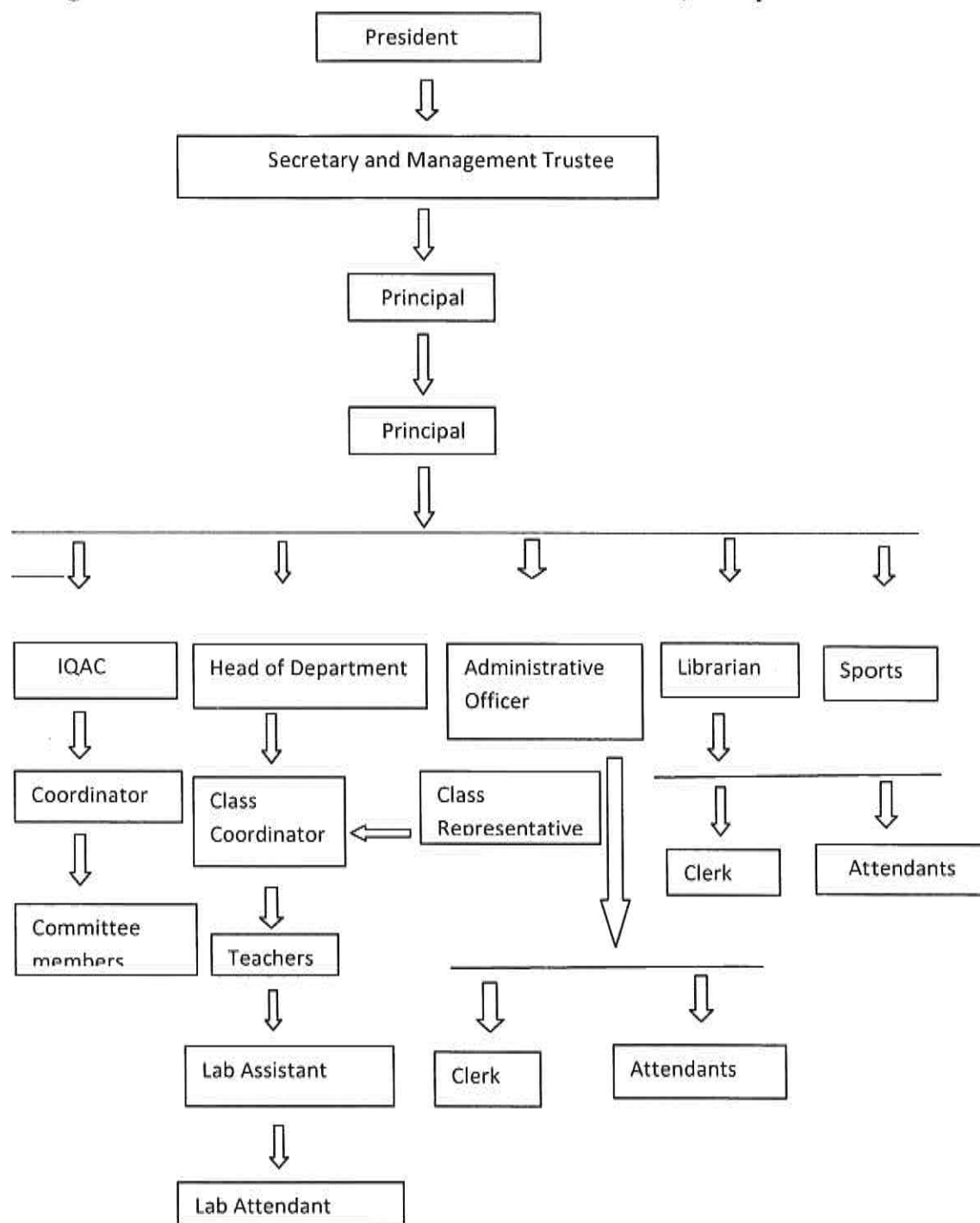


Fig. 1 -Organogram of the college

**3.2.NAME AND ADDRESS OF COLLEGE:**

|                         |                                                                     |
|-------------------------|---------------------------------------------------------------------|
| <b>Name of college:</b> | College of Non-Conventional Vocational Courses for Women Kolhapur   |
| <b>Address</b>          | CSIBER campus, Shivaji University Road, Kolhapur.<br>( Maharashtra) |
| <b>Pin : 591237</b>     | 416004                                                              |
| <b>Website :</b>        | <a href="http://www.cncvcw.edu.in">www.cncvcw.edu.in</a>            |

| <b>Designation</b> | <b>Name</b>             | <b>Telephone with<br/>STD code</b> | <b>Mobile</b> | <b>Email</b>                                                                             |
|--------------------|-------------------------|------------------------------------|---------------|------------------------------------------------------------------------------------------|
| <b>Principal</b>   | Dr. Anil R.<br>Kulkarni | -                                  | 7588470146    | <a href="mailto:principalcncvcw@siberindia.edu.in">principalcncvcw@siberindia.edu.in</a> |
|                    | Sayali A.<br>Chavan     | -                                  | 9403234296    | <a href="mailto:sayalichavan2015@gmail.com">sayalichavan2015@gmail.com</a>               |
|                    | Anagha A.<br>Raut       | -                                  | 7875931852    | <a href="mailto:anagharaut81@gmail.com">anagharaut81@gmail.com</a>                       |
|                    | Ar. Amarr<br>Mestry     | -                                  | 9860703327    | <a href="mailto:amarmestry@gmail.com">amarmestry@gmail.com</a>                           |

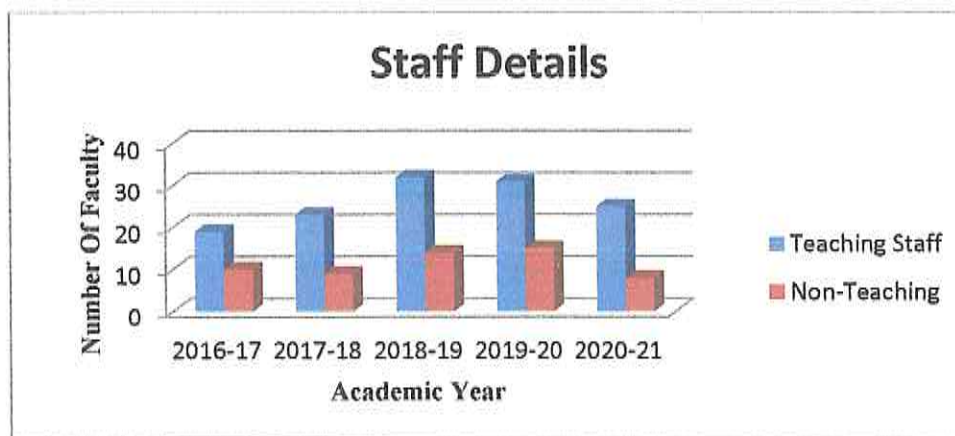
|                                                          |                    |
|----------------------------------------------------------|--------------------|
| <b>Status of the institution:</b>                        | Non – aided        |
| <b>Type of institution:</b>                              |                    |
| <b>a. By gender</b>                                      | Women's            |
| <b>b. By shift</b>                                       | -                  |
| <b>Sources of funding:</b>                               | Self-Supportive    |
| <b>a. Date of establishment of the college:</b>          | 1994               |
| <b>b. University to which the college is affiliated:</b> | Shivaji University |
| <b>c. Details of UGC recognition:</b>                    |                    |
| <b>Under section</b>                                     |                    |
| <b>i) 2 (f)</b>                                          | -                  |
| <b>ii) 12 (f)</b>                                        | -                  |

### **3.3.COURSE OFFERED BY COLLEGE:**

| Sr. No. | Programme level       | Name of programme                                |
|---------|-----------------------|--------------------------------------------------|
| 1       | Undergraduate         | B.Sc. (FTM)                                      |
| 2       | Undergraduate         | B.A. (DMFC)                                      |
| 3       | Undergraduate         | BID                                              |
| 4       | Undergraduate         | B.Com. Bank Management                           |
| 5       | Undergraduate         | B.Com. Business Management                       |
| 6       | Undergraduate         | B.Sc. Environment Science                        |
| 7       | Undergraduate         | B.A. (Multimedia)                                |
| 8       | Post-Graduate Diploma | Post Graduate Diploma in Nutrition and Dietetics |
| 9       | Post-Graduate         | M.Sc. ( Food Science & Nutrition )               |

### **3.4.Details of Teaching and Non-Teaching Faculty –**

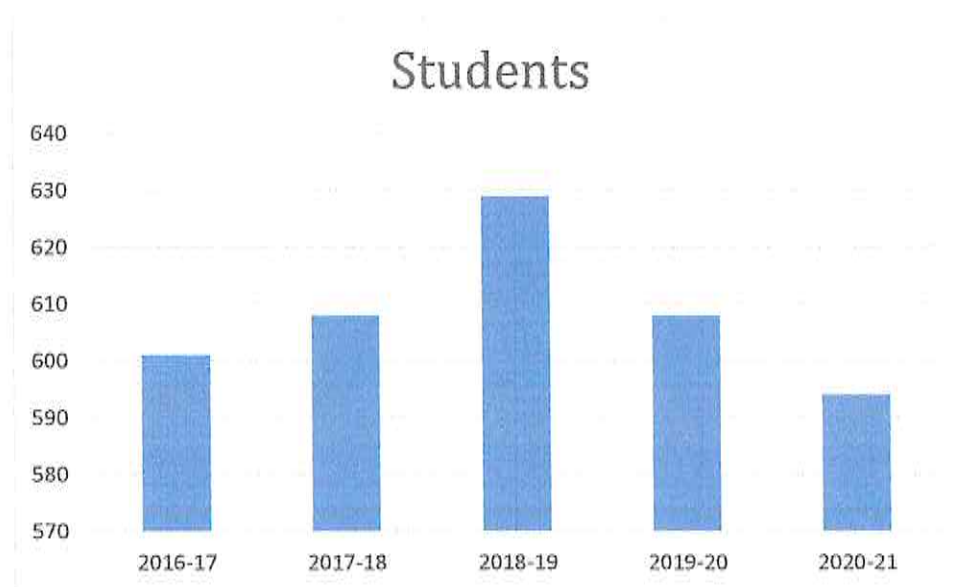
| Year    | Teaching Staff | Non-Teaching | Total |
|---------|----------------|--------------|-------|
| 2016-17 | 19             | 10           | 29    |
| 2017-18 | 23             | 9            | 32    |
| 2018-19 | 32             | 14           | 46    |
| 2019-20 | 31             | 15           | 46    |
| 2020-21 | 25             | 8            | 33    |



