

SUSTAINABLE DEVELOPMENT GOALS

13. CLIMATE ACTION



13.2.1 Low carbon Energy Tracking

Solar Panel and Water heater

The 1.08 GJ solar energy system installed on the rooftops of the academic buildings and hostels generates an average of 4.468 GJ of power per day and 134.1 GJ per month. This renewable energy for electricity helps to reduce purchased electricity.



13.2.2 Low-carbon energy Use

Chennai Institute of Technology is committed to sustainability and environmental stewardship, and this is reflected in our approach to campus transportation. The Institute integrated electric vehicles (EVs) and bicycles into our transportation infrastructure to support a greener, more eco-friendly campus environment. Chennai Institute of Technology installed EV charging stations across campus to support the growing use of electric vehicles. These stations are accessible to both campus vehicles and personal EVs of students.

Measurement of the amount of low carbon energy used across the institute: 1631GJ / Year.

Total energy used : 2407 GJ / Year

Total energy used from low-carbon sources : 1631 GJ/Year

Zero emission vehicles (ZEV) policy on campus



Electric vehicle



Charging points for EV



Electric vehicle load carrier (CIT)



Bicycles



e-Vehicle project by Students

13.3 Environmental education measures

13.3.1 Local education programmes on climate

World environmental health day at Chennai institute of technology on 26th September 2022 featured a debate on the question, "Is today's generation protecting the environment or degrading it?" This debate highlighted the importance of local education programs on climate change, which are essential to fostering a more sustainable future. Such programs are designed to raise awareness about the risks and impacts of climate change, particularly at the grassroots level. Through targeted campaigns, communities are educated on climate change mitigation and adaptation, helping them reduce their environmental impact and build resilience to changing weather patterns. By empowering individuals with knowledge about climate change and practical solutions, local education programs ensure that the next generation plays an active role in environmental protection and sustainability.



13.3.2 Climate Action Plan, shared

Climate action plan

The climate action plan for Chennai Institute of Technology outlines a strategic roadmap for reducing the institution's carbon footprint, enhancing environmental sustainability, and fostering a climate-conscious campus. The institution is committed to integrating climate action into its operations, curriculum, and community outreach efforts, ensuring that both short-term initiatives and long-term strategies contribute to sustainable goals.

The institution has following development plans

1. Expanding the installation of solar panels on additional rooftops across campus, Install battery storage systems to store excess solar energy for use during non-sunny hours, improving energy reliability.
2. Increase biomass energy generation
3. Replacement of all old lighting and appliances with energy-efficient LED bulbs. Installation of EV charging stations at key locations on campus to encourage the use of electric vehicles among students and staff.
4. Establishment of dedicated bi-cycle lanes, to encourage cycling as a primary mode of transport.
5. Conduct regular seminars, workshops, and guest lectures on climate change mitigation, adaptation strategies, and sustainability innovations.
6. Plantation of native plant species to support local biodiversity, enhance the campus's carbon sequestration potential, and improve air quality.

13.3.5 Environmental education collaborate with NGO Collaborate with NGOs on climate adaptation

Flood relief efforts for Anakaputhur – November 2, 2022

On November 2, 2022, Chennai institute of technology took significant steps toward fulfilling its social responsibility by organizing and sending much-needed flood relief supplies to Anakaputhur, a locality in Chennai that was devastated by severe flooding. The heavy rains and subsequent floods had led to widespread disruption of daily life, extensive damage to homes, and left many residents stranded without basic essentials. In the face of such a disaster, CIT's response was swift, well-coordinated, and rooted in a deep sense of community commitment. In addition to the immediate relief provided, CIT also that the response was structured in a way that was effective to the needs of the affected population. This included prior communication with local authorities and communities, as well as active collaborations with local non-governmental Organizations, which played a crucial role in both immediate disaster relief and in promoting long-term climate adaptation strategies for the affected area.

A strategic approach to relief

CIT's proactive approach was evident from the early stages of the crisis. The flooding in Anakaputhur prompted the management, faculty, and students to begin planning an effective relief effort. Then took the initiative to reach out to local authorities in Anakaputhur, including community leaders, local councils, and government officials, to gather crucial information about the extent of the damage and the specific needs of the affected population. By staying in constant communication with local bodies, CIT was able to identify the most urgent needs, including food, water, medical supplies, clothing, and other essential relief materials, which were promptly sent and distributed to the affected people.



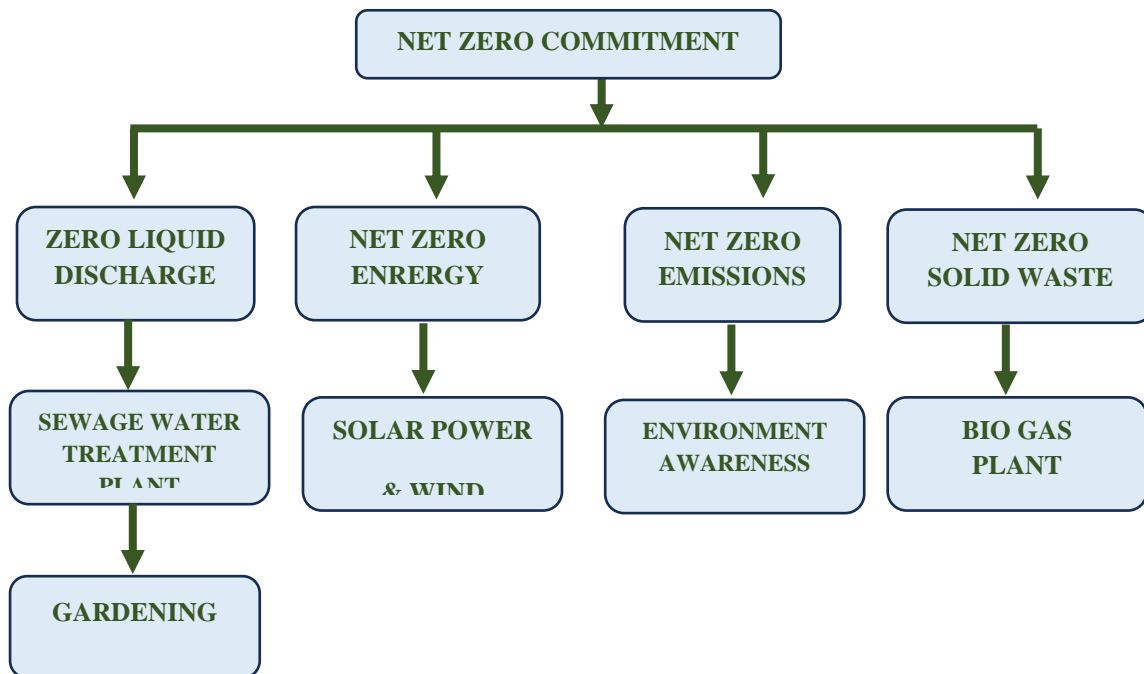
13.4 Commitment to carbon neutral university

13.4.1 Commitment to carbon neutral university

Net Zero Commitment

Chennai Institute of Technology with its vision to be a Net Zero Campus by 2050, producing professional with high technical knowledge, professional skills and ethical values,

it is committed to institutional practices and personal behaviours that will foster public health, environmental protection, and energy conservation.



Establishment of Green Data Centre:

CIT has deployed renewable energy technologies, such as the 300 kW solar system on the rooftops of its academic buildings and hostels, which generates 1,140 kWh of power daily and 35,800 kWh monthly.

Sewage Water Treatment

Wastewater treatment plants operate in the Main campus (275 KLD). A treatment plant with an ultra-filtration facility and it is used for gardening purposes