# SUSTAINABLE DEVELOPMENT GOALS 7. AFFORDABLE AND CLEAN ENERGY



# 7.2 University Measures Towards Affordable and Clean Energy





#### 7.2.1 Energy-efficient Building

Name of the Policy/Guidelines	Policy for Energy Efficiency
Short Description	This policy is implemented to ensure that all renovations and new builds at Chennai Institute of Technology, adhere to energy efficiency standards. The policy aims to promote sustainable practices, reduce energy consumption, and minimize the environmental impact of construction and building operations.
Scope	This policy applies to all upgradation/renovations and new construction projects undertaken by Chennai Institute of Technology.
Policy Created on	21-06-2020
Policy Revised on	09-05-2022

#### **Background and Principles**

Chennai Institute of Technology is committed to promoting sustainable practices in all aspects of its operations, including building construction and renovations. Energy efficiency is a key focus area to reduce greenhouse gas emissions and minimize the environmental impact of our facilities. This policy ensures that all renovations and new builds at Chennai Institute of Technology meet energy efficiency standards, contributing to a greener and more sustainable campus.

Energy Efficiency Standards

#### 1. Design and Planning:

a. Regional energy efficiency norms and regulations must be followed for all new construction and renovations.

b. To minimize the need for artificial lighting and excessive air cooling, buildings should be constructed to maximize natural lighting and ventilation.

c. To reduce energy usage, passive design techniques including orientation,





insulation, and shading should be used.

#### 2. Lighting

a. All newly built and remodeled spaces should have energy-efficient lighting solutions, like LEDs.

b. To optimize energy savings, lighting controls such as daylight harvesting and occupancy sensors should be used.

#### 3. HVAC System

a. Energy efficiency requirements should guide the design and installation of heating, ventilation, and air conditioning (HVAC) systems.

b. To guarantee optimum performance and energy savings, HVAC systems should undergo routine maintenance and optimization.

c. To reduce energy waste, technologies for heat exchange and energy recovery should be taken into account.

#### 4. Renewable Energy Integration:

a. Opportunities for integrating renewable energy sources such as solar panels should be explored during renovations and new builds.

b. Feasibility studies and assessments should be conducted to determine the potential for renewable energy generation on-site.

#### 5. Monitoring and Evaluation:

a. Energy performance monitoring systems should be installed in renovated and new buildings to track energy consumption and identify areas for improvement.

b. Regular energy audits and assessments should be conducted by the internal energy audit team to evaluate the effectiveness of energy efficiency measures and identify opportunities for further optimization.



### 7.2.2 Upgrade Building To Higher Energy Efficiency

Chennai Institute of Technology is having the Internal energy auditing and monitoring team, who regularly audit the usage of energy and advise the leadership team where to save energy and how to improve the energy efficiency. They audit three months once (each building once in three months on rotation) and along with the external auditors report, 6 months once suggestions are implemented phase wise.



Flow Chart -Audit Phase Process

#### 1. Sensor based LED lights:

The CFL lights in the existing academic buildings and the hostels are replaced with LED lamps which saves around 60% of energy and some of the labs are upgraded with LED lights with sensors





S.No	Buildings	Qty	Total
1	Auditorium	150	1950
2	Main block	275	3575
3	First year block	25	375
4	Ladies hostel	190	2850
5	Gent's hostel	350	5250
6	Campus street light	90	2160
7	Canteen	10	150
8	Mess hall	50	900
9	HR office	5	60
10	Parents waiting hall	5	45
11	Food waste management plant	8	220
12	Computer science lab	24	250
13	Sports lighting	29	5800
	Total	1211	23585





#### 2. Solar based Water heaters in hostels:

The hostel for both boys and girls were equipped with solar heaters, which saves the power of 1200 units per day.



#### 3. Air-conditioners:

The Air-conditioning system was incorporated in the campus, from the normal 1.5 ton split to 5\* A/C system, which was a power consumed model with more efficiency in less power pack sources.







MODEL	Qty	TON
1.5 Ton Split 5*	75	112.5
2 Ton Split 5*	23	46
Total	98	158.5





#### 7.2.3 Carbon Reduction And Emission Reduction Process

Chennai Institute of Technology taken the following initiatives for reducing the carbon foot print in campus

- 1. Renewable Energy (Solar Panel, Solar Panel, Bio Gas).
- 2. E- Vehicle for internal movement.
- 3. Usage of Bicycle.
- 4. Increase the percentage of paperless office.
- 5. Avoiding usage of single use plastics.