**Fig 2: Graphical representation of Staff details for 2016-17 to 2020-21**

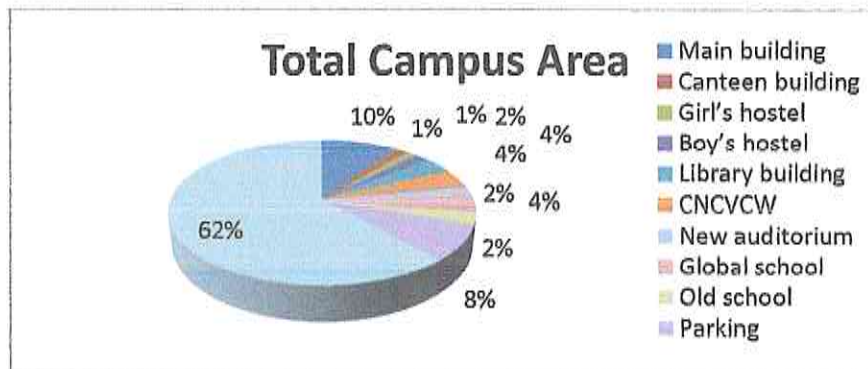
### 3.5. Details of Students:

| Year         | Students    |
|--------------|-------------|
| 2016-17      | 601         |
| 2017-18      | 608         |
| 2018-19      | 629         |
| 2019-20      | 608         |
| 2020-21      | 594         |
| <b>Total</b> | <b>3040</b> |



**Fig 3: Graphical representation of Students details for 2016-17 to 2020-21**





**Fig 4: Graphical representation of Geographical details of the college area**

| Boundary pillar (BP) | Latitude (N) | Longitude (E) | Elevation (m) MSL |
|----------------------|--------------|---------------|-------------------|
| 1                    | 16.68        | 74.25         | 588.24            |
| 2                    | 16.68        | 74.25         | 588.24            |
| 3                    | 16.68        | 74.25         | 588.24            |
| 4                    | 16.68        | 74.25         | 588.24            |



**Fig 5 :Location of the college area is shown on Google Earth Map**



Thinking about carbon footprints is a simple way of thinking about ways to reduce environmental pollution. By reducing our carbon footprints, each one of us can contribute to making the earth a safer, better place to live.



**Fig 5 : Solar Panel**

Considering the growing energy demand from various sectors our college has decided to go for use of nonconventional energy resources for all its internal consumptions by installing roof top solar panels.

For the last five years, energy usage, our annual requirement is about 16824 units. We have installed 46 numbers of solar panels with the install capacity of 20kw with capital cost of Rs. 547676/- in the month of November 2018. Solar system has given excellent results which have generated 37372 units of solar energy for November 2018 to July 2020. On an average the system generates about 50 units of energy per day. That is about 18000 units per year against our requirement of 16825 units. Thus making collegeself-sufficient to export the surplus energy to national grid.

Generation of solar energy has given number of environmental benefits in terms of offsetting green house gases. Such as solar energy generated is equivalent to creation of 41.6 hectare of forest land, saves 482278 kg of carbon dioxide which reduces pollution made by 6 passenger cars emitting carbon dioxide, over 106.32 hours. Reduction of 236.64 kg of nitrous oxide which is equivalent to requirement of power to 2094 computer for a year. And also reduces 1393 kg of sulphur oxide which equivalent to emission of carbon dioxide by TV over 103005 hours.

#### **4.2.3.: Plantation:**

- In order to create awareness among students, plantation is carried out from time to time. The environment department of college is taking continuous efforts to increase the green cover in college campus.
- Plantation consists of different types of shady and flowering trees.
- Ornamental plants are planted in soil pots, which are placed in corridors.
- Proper care of all these plants is taken by gardener.

**Table no. 5 List of plants in college campus**

| Sr. No. | Name of plant | Number of plants |
|---------|---------------|------------------|
| 1       | Spider lily   | 50               |
| 2       | Zebrine       | 50               |
| 3       | Heliconia     | 100              |
| 4       | Ixora         | 200              |
| 5       | Blue lotus    | 1                |
| 6       | Plumeria      | 6                |
| 7       | Palm          | 20               |
| Total   |               | 427              |

#### **4.2.4. Water Management:**

Demand Analysis of water requirement: Residential based population on the campus and off the campus is given table No.10

**Table no 6: college Strength**

| Year    | Students | Teaching staff | Non-Teaching staff | Total |
|---------|----------|----------------|--------------------|-------|
| 2016-17 | 601      | 16             | 10                 | 627   |
| 2017-18 | 608      | 23             | 9                  | 640   |
| 2018-19 | 629      | 32             | 14                 | 675   |
| 2019-20 | 608      | 31             | 15                 | 654   |
| 2020-21 | 594      | 25             | 8                  | 627   |

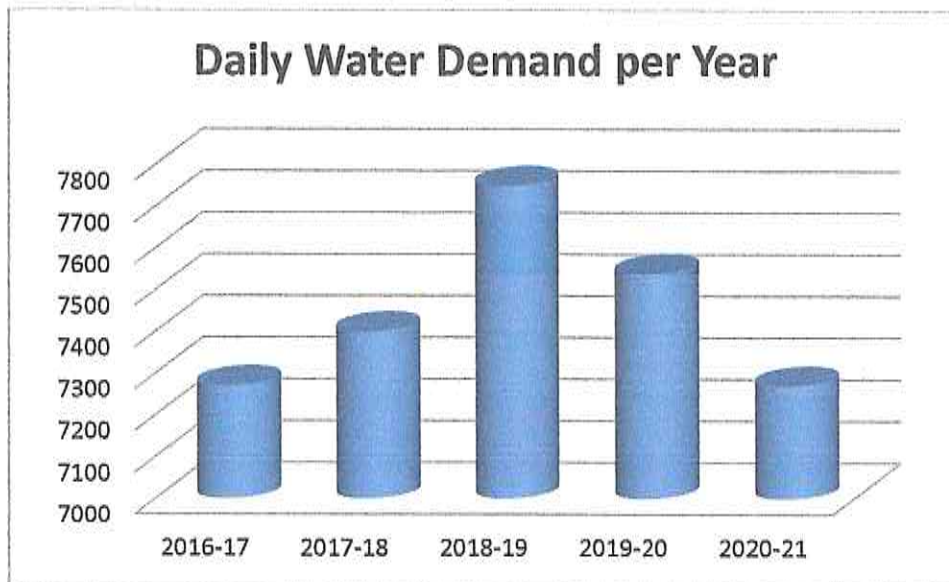
#### **4.2.4.1 Water Demand Analysis:**

Water demand for people on campus for duration of maximum 7 hrs is calculated at the rate of 10 liters / person for last 5 years.

**Table No.7: Water Demand Analysis**

| Year    | People on campus | Water demand | Total person per day( lit) | Water for plantation | Total requirement per day(lit) |
|---------|------------------|--------------|----------------------------|----------------------|--------------------------------|
| 2016-17 | 627              | @10 l/d      | 6270                       | 1000 lit/day         | 7270                           |
| 2017-18 | 640              | @10 l/d      | 6400                       | 1000 lit/day         | 7400                           |
| 2018-19 | 675              | @10 l/d      | 6750                       | 1000 lit/day         | 7750                           |
| 2019-20 | 654              | @10 l/d      | 6540                       | 1000 lit/day         | 7540                           |
| 2020-21 | 627              | @10 l/d      | 6270                       | 1000 lit/day         | 7270                           |
| Average |                  |              |                            |                      | 7446                           |





**Fig 7: Graphical Representation of Water demand in campus**

On an average requirement of water per day would be 7446 lit/d for the last 5 years. The highest water demand was in year 2018-19 that is 7750lit/d for 675 peoples.

This demand is met through supply of water from a bore well, which can yield water throughout the year.