The details of the facilities available/ provided and the evidences are mentioned below

#### 1. Renewable Energy

#### Solar Panel and Water heater

The 300 kWh solar energy system installed on the rooftops of the academic buildings and hostels generates an average of 1,140 kWh of power per day and 35800 kWh per month. This renewable energy for electricity helps to reduce purchased electricity.



#### **Bio-gas**

The institution takes biogas initiative aimed towards reducing waste, generating renewable energy, and promoting sustainable practices on campus, helping to create a greener and more eco-friendly environment. Biogas which generates 22,775 kWh of power per year.







#### Wind Energy

Wind energy promotes environmental awareness and sustainability among students and faculty. Wind turbines can help in reducing energy costs. By using wind, the institution generates 1,247 kWh of power per year.



#### 2. E- Vehicle for internal movement.

The Chennai Institute of Technology uses electric vehicles for passengers transport purpose also for carrying loads, which has led to improved greenhouse gas emissions by reducing reliance on fossil fuels and lowering overall carbon footprints.







#### **EV charging point:**

The institution has installed EV charging stations across campus to support the growing use of electric vehicles. These stations are accessible to both campus vehicles and for personal EVs of students



#### 3. Usage of Bicycle

The institution has introduced a range of transportation initiatives which are designed to promote alternative modes of transport, reduce reliance on personal cars, and foster a more sustainable campus environment.

Free to rent bicycle on campus



Bicycle usage inside the campus





#### 4. Increase the percentage of paperless office

To minimize paper waste and promote digital solutions, the institution has launched a paper reduction initiative that encourages the use of electronic resources and sustainable materials. This program aligns with our broader goal of fostering a more environmentally conscious and resource-efficient campus.



#### 5. Avoiding usage of single use plastics

To support a cleaner, greener campus the institution has rolled out a comprehensive program to significantly reduce plastic waste.







This includes initiatives such as eliminating single-use plastics, promoting reusable alternatives and increasing recycling efforts to minimize plastic pollution which helps to promote more sustainable campus environment.



**Promoting No Plastic in Campus** 





### 7.2.4 Plan to reduce energy consumption

#### Energy efficiency plan in place to reduce overall energy consumption

Chennai Institute of technology has a clear plan to reduce the energy consumption in the campus while constructing / renovating the building and upgraded the necessary facilities to reduce energy usage by the following ways

1. Ventilation (For natural lighting and fresh air circulation)

- 2. Renewable energy
- 3. Energy saving appliances

#### **1.Ventilation:**

Class rooms and faculty room are provided with proper ventilation to ensure nature lighting and natural air circulation is available to save energy and keep them healthy.







# 2.Energy from Nature Source Solar Energy

Solar panel installation reduces carbon emission by generating electric energy from sunlight. This reduces the dependence of fossil fuels for energy production. Maintenance of these solar panels are low therefore making it an affordable and accessible source in our campus.



• The 300 kW solar energy system installed on the rooftops of the academic buildings and hostels generates an average of 1,140 kWh of power per day and 35800 kWh per month.

#### **Biogas**

Biogas, produced from food waste is another method adapted in the campus to produce energy in an eco-friendly manner. The food waste from around the campus is collected and fed to the system that is converted to obtain electric current. By using biomass, we generate 25,775 kWh of power per year. Our campus keeps track of its energy consumption and revises different ways in which it can be minimized regularly. Research is one such way where we analyze new trends and contemplate on how it would be beneficial to our campus in ways of aligning with the development goals.





Students are often given lectures, and workshops are conducted to bring awareness about these alternate sources of energy. Labs are highly facilitated to understand the working of these wind and solar energy, allowing students to conduct research and allow them to learn more about sustainable ways to produce and consume energy.

#### Wind Mill

Wind energy promotes environmental awareness and sustainability among students, faculty .wind turbines can helps reduce energy costs. By using wind, we generate 1,247 kWh of power per year.



S.No	Туре	Location	Amount of the energy produced (KWH) per year
1	Solar Energy	Roof top of the academic buildings and Hostels	429,320
2	Biomass	Near Mess Hall	25,775
3	Wind Power	Energy Lab	1,247





**3.Energy Saving Appliances in campus:** 

**Convenient and Eco-Friendly Laundry** 



Both hostels feature a "Smart Laundry Facility" powered by Hier, offering an energyefficient, eco-friendly, and low-cost washing solution. This facility is accessible through a mobile app, enabling students to manage their laundry conveniently. This saves water usage and in turn contribute to the energy saving

Both hostels are equipped with a state-of-the-art "Smart Laundry Facility" powered by Hier. This innovative system offers a hassle-free and sustainable laundry solution for students.

#### **Dishwasher:**

Dishwashers are used in the mess of campus and hostels, so that water usage will be reduced and it saves the energy usage



Dishwasher in Mess 17





#### Sensor-Controlled LED Lighting

The CFL lights in the existing academic buildings and the hostels are replaced with LED lamps which saves around 60% of energy and some of the labs are upgraded with LED lights with sensors.

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13	Sports lighting	29	5800
	Total	1211	23585



#### **4.Plantation:**

Our institute is a green campus, tropical, serene, with a landscape. Students and staff are urged to plant more trees to clear the campus of litter and plastic. Swacch Bharat Abhiyan is being pursued at our college to keep the campus safe. Tree plantation projects help to foster the eco-friendly climate, which provides pure oxygen inside the institute and recognition among villagers.



### Continuous action to make greener campus



### 7.2.5 Energy Review to Identify Areas Where Energy Wastage Is Highest

The internal energy monitoring and auditing team of Chennai Institute of Technology reports on routine inspection of energy consumption and suggests guidance to the leadership team on conservation and energy efficiency enhancement. They audit every three months once (each building once in three months on rotation). External experts or consultancy energy auditing is done once every year. The audit flow is given below.





The EA report conducted by Unimech Solutions (India) Pvt. Ltd for 2023 is attached here.

#### **•** UNIMECH SYSTEMS (INDIA)

#### **O** UNIMECH SYSTEMS (INDIA)

ACKNOWLEDGEMENT

Thanks to the Chennai Institute of Technology's administration. Unimech Systems (India) Pvt. Ltd was able to conduct an energy audit on their campus. The data supplied or seen during the study, as well as the field observations, served as the foundation for the report. This is merely a walk-through assessment; if Chennai Institute of Technology consents, we may also do a thorough energy audit.

Unimech is appreciative to all the team who were helping to completing the field study successfully. Finally, we would like to thank the management and all of the personnel for their kindness.

EA Report Of Chennai Institute Of Technology

12.06.2023



Melenstumar Evaluator / Auditing Officer

||Unimech Systems (India) Private Limited| ||# 29.E- st Floor .Price Arcade, Cathetral Road,Chennai-600087, Tamilnadu.India| ||044-24793914||www.unimechsystem.in||Follow us on: ℃ ▼ №

#### 𝗊 UNIMECH SYSTEMS (INDIA)

I. Nature / Phase of Audit : A walk through auditing handled by Unimech Sysytems Pvt.Ltd

II. Details of Firm/Company/Educational Institute/Commercial use:

Name / Organisation			Chennai Institute of Technology		
Address			Sarathy Nagar, Kundrathur, Chennai-69		
Coordin	nator Incharge		Dr.M.D.Vijay	akumar	
Audit on product Evaluator(S)			Engineering college		
			Mr. Ameerudeen & Mr. Gopikumar		
Energy Saved (KLOE)/Annum			26.3		
	Executive Sur	mmary Cher	nai Institute o	f Technology	
S.No Energy		Annual Savings		Investment	Payback
	Conservation Measures	Kwh	Rs	Rs	Month
1	Replace FTL lamps and Night Lamps with LED.	72000	7,20,000	10,00,000	15
2	Replace conventional type fans with BLDC fans	84000	8,40,000	12,00,000	20
		Summary	of savings		
Total A EB	nnual kWh Savings by	1,56,000	15,60,000	22,00,000	35
Annual EB cor	Savings in (KLOE) by sumption			26.3	

III. Equipment's list: Observed in Walk-through:Yes/No

(Note:Add separate sheets for calculation)

Equipment list		
Item Description	Quantity in No's	Capacity(in w / TR / kVA)
Transformer	2	440
Transformer	2	320
DG	2	320
DG	2	400
Lights (FTL & CFL)	1400	40
Ceiling Fan/Wall Mount	1200	70
Split AC	175	1 - 2
VRF AC	6	12
Chiller	2	75
Lifts	01	NA

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#### **D** UNIMECH SYSTEMS (INDIA)

#### IV. Energy Savings Comments

- Total oil Savings Identified is 26.3 KLOE/Annum.