The water demand is fulfilled from two main sources:

Local water supply body: 3000lit/day

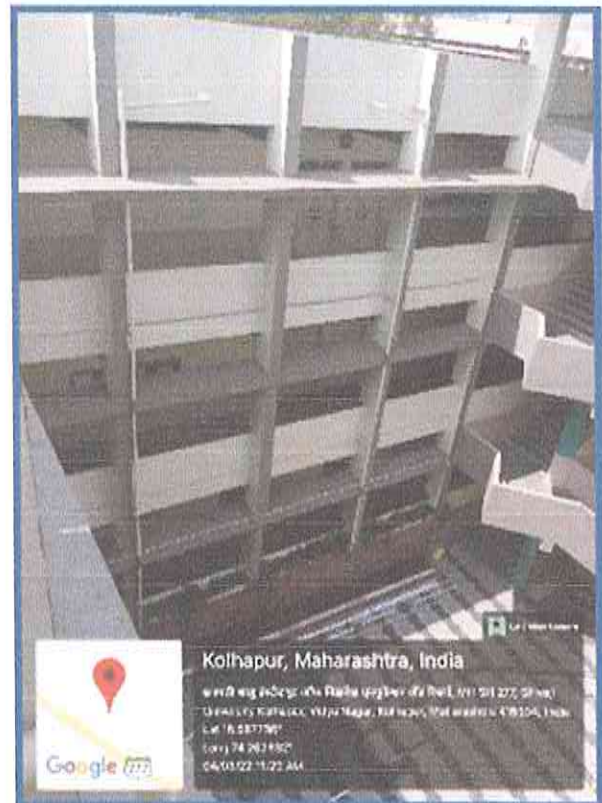
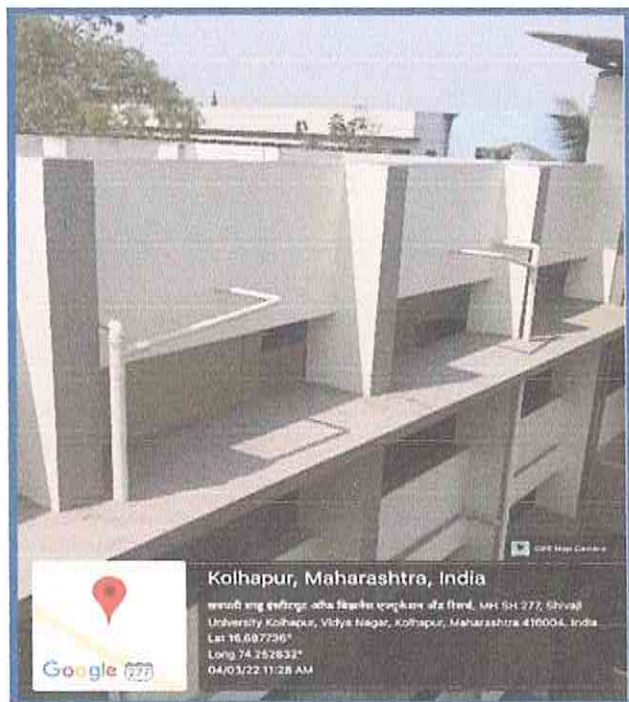
Bore well: 4000-5000 lit/day



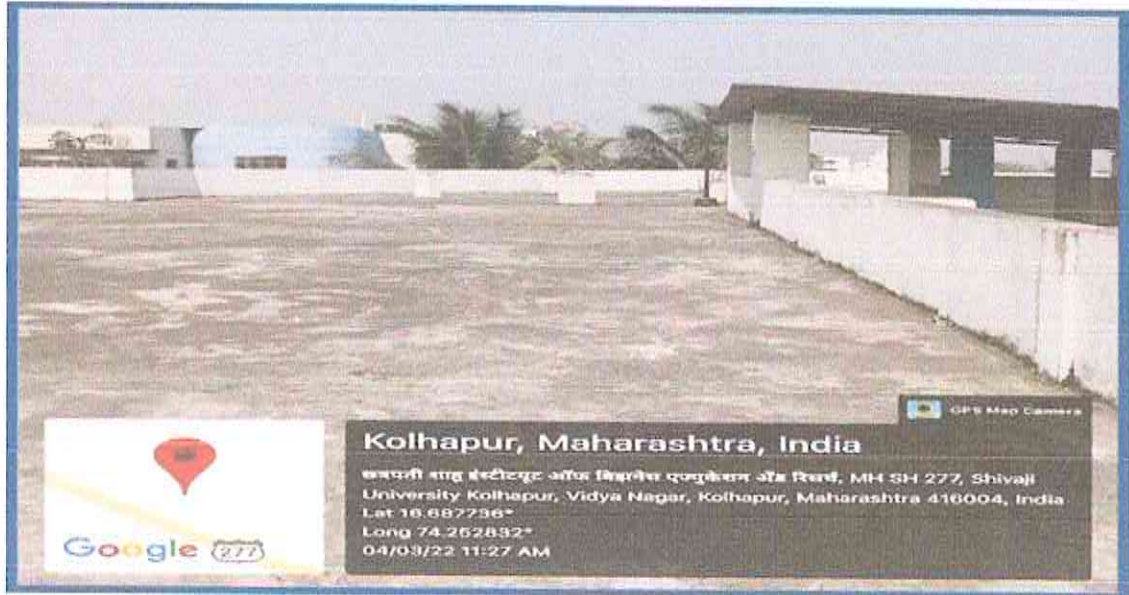
#### 4.2.1.2 Rain water harvesting:

Rain water collected from the roof of the building is connected through pipeline to the bore well. This recharges existing water table level. Thereby reduces surface runoff and enhances in filtration.

Layout system of the rain water harvesting is shown in following photographs







## TREATMENT METHODOLOGY:

Sewage from toilets is screened & collected in Aeration tank which is equipped with Jet Aerator. Sewage collected from Library Building is processed by Activated sludge process using Jet Aerator. In this process microbial activity will degrade the organic matter in the effluent into minerals & water. Microbial activity will be enhanced by using organic culture in aeration tank. This will help in reduction of all the effluent parameters like BOD, COD, Suspended Solids etc. to enable us to reuse this water selectively. The treated water parameters are far better than effluent parameters specified by MPCB.

The stages of treatment are as follows,

1. Aeration Tank will be 2.4m in height to reduce space and also to optimize diffused aeration process. Sewage will be aerated by Jet Aerator.
2. After aeration, sewage will be settled in a settling tank provided with sludge pumps.
3. Overflow from the settling tank will be collected in the Filter Feed tank.
4. Filtered water will be further filtered through a Dual Media Filter & disinfected by UV to obtain clear water for use as gardening purpose.
5. During operation of the plant, after some time, it is necessary to remove sludge from the system. This is achieved by a sludge drying pot provided for this purpose. Dry cake from the drying pot can be used as manure where as clear filtrate is recycled back to plant.

#### TREATMENT PLANT UNITS :

1. 1(One) Bar Screen chamber of 0.5m x 0.5m x 0.5m swd,
2. 1 (One) Jet Aerator of cap. 10 m<sup>3</sup>/hr @ 0.3kg pressure
3. 1 (One) Aeration tank of 2.75m x 1.66m x 2.4m swd,
4. 1 (One) Settling tank of 2.75m x 1.9m x 2.2m swd
5. 1 (One) Sludge pumps 2 m<sup>3</sup>/hr @ 6m head
6. 1 (One) Filter Feed tank of 2.75m x 1.7m x 2.1m swd
7. 2 (Two) Filter feed pumps of 2 m<sup>3</sup>/hr @ 25m head
8. 1 (One) Dual Media Filter of 400mm dia x 1600mm Ht.
9. 1(One) Ultraviolet (UV) System,
10. Set Interconnecting piping for the above system
11. Set Electrical of the plant

#### RAW WASTE QUALITY ASSUMED FOR DESIGN

| Sr. No. | PARAMETER                     | DOMESTIC SEWAGE |
|---------|-------------------------------|-----------------|
| 1       | pH                            | 6 to 8          |
| 2       | Suspended solids              | 150 to 300 mg/l |
| 3       | 5 day's 20 <sup>o</sup> C BOD | 300 to 400 mg/l |
| 4       | C.O.D.                        | 600 to 800 mg/l |
| 5       | Oil and Grease                | 40 to 50 mg/l   |

Note: - All parameters except pH are expressed as mg/l.

#### TREATED EFFLUENT QUALITY

| SR. No. | PARAMETERS                    | Treated Water as per MPCB Standards |
|---------|-------------------------------|-------------------------------------|
| 1       | pH                            | 6 to 8                              |
| 2       | Suspended solids              | <10                                 |
| 3       | 5 day's 20 <sup>o</sup> C BOD | <100                                |
| 4       | C.O.D.                        | <250                                |
| 5       | Oil and Grease                | < 10                                |

Note: - All parameters except pH are expressed as mg/l.



## **SEWAGE TREATMENT PLANT -2 NEAR LADIES HOSTEL**

**Design Flow:** 15m<sup>3</sup>/day

### **DESCRIPTION OF TREATMENT PLANT**

To have eco-friendly & natural treatment, this plant is designed based on the biological treatment concept. This means naturally occurring microbes (which are present in influent water itself) removes or degrade the organic matter present in the influent & at the end clean water is available for the non potable usage or to dispose safely in the drainage or river bodies as per the norms.

#### **• Pre – Treatment**

**Screening:** This is the first units of the plant in which large or floating materials in the influent gets arrested and blockage or choking of the downstream equipments can be avoided. This arrested material will be removed manually and then will be disposed of suitably

**Equalization:** To absorb variation in quantity and quality of influent and to provide uniform flow at the downstream treatment process, a collection or equalization tank is provided. This will avoid shock loading and process upsets of the treatment plant. To avoid settling of suspended solids in this tank continues air agitation is provided. If at site, septic tank is provided then collection tank as well as air agitation is not required.

#### **2. Secondary Treatment Biological Treatment:**

This is the main section of the plant where degradation of organic pollutants with the help of aerobic microorganism takes place. To maintain the aerobic condition in the bioreactor, air supply arrangement is provided by means of aeration equipment which has high oxygen transfer efficiency.

**Tube Settler:** Gravity overflow from the bioreactor is collected in the tube settler tank. In this settling tank, generated sludge from the bioreactor undergoes a gravity settling. Clear supernatant from settling tank will flow by gravity to a chlorine contact tank. To reduce the plan area of settling tank, tube modules are placed in this tank to increase the settling area of the tank. Since this tank is a hopper bottom tank due to which there is no need of sludge scrapping mechanisms.

**Disinfection:** Supernatant from Tube settler, flow by gravity to the chlorine contact tank. To disinfect the harmful bacteria in the treated water as well as to remove the refractory organics from treated water, in this tank hypo chlorite solution is dosed with the help of dosing system.