- Some Blue star AC are BEE rated 4 star. Replace it. Review or replacing for chiller is LED lamps need to replaced for FTL Pumps performance needs to be reviewed by noting the time and head. Rooftop Solar grid performance to be maintained and improved.
  - The suggestions/actions to be incorporated at the possible earliest to save energy.

Save Energy! Stay Sustainable!

The often-received comments from the internal auditing were reported that in Labs of CoE,



Students leaving for break or lunch hours was not satisfactorily acting towards energy saving.



Lights ON during Lunch or break hours

The maintenance and efficiency of DG has been improved by following internal and external auditing panel.



After the audit, the BEE 4-star AC's been replaced energy-efficient 5-star AC.



#### **Energy reducing Fixtures replaced after Observations**

The institute has been assessed and certified for Green, Energy and Environment Audit by Ignite Engineering and the evidence attached below.





## **IGNITE ENGINEERING**

COMPLIANCE VERIFICATION

This is to certify that

(Autonomous)

**Chennai Institute of Technology** 

Sarathi Nagar, Kundrathur, Chennai - 600069.

Has been assessed and found to be in accordance with the requirements of detailed

below

## Green, Energy & Environment Audit

( Based on ISO 14001 : 2015 & ISO 50001 : 2018 Standards)

Certificate Number: IE/GA/9886/19

Latest Issue: 10.06.2021

Valid Until: 09.06.2023

Validity of this certificate is subject to annual surveillance audit to be done successfully on or before 20.06.2020 and 20.06.2021 respectively. In case if surveillance audit is not allowed to be conducted, this certificate shall be suspended/withdrawn.



No. 28, Kuttiappa Nagar, S.Kodikulam, K.Pudur, Madurai - 625 007, Tamilnadu. India Certified Under American International Accreditation Organization (Certificate No: QMS2017359)



#### 7.2.6 Divestment from Carbon-Intensive Energy Industries Policy

Name of the Policy/Guidelines	Divestment from Carbon-Intensive Energy Industries Policy
Short Description	This policy aims to guide Chennai Institute of Technology indivesting its investments from carbon- intensive energy industries, particularly coal and oil. The policy aligns with the institution's commitment to environmental sustainability and reducing its carbon footprint.
Scope	This policy applies to all investments made by Chennai Institute of Technology.
Policy Created on	21-06-2020
Policy Revised on	09-05-2022

#### **Background:**

Chennai Institute of Technology recognizes the urgent need to address climate change and reduce greenhouse gas emissions. As an institution committed to sustainability, the institute was acknowledging the environmental impact of carbon-intensive energy industries, such as coal and oil. This policy reflects the institute dedication to responsible investment practices and its commitment to supporting a transition to cleaner and renewable energy sources.

#### **Policy:**

- **1. Divestment from Carbon-Intensive Energy Industries**: Chennai Institute of Technology remove its investments from carbon-intensive energy sectors. The institute will make a concerted effort to limit its exposure to businesses engaged in the production, distribution, or extraction of fossil fuels.
- **2. Responsible Investment Practices**: The institute will adopt responsible investment practices that prioritize environmental sustainability and align with its commitment to reducing carbon emissions.
- **3. Engagement and Advocacy**: Chennai Institute of Technology will actively engage with stakeholders, including investment managers, to promote the divestment from carbon- intensive energy industries



- **4. Monitoring and Reporting**: The Institute will establish mechanisms to monitor and assess the progress of divestment efforts. Regular reports will be prepared to track the divestment process and communicate the institute commitment to stakeholders.
- **5. Review and Updates**: Chennai Institute of Technology will periodically review this Divestment from Carbon-Intensive Energy Industries Policy to ensure its effectiveness and alignment with evolving sustainability goals. Updates will be made as necessary to addressemerging challenges and opportunities.