**Sludge disposal system:** Settled sludge from tube settler will be removed by pumping to the sludge holding tank

### **3. Tertiary treatment:**

Secondary treated water will be further passed through sand media filter followed by activated carbon filter. Filtered water will be collected in the Irrigation water tank from where it will be for desired non potable application. Backwashed water from filters will return back to equalization tank.

#### **Advantages of treatment scheme**

This plant will produce the treated water which can be recycled back.

- This plant is based on biological principle hence no need use of any excessive hazardous chemicals for the main degradation process.
- Due to efficient aeration system, electrical power requirement is very low.
- Due to user friendly equipment, plant maintenance is very less.
- Due to inbuilt automation, plant machinery life is high & ensures trouble free operation all process rotating electromechanical equipment is provided with standby equipment to ensure the uninterrupted operation.
- Due to effective after sales service from our qualified staff, maintenance issues to the owner are less.
- If influent treated & operated properly this effluent treatment plant will give enormous benefits such as
  - It will avoid the water pollution
  - It will help us to give hygienic surrounding
  - After required treatment, treated water can reduce our 60-70 % fresh water requirement, which otherwise we use for toilet flushing, gardening, construction etc. Thus we can save a lot on water expenditure as well as provide us a remedy on present water crises.
  - Being a water recycling & conservation system, commercial establishment gets depreciation benefits for promoting green & eco friendly development.

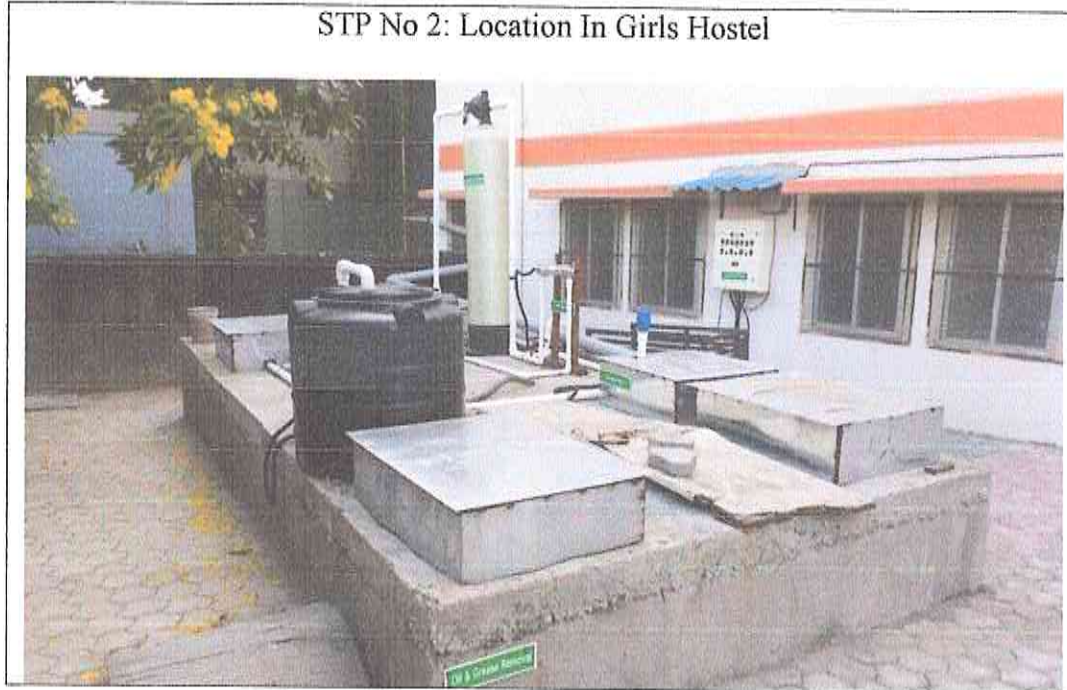
Filtered water will be collected in the Final Collection water tank from where it will be pumped to the Gardening.

Photographs showing STP1 and STP2 is shown below: .

STP No 1: Location near Library



STP No 2: Location In Girls Hostel



#### **4.2.5: Hazardous waste management:**

Hazardous waste management involves reducing the number of hazardous substances produced, treating hazardous wastes to reduce their toxicity, and applying sound engineering controls to reduce or eliminate exposures to these wastes.

Following measures have been taken by college to treat different kind of waste:

- **Laboratory waste:**

- a) Chemical waste is diluted with water and drained in closed pipes.
- b) Acids are stored in glass bottles and it is kept in sand.
- c) The stoppers of the bottles containing chemicals releasing fumes are regularly monitored and always kept closed to avoid any kind of leakage.

- **Other measures for waste reduction:**

- a) College tries to avoid use of non-biodegradable products like plastic plates, cups and glasses in the canteen.
- b) Students are instructed to avoid use of plastic materials.
- c) Dustbins are placed everywhere in college campus to ensure proper disposal of solid waste.
- d) Biodegradable and non-biodegradable wastes are segregated properly.
- e) Reusable glasses and plates are used in college canteen.

#### **4.2.6 Quality of water, air and noise:**

Quality of air: Considering the proximity of the highway, institute has carried out ambient air quality to ensure good quality with respect to Suspended Particulate Matter (56.51 microgram / m<sup>3</sup>), Respirable Particulate Matter (20.21 microgram / m<sup>3</sup>), Oxides of Nitrogen (16.47 microgram / m<sup>3</sup>) and Sulphur Dioxide (3.90 microgram / m<sup>3</sup>). All the parameters are within the permission limit for sensitive areas given by the



Central pollution Control Board, Ministry of Environment and Forests,  
Government of India. Analysis report of ambient air quality is given.

**Table No. 8: Ambient Noise Standards prescribed by Central Pollution Control Board (CPCB), New Delhi**

| Area Code | Category of Area/Zone | Limits in dB(A) Leq*            |                                   |
|-----------|-----------------------|---------------------------------|-----------------------------------|
|           |                       | Day Time<br>(6.00am to 10.00pm) | Night Time<br>(10.00pm to 6.00am) |
| A         | Industrial Area       | 75                              | 70                                |
| B         | Commercial Area       | 65                              | 55                                |
| C         | Residential Area      | 55                              | 45                                |
| D         | Silence Zone          | 50                              | 40                                |

**Note:** Silence Zone is a area comprising not less than 100 meters around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority.

Analysis report of ambient air, Noise and water quality in college campus is given in Annexure I, II and III respectively.

**Other measures taken by college for environmental conservation:**

**Table no. 9: Measures taken by college for environmental conservation**

| Sr. No. | Name of activity             | Date and place                                                                              | Beneficiaries | Outcome                                                                                                       |
|---------|------------------------------|---------------------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------|
| 1.      | 5 <sup>th</sup> June 2018    | Celebration of Environment Day                                                              | 32            | Created awareness regarding Environment                                                                       |
| 2.      | 28 <sup>th</sup> July, 2018  | A wallpaper display on "Dengue- Causes, Prevention & Treatments<br>"Substitute for Plastic" | 400           | Created awareness regarding prevention of Dengue fever & different Substitutes for plastic among the students |
| 3.      | 15 <sup>th</sup> August 2018 | Social Outreach Programme<br>Beat Plastic 2018                                              | 160 students  | Cloth bags made & distributed                                                                                 |

|     |                                                             |                                                                |                                               |                                                                                   |
|-----|-------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|
|     |                                                             |                                                                |                                               | the awareness of Beat Plastic                                                     |
| 4.  | 7 <sup>th</sup> September 2018                              | Lead College workshop on "Green Audit" Dept. of Fashion Design | 53 from other colleges & 157 from our college | Created awareness among the society about green audit which is necessary for NAAC |
| 5.  | 2 <sup>nd</sup> October 2018                                | SwachataAbhiyan Celebration of Gandhi Jayanti                  | All Students                                  | Created awareness regarding Gandhiji's Ideologies                                 |
| 6.  | 21 <sup>st</sup> December 2018                              | Display by 3rd year students Theme – Nature                    | 59                                            | To impart knowledge about various themes of nature                                |
| 7.  | Celebration of world Environment Day                        | 05/06/2019                                                     | All Departments                               | To create Environmental Awareness                                                 |
| 8.  | Ganapati Idol making Workshop and Competition by Mrs. Ahire | 30/08/2019                                                     | All Departments                               | To create environmental awareness                                                 |
| 9.  | Bag Stitching                                               | 18/12/2019                                                     | B.A.(DMFC) Department                         | For International Conference Conduct by: Environment department CSIBER            |
| 10. | Identification of Plants in College Campus                  | 17/02/2021                                                     | Department of Environment Science             | To Identify the plants in campus                                                  |
| 11. | Plastic free Kolhapur                                       | 18/02/2021                                                     | All Departments                               | To create the awareness on harmful effect of plastic on the environment           |

### **5.0: Suggestions for improvement:**

CNCVCW College has already taken various measures for creating environmental awareness among students and staff. Along with these efforts, some more measures can be taken for further improvement in environmental condition:

- Plant medicinal trees.
- Biodegradable waste should be used for composting





CHH. SHAHU INSTITUTE OF BUSINESS EDUCATION & RESEARCH TRUST'S  
COLLEGE OF NON-CONVENTIONAL VOCATIONAL COURSES FOR WOMEN

Affiliated to Shivaji University, Kolhapur, Maharashtra, India

University Road, Kolhapur - 416 004

Accredited by NAAC with B Grade (3<sup>rd</sup> Cycle)

Dr. R. A. SHINDE  
Secretary & Managing Trustee

Ref. No: CNCVCW/2021-22/

Date:

## Air Monitoring Report

Name of the Party : College of Non-Conventional Vocational courses for women,  
University road, Kolhapur 416 004

Monitoring Station : CSIBER campus

Date of Monitoring : 09-03-2021

Monitoring Period : 8:00 am to 8:00 pm

Instrument used : Repairable dust sampler (Envirotech APM 460BL)

Monitoring type/ purpose: Ambient Air Monitoring

| Sr. No. | Parameter                             | Value | CPCB standards (24 hrs.) |
|---------|---------------------------------------|-------|--------------------------|
| 1.      | Suspended particulate matter (SPM)    | 64.50 | 100                      |
| 2.      | Respirable Particulate matter (RSPM)  | 24.86 | 50                       |
| 3.      | Oxides of Nitrogen (NO <sub>x</sub> ) | 19.46 | 30                       |
| 4.      | Sulphur Dioxide (SO <sub>2</sub> )    | 5.02  | 30                       |

Note: All values are in  $\mu\text{g}/\text{m}^3$

Monitoring carried out by

Ms. Pooja S. Sarolakar

Checked by

Ms. Sayali A. Chavan



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Dr. R. A. SHINDE  
Secretary & Managing Trustee

Ref. No: CNCVCW/2021-22/

Date:

## Noise Monitoring Report

Name of the Party : College of Non-Conventional Vocational courses for women,  
University road, Kolhapur 416 004

Monitoring Station : CSIBER campus

Date of Monitoring : 10-03-2021

Monitoring Period : 8:00 am to 8: 00 pm

Instrument used : Sound Level Meter (SLM 100)

Monitoring type/ purpose: Ambient Noise Monitoring

| Sr. No. | Parameter             | Noise in dB(A) |
|---------|-----------------------|----------------|
| 1       | Staff room            | 50.3           |
| 2       | Administrative office | 55.4           |
| 3       | IQAC                  | 42.7           |
| 4       | Corridors             | 54.3           |
| 5       | Reading room          | 45.3           |
| 6       | Library               | 46.5           |
| 7       | Class room (outside)  | 48.5           |
| 8       | Class room (inside)   | 45.6           |
| 9       | Open Space (stage)    | 50.7           |
| 10      | Campus                | 58.2           |
| 11      | Entrance (Near gate)  | 62.2           |
| 12      | Near Boys Hostel      | 50.9           |
| 13      | Near RSEM School      | 45.8           |

Note: Weighted average of 8 hrs monitoring

Monitoring carried out by

Ms. Pooja S. Sarolkar

Checked by

Ms. Sayali A. Chavan



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Dr. R. A. SHINDE  
Secretary & Managing Trustee

Ref. No: CNCVCW/2021-22/

Date:

**WATER ANALYSIS REPORT**

Name of the party: College of vocational and non vocational courses of women, Kolhapur

Nature of sample: Bore well water

Sample analyzed on: 10/03/2021

| Sr.No. | Parameter      | Value  | Highest desirable Limit | Maximum Permissible Limit |
|--------|----------------|--------|-------------------------|---------------------------|
| 1      | pH             | 7.8    | 7.0-8.5                 | 6.5-9.2                   |
| 2      | Total Hardness | 151.59 | 100                     | 500                       |
| 3      | Calcium        | 45.10  | 75                      | -                         |
| 4      | Magnesium      | 10     | 50                      | 150                       |
| 5      | Chloride       | 25     | 200                     | 600                       |
| 6      | MPN/100ml      | 10     | 00                      | 10                        |
| 7      | Sodium         | 5      | 20                      | -                         |
| 8      | Potassium      | 4      | 10                      | -                         |

NOTE: All values unless otherwise stated are in mg/l ; except pH.

MPN: Most Probable Number of coliform bacteria.

REMARK: Water is suitable for domestic use.

Analysed by

  
(Ms. Anagha A. Raut)

Checked by

  
(Ms. Sayali A. Chavan)



**CSIBER TRUST'S**  
**College of Non-Conventional**  
**Vocational Courses for Women**  
**(CNCVCW)**  
**ENERGY AUDIT REPORT**  
**2016-17 TO 2020-21**



**Certified by**  
**Er. D.S. Mali**  
**Head of Department,**  
**Dept. of Environment Management,**  
**CSIBER, Kolhapur**

**June, 2022**



Website: www.cncvcw.edu.in

Ph.No.:(0231) 2535405

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Dr. R. A. SHINDE  
Secretary & Managing Trustee

Ref. No. CNCVCW/2021-22/

Date: 17/06/2022

### Certificate

This is to certify that Energy Report for the academic year 2016-17 to 2020-21 of the “College of Non-Conventional Vocational Courses for Women (CNCVCW), Kolhapur ” has been prepared by us based on the document submitted by College of Non-Conventional Vocational Courses for Women (CNCVCW), Kolhapur.

#### Prepared by,

Ms. Anagha A. Raut  
(M.Sc. Env't. Science SET)  
Dept. Of Environment Science,  
College of Non-Conventional  
Vocational courses for Women,  
Kolhapur

Ms. Sayali A. Chavan  
(M.Sc. Env't. Science SET)  
Dept. Of Environment Science,  
College of Non-Conventional  
Vocational courses for Women  
Kolhapur

Ms. Pooja S. Sarolkar  
(M.Sc. Env't. Science & Safety)  
Dept. Of Environment Science,  
College of Non-Conventional  
Vocational courses for Women  
Kolhapur

#### Certified by

Er. D.S. Mali  
Head of Department,  
Dept. of Environment Management,  
CSIBER, Kolhapur

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# ENERGY AUDIT REPORT

## **1. PREAMBLE:**

Energy sector has played a very important role in development of human race. Various forms of energy are used in industrial as well as domestic sector. Energy resources can be divided mainly into two types i.e., renewable resources and non-renewable resources. The renewable resources of energy mainly include solar energy, wind energy, water energy etc. The non-renewable resources include coal, petroleum, natural gas etc.

Now-a-days, 90 percent of our energy needs are fulfilled by non-renewable resources, which has led to increase in environmental pollution level. The burning of coal leads to release of Sulphur dioxide, which in turn causes acid rain. The carbon dioxide release from various industrial activities has caused significant increase in the level of greenhouse gases, which is main cause of global warming. Along with this, various other major and minor pollutants are environment friendly. More use of renewable energy resources ensures sustainability.

The energy audit mainly focuses on evaluating the use of energy in institutions generated through renewable and non-renewable means of energy and promoting the use of renewable resources for environmental sustainability.

## **2. COLLEGE PROFILE:**

The institute has been named after Rajarshi Shahu Maharaj of Kolhapur, who was known for love and affection for the lowest and loneliest of his subjects. He was instrumental in spreading education and message of equality amongst the people in the beginning of the 20th century.

Imparting management education in the Shivaji University commenced in the late sixties with a provision for very limited years. However, the demand for management and social work education was large and growing continuously. With a view to cater to the needs of this growing demand, Prof. Dr. A. D. Shinde, the renowned chartered accountant and former dean of the faculty of commerce and management, Shivaji university, Kolhapur, established this institute: Chhatrapati Shahu Institute of Business Education and Research (CSIBER) in July 1976 with active support of the Chief Minister of Maharashtra Honourable (late) Shri Vasantrao Dada Patil and Honourable (late) Shri Shripatraoji Bondre.

**Vision:**

- To promote equal opportunities in higher education for women student community.
- To educate & prepare girls, student community for vocational & professional excellence to face the need of changing economic condition & business policies of the government.

**Mission statements:**

1. Creating awareness among students and teachers in terms of plastic free campus, energy conservation, rain water harvesting and environmental and social outreach programmes.
2. College seeks to reduce consumption of resources, reuse where ever possible and recycle the same.
3. Implementation of proper principles of solid waste management and reduction of environmental pollution.
4. Ensure staff and students receive appropriate environmental awareness training

**Goals:**

- Promoting sense of belongingness, confidence and fulfil the expectations of women community and society at large.
- Imparting high quality value-based career-oriented education to women students and encouraging to them self-employment.
- Developing a systematic approach in solving the problems at specific and universal context. Encouraging on team spirit and team work

### COLLEGE ORGANOGRAM:

College of Non-Conventional Vocational Courses for Women, Kolhapur.

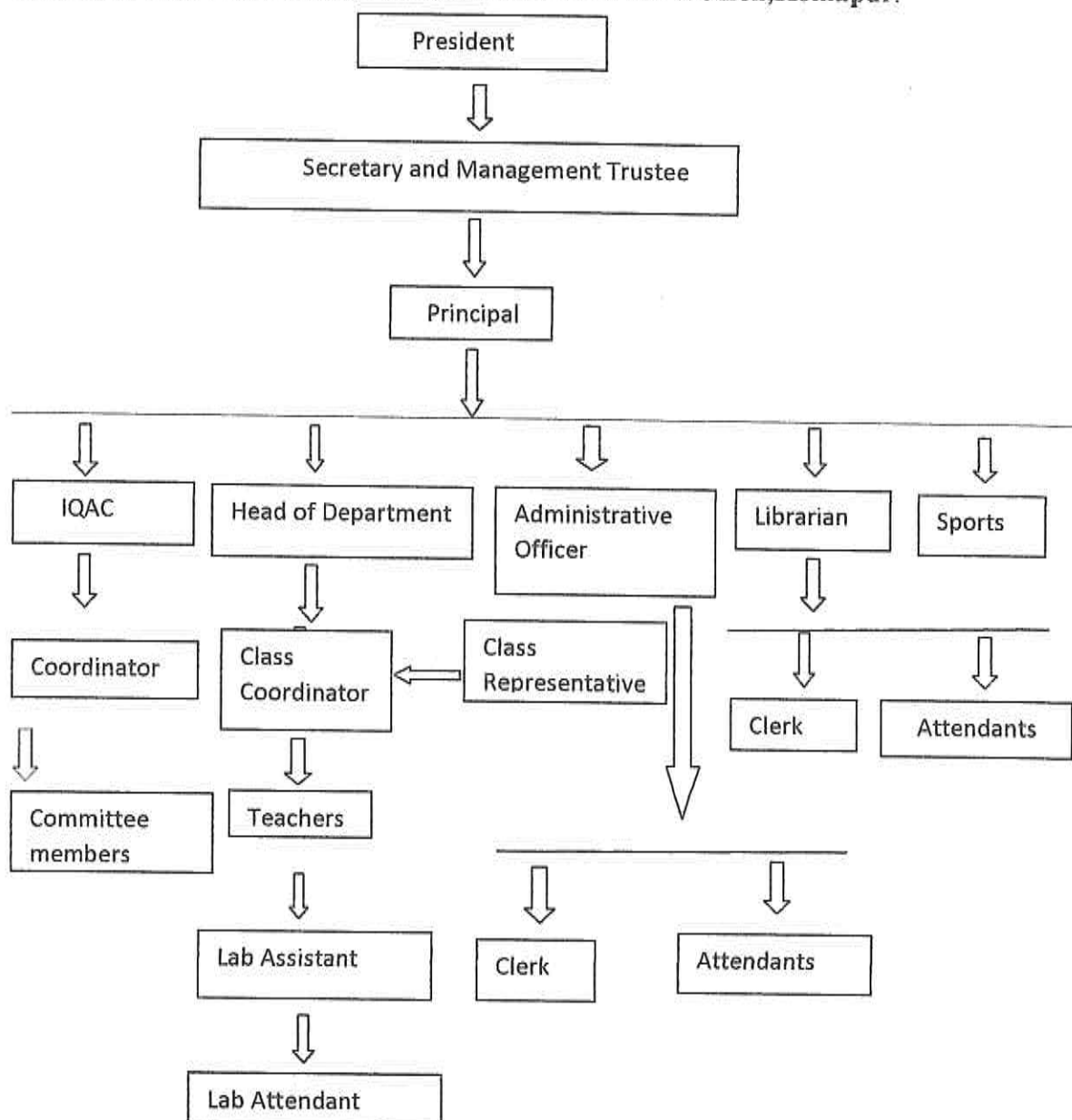


Figure 1: Organogram of the college is given in below

**COURSE OFFERED BY COLLEGE:**

| Sr. No. | Programme level       | Name of programme                                |
|---------|-----------------------|--------------------------------------------------|
| 1       | Undergraduate         | B.Sc. (FTM)                                      |
| 2       | Undergraduate         | B.A. (DMFC)                                      |
| 3       | Undergraduate         | BID                                              |
| 4       | Undergraduate         | B.Com. Bank Management                           |
| 5       | Undergraduate         | B.Com. Business Management                       |
| 6       | Undergraduate         | B.Sc. Environment Science                        |
| 7       | Undergraduate         | B.A. (Multimedia)                                |
| 8       | Post-Graduate Diploma | Post Graduate Diploma in Nutrition and Dietetics |
| 9       | Post-Graduate         | M.Sc. (Food Science & Nutrition)                 |

**NAME AND ADDRESS OF COLLEGE:**

|                         |                                                                   |
|-------------------------|-------------------------------------------------------------------|
| <b>Name of college:</b> | College of Non-Conventional Vocational Courses for Women Kolhapur |
| <b>Address</b>          | CSIBER campus, Shivaji University Road, Kolhapur. (Maharashtra)   |
| <b>Pin: 591237</b>      | 416004                                                            |
| <b>Website:</b>         | <a href="http://www.cncvcw.edu.in">www.cncvcw.edu.in</a>          |

| Designation           | Name                 | Telephone with STD code | Mobile     | Email                                                                                    |
|-----------------------|----------------------|-------------------------|------------|------------------------------------------------------------------------------------------|
| <b>Principal</b>      | Dr. Anil R. Kulkarni | 0231-2535405            | 7588470146 | <a href="mailto:principalcncvcw@siberindia.edu.in">principalcncvcw@siberindia.edu.in</a> |
| <b>Vice Principal</b> | -                    | -                       | -          | -                                                                                        |
|                       | Sayali A. Chavan     | -                       | 9403234296 | <a href="mailto:sayalichavan2015@gmail.com">sayalichavan2015@gmail.com</a>               |
|                       | Anagha A. Raut       | -                       | 7875931852 | <a href="mailto:anagharaut81@gmail.com">anagharaut81@gmail.com</a>                       |
|                       | AmarrMestry          | -                       | 9860703327 | <a href="mailto:amarrmestry@gmail.com">amarrmestry@gmail.com</a>                         |

|                                                   |                    |
|---------------------------------------------------|--------------------|
| Status of the institution:                        | Non – aided        |
| Type of institution:                              |                    |
| a. By gender                                      | Women's            |
| b. By shift                                       | -                  |
| Sources of funding:                               | Self-Supporting    |
| a. Date of establishment of the college:          | 1994               |
| b. University to which the college is affiliated: | Shivaji University |
| c. Details of UGC recognition:                    | -                  |
| Under section                                     |                    |
| i) 2 (f)                                          | -                  |
| ii) 12 (f)                                        | -                  |

**3. ENERGY CONSUMPTION:** Electricity is used for illuminating the rooms, fans, computers, Laboratory equipment, and pumps and for cooling rooms (AC).

**Table No. 1: Number of rooms in the college:**

|    |                           |    |
|----|---------------------------|----|
| 1. | Total number of buildings | 1  |
| 2. | Total number of rooms:    | 22 |
| 3. | Total number of labs:     | 5  |
| 4. | Girl's hostel:            | 2  |
| 5. | Rector bungalow (girls)   | 2  |
| 6. | Seminar halls             | 1  |



### **3.1 ENERGY CONSUMPTION UNITS**

Details of various sources of energy consumption units is given in table no. 2.

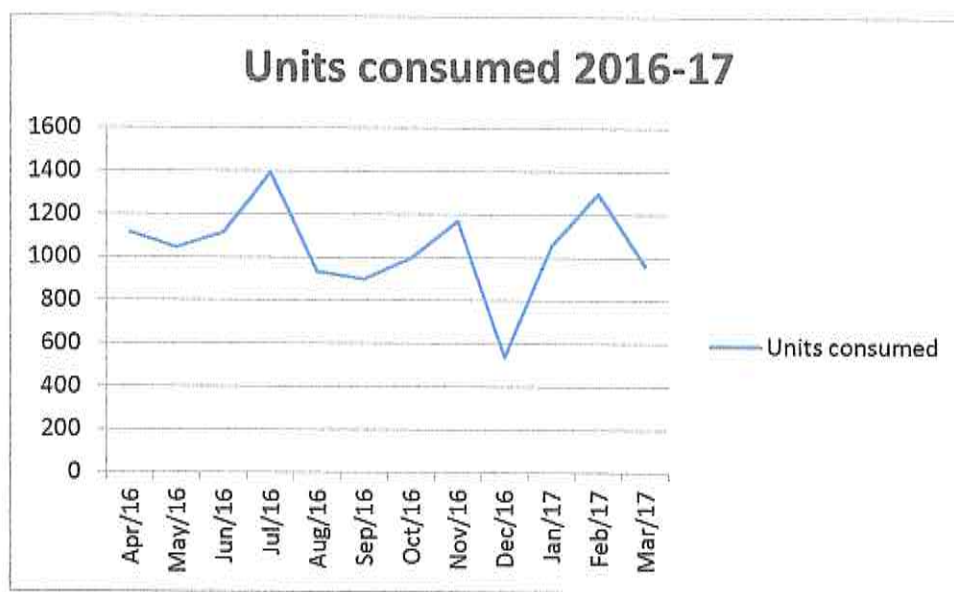
**Table No. 2: Energy consumption units**

|    | <b>Energy sources</b>              | <b>Electricity/generator/solar<br/>lamps</b> |
|----|------------------------------------|----------------------------------------------|
| a. | Moters of 10 HP, 7.5 HP<br>and 1HP | 3                                            |
| b. | UPS                                |                                              |
|    | 10 KV                              | 2                                            |
|    | 7.5 KV                             | 1                                            |
| c. | Batteries                          |                                              |
|    | 75 AMP x 180 V                     | 30                                           |
|    | 40 AMP x 180 v                     | 15                                           |
| d. | Projector                          | 16                                           |
| e. | CC TV                              | 9                                            |
| f. | Display screen                     | 1                                            |
| g. | Tube                               | 160                                          |
| h. | Computer                           | 72                                           |
| i. | Fan                                | 127                                          |
| j. | Attendance machine                 | 1                                            |
| k. | Fridge                             | 2                                            |
| l. | Bulb of 18 v                       | 35                                           |
| m. | Xerox machine                      | 2                                            |
| n. | Printer                            | 5                                            |
| o. | Air conditioner                    | 3                                            |
| p. | Electric sewing machine            | 25                                           |
| q. | Iron press                         | 3                                            |
| r. | Cooler                             | 1                                            |

**Table no.3Details of monthly energy consumption units per year:**

**2016-17**

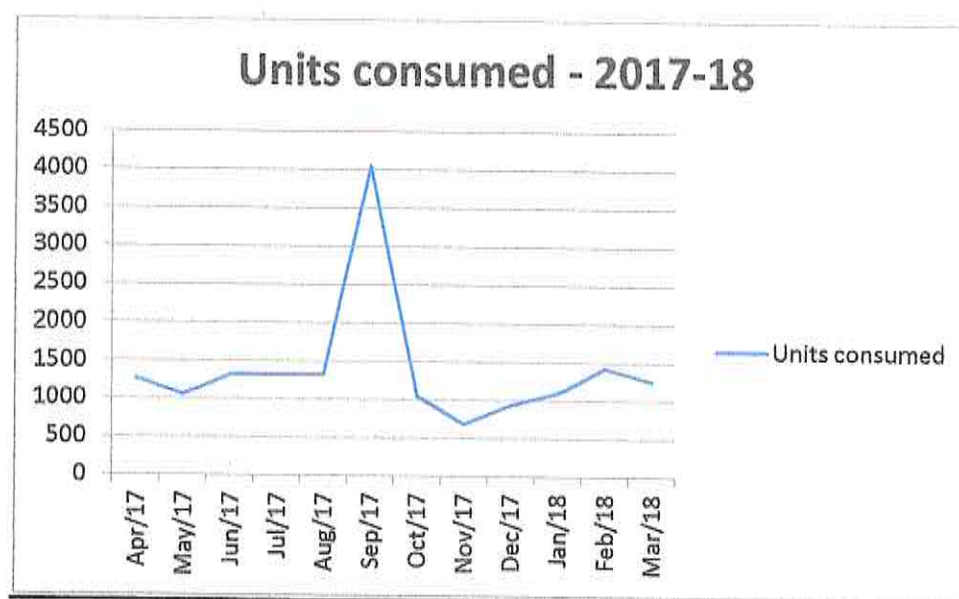
| Month           | Units consumed |
|-----------------|----------------|
| April- 2016     | 1116           |
| May- 2016       | 1046           |
| June- 2016      | 1116           |
| July- 2016      | 1395           |
| August- 2016    | 936            |
| September- 2016 | 901            |
| October- 2016   | 998            |
| November- 2016  | 1169           |
| December- 2016  | 538            |
| January- 2017   | 1055           |
| February- 2017  | 1298           |
| March- 2017     | 964            |
| <b>Total</b>    | <b>12532</b>   |



**Graphical representation of total energy consumption units for 2016-17**

### 2017-18

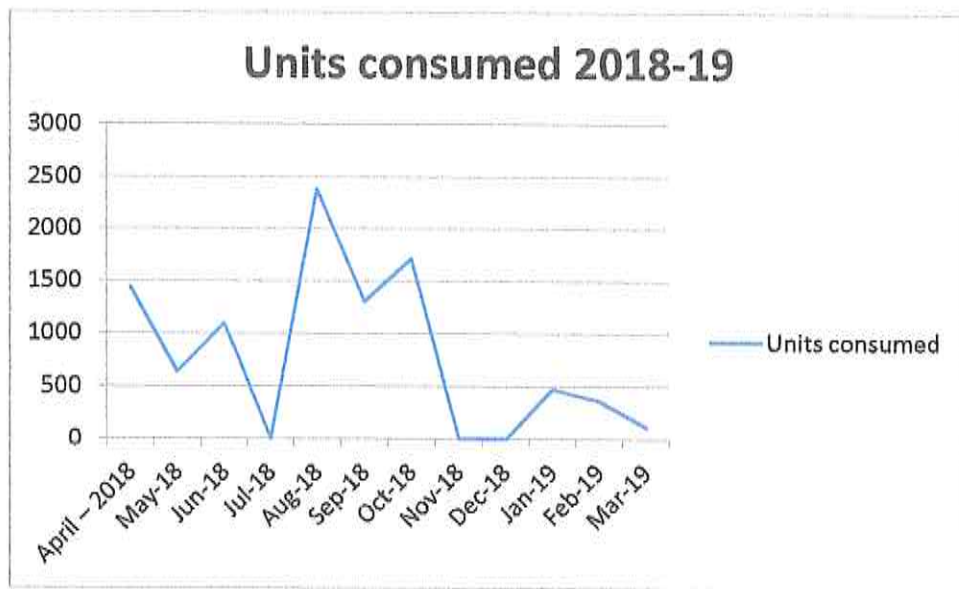
| Month           | Units consumed |
|-----------------|----------------|
| April- 2017     | 1272           |
| May- 2017       | 1058           |
| June- 2017      | 1318           |
| July- 2017      | 1318           |
| August- 2017    | 1318           |
| September- 2017 | 4050           |
| October- 2017   | 1050           |
| November- 2017  | 686            |
| December- 2017  | 937            |
| January- 2018   | 1097           |
| February- 2018  | 1429           |
| March- 2018     | 1261           |
| Total           | 16794          |



**Graphical representation of total energy consumption units for 2017-18**

### 2018-19

| Month           | Units consumed |
|-----------------|----------------|
| April – 2018    | 1441           |
| May- 2018       | 633            |
| June- 2018      | 1100           |
| July- 2018      | 2              |
| August- 2018    | 2382           |
| September- 2018 | 1308           |
| October- 2018   | 1713           |
| November- 2018  | 0              |
| December- 2018  | 0              |
| January- 2019   | 476            |
| February- 2019  | 367            |
| March- 2019     | 115            |
| Total           | 9537           |



**Graphical representation of total energy consumption units for 2018-19**

## 2020-21

| Month           | Units consumed |
|-----------------|----------------|
| April – 2019    | 1916           |
| May- 2019       | 0              |
| June- 2019      | 0              |
| July- 2019      | 1916           |
| August- 2019    | 2519           |
| September- 2019 | 2160           |
| October- 2019   | 2051           |
| November- 2019  | 1739           |
| December- 2019  | 4202           |
| January- 2020   | 5496           |
| February- 2020  | 5137           |
| March- 2020     | 4945           |
| Total           | 32081          |

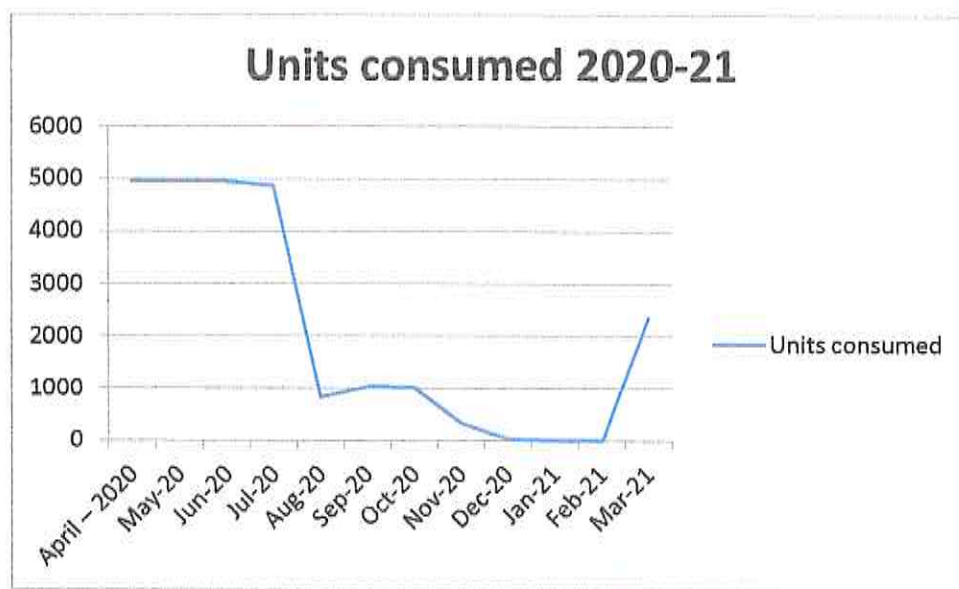


**Graphical representation of total energy consumption units for 2019-20**



### 2020-21

| Month           | Units consumed |
|-----------------|----------------|
| April – 2020    | 4945           |
| May- 2020       | 4945           |
| June- 2020      | 4945           |
| July- 2020      | 4862           |
| August- 2020    | 833            |
| September- 2020 | 1025           |
| October- 2020   | 1004           |
| November- 2020  | 332            |
| December- 2020  | 23             |
| January- 2021   | 0              |
| February- 2021  | 0              |
| March- 2021     | 2363           |
| Total           | 25277          |



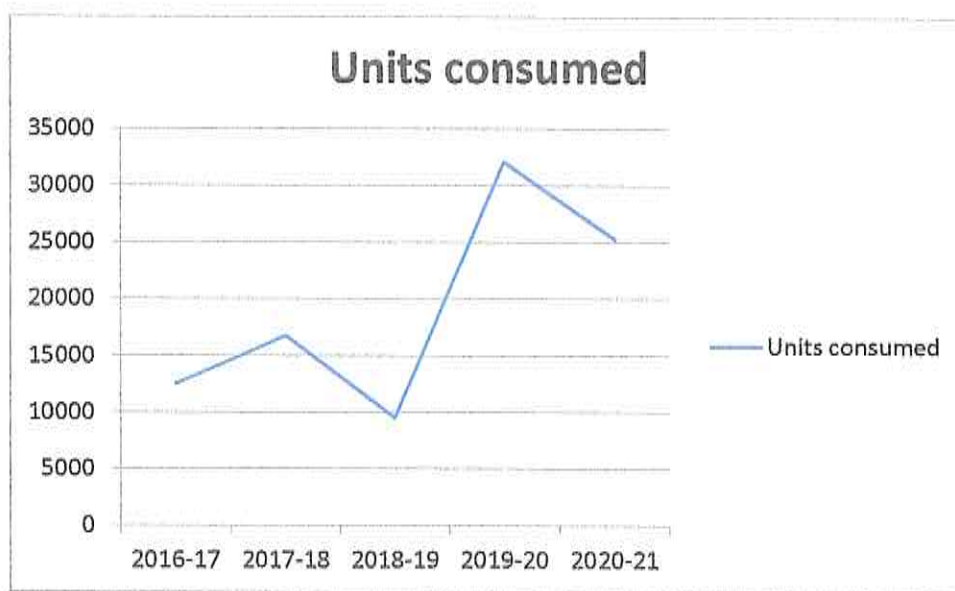
**Graphical representation of total energy consumption units for 2020-21**

### **Total energy consumption units from 2016 to 2021:**

The total energy consumption by the whole college from 2016 to 2021. The graphical representation for all these years is as follows:

| Year    | Units consumed |
|---------|----------------|
| 2016-17 | 12532          |
| 2017-18 | 16794          |
| 2018-19 | 9537           |
| 2019-20 | 32081          |
| 2020-21 | 25277          |

**Table for energy consumption from 2016 to 2021**



**Graphical representation of total energy consumption units from 2016 to 2021**

### **3.2 ENERGY REQUIREMENT:sanctioned load (22 kw)**

Electricity supplied from the Maharashtra State Electricity Board is the main source of energy for the activities on the campus.

Energy conservation measures taken up by the college:

1. Increased use of Compact Fluorescent Lamp and LED bulbs against incandescent bulbs
2. Increased use of UPS against conventional generator
3. Most of the fans carry three-star rating of electrical appliances.
4. College has encouraged use of SMS/e-mail instead of sending notices and faxing documents.
5. Awareness amongst students was carried out and accordingly sign boards are displayed at strategic locations for conservation of energy and students positively responding.
6. College is using flat-screen LCD monitors rather than CRT monitors.

### **3.3: USE OF RENEWABLE ENERGY:**

**1. Use of solar system:** Previously, electricity based hot water geysers were used in the hostel which used to consume huge amount of energy. But then these waters geysers were replaced by solar water heater.

#### **2. Efforts for carbon neutrality:**

Thinking about carbon footprints is a simple way of thinking about ways to reduce environmental pollution. By reducing our carbon footprints, each one of us can contribute to making the earth a safer, better place to live.

#### **3.Efforts for carbon neutrality:**

Thinking about carbon footprints is a simple way of thinking about ways to reduce environmental pollution. By reducing our carbon footprints, each one of us can contribute to making the earth a safer, better place to live



**Solar Panel**

Considering the growing energy demand from various sectors our college has decided to go for use of nonconventional energy resources for all its internal consumptions by installing roof top solar panels.

For the last five years, energy usage, our annual requirement is about 50-65 units. We have installed 46 numbers of solar panels with the install capacity of 20kw with capital cost of Rs. 547676/- in the month of November 2018. Solar system has given excellent results which have generated 37372 units of solar energy for November 2018 to July 2020. On an average the system generates about 50 units of energy per day. That is about 18250- 23725 units per year against our requirement of 16825 units. Thus making college self-sufficient to export the surplus energy to national grid.

Generation of solar energy has given number of environmental benefits in terms of offsetting green house gases. Such as solar energy generated is equivalent to creation of 41.6 hectare of forest land, saves 482278 kg of carbon dioxide which reduces pollution made by 6 passenger cars emitting carbon dioxide, over 106.32 hours. Reduction of 236.64 kg of nitrous oxide which is equivalent to requirement of power to 2094 computer for a year. And also reduces 1393 kg of sulphur oxide which equivalent to emission of carbon dioxide by TV over 103005 hours.

At CNCVCW College carbon footprint for indoor lighting in office building is considered. The performance of the building by using LCD and LED lights is monitored which reduces the building carbon foot print. The carbon foot print is monitored for –

1. Incandescent Light
2. LED Lights



### **3.4: ELECTRICITY**

This electricity is produced by natural gas, coal, petroleum and some other renewable resources. Electricity is produced from different sources. The following table shows the quantity of greenhouse gas released from them:

**Table No. 3: Electricity produced from different sources**

| Source           | Million metric tons of CO <sub>2</sub> emission for 1 year | Electricity generation (Billion kWh) for 1 year |
|------------------|------------------------------------------------------------|-------------------------------------------------|
| Coal             | 1788                                                       | 1882                                            |
| Petroleum        | 106                                                        | 119                                             |
| Natural gas      | 337                                                        | 562                                             |
| Other            | 14                                                         | 22                                              |
| Non fossil fuels | None                                                       | 1106                                            |
| <b>Total</b>     | <b>2245</b>                                                | <b>3691</b>                                     |

A single kilowatt-hour of electricity will generate 619 grams of CO<sub>2</sub> emissions.

Following sources of light are generally used:

#### **1. Compact Fluorescent Light**

Compact Fluorescent Light produce less heat and more visible light compare than incandescent lamp. We can calculate how much CO<sub>2</sub> will be emitted by 14watt incandescent bulb

- Power Consumption- 14 watts
- Operation per day- 10 hours
- Power Consumption per annum-51100 watt
- Electricity per hour (kwh) – 0.014 (1 kWh=619 g CO<sub>2</sub> can be released)
- Lighting Carbon Emission per year/lamp- (51.1\*619g ) - 31.6 kg.



A single 14 watts CFL lamp will generate 31.6 kilograms of CO<sub>2</sub> for every year. The reduction of carbon footprint is none for this lamp. CFL contains harmful mercury which creates mercury emission. Estimated suggestion led lights only will reduce our carbon footprint over than other lights.

## **2. Incandescent Light**

Incandescent lamp is a source of light which produce light when the filament is being heated. It can release 80% electrical energy converted into heat energy. We can calculate how much CO<sub>2</sub> will be emitted by 40-watt incandescent bulb.

- Power Consumption- 40 watts
- Operation per day- 10 hours
- Power Consumption per annum-146000 watt
- Electricity per hour (kwh) - 0.04 (1 kWh=619g CO<sub>2</sub> can be released)
- Lighting Carbon Emission per year/lamp (146\*619g ) -90.3 kg.

A single 40 watts incandescent bulb will generate 90.3 kilograms of CO<sub>2</sub> for every year. The reduction of carbon footprint is none for this lamp.

## **3.LED Lights**

LED lights consumes low power and energy efficient over than other lights. Not even a single point we can't compare led lights with other lighting. We can calculate how much CO<sub>2</sub> will be emitted by 8 watt LED lamp -

- Power Consumption- 8 watts
- Operation per day- 10 hours
- Power Consumption per annum-29200 watt
- Electricity per hour (kwh) – 0.008 (1 kWh=619 g CO<sub>2</sub> can be released)
- Lighting Carbon Emission per year/lamp (29.2 \*619g) - 18 kg.

A building's carbon footprint from led lighting can be reduced by 68%.

- Reduction in Carbon Footprint (tons)-0.122(12.28 kg)

The 8-watt LED equivalent will only be responsible 18 kilograms of CO<sub>2</sub> over the same time span.

**Table No. 4: Carbon foot prints**

|                                             | CFL   | Incandescent bulb | LED light |
|---------------------------------------------|-------|-------------------|-----------|
| Power Consumption(watt)                     | 14    | 40                | 8         |
| Electricity(kwh)                            | 0.014 | 0.04              | 8.008     |
| Hours of Operation Per Day                  | 10    | 10                | 10        |
| Carbon Emissions (tons) per year/lamp       | 0.316 | 0.903             | 0.18      |
| Reduction in Carbon Footprint (tons) / lamp | --    |                   | 0.12      |

- LED light can reduce our carbon footprint by 0.12 tones per year.
- Led light does not contain mercury; it is a big benefit for this lamp.
- CFL contain 3-5mg per bulb which is poisonous. Mercury emission is 1.2mg from power plant using CFL.
- Incandescent, it is 5.8 mg from power plant.

The 8-watt LED equivalent will only be responsible 18 kilograms of CO<sub>2</sub> over the same time span.

Based on above comparisons, LED emerges as the Best option to reduce carbon footprint.

At CNVCW College, all together there are 20class rooms with 35LED

Details of CO<sub>2</sub> emitted from these lights are given in table 05.

**Table No. 5: Details of CO<sub>2</sub> emitted due to bulbs 2016**

| Light                    | No. of bulbs/tubes | CO <sub>2</sub> emitted per 40 watt lamp / year | Total CO <sub>2</sub> emitted per year |
|--------------------------|--------------------|-------------------------------------------------|----------------------------------------|
| Incandescent bulbs/tubes | 195                | 90.3kg                                          | <b>17,605.5 kg</b>                     |

Total carbon emission due to lights in 2016-17 was 17608.5 Kg/year.

**Table No. 6: Details of CO<sub>2</sub> emitted due to tubes**

| Light            | No. of<br>bulbs/tubes | CO <sub>2</sub> emitted per 8-<br>12 watt lamp / year | Total CO <sub>2</sub> emitted<br>per year |
|------------------|-----------------------|-------------------------------------------------------|-------------------------------------------|
| LED bulbs/ tubes | 195                   | 18 kg                                                 | <b>3,510 kg</b>                           |

College has replaced all the high energy consuming bulbs by 8-12 watt of LED bulbs and tubes. This has given emission of 3,510 Kg/year.

Therefore, total carbon emission reduced by the college is

17,608.5 Kg - 3,510 Kg = 1,498.5 Kg/year.

**Table No.7: Total CO<sub>2</sub> emissions:**

| Light            | No. of<br>bulbs/tubes | CO <sub>2</sub> emitted per 8-<br>12 watt lamp / year | Total CO <sub>2</sub> emitted<br>per year |
|------------------|-----------------------|-------------------------------------------------------|-------------------------------------------|
| LED bulbs/ tubes | 195                   | 18 kg                                                 | <b>3,510 kg</b>                           |

### **3.6: Suggestions:**

- Even after installation of Solar Power Pack system, consumption of energy can be saved, so that surplus energy can be sold.
- Unplug unused electronic devices.
- Switch off electronic devices when not in use.
- Use of task lights where ever necessary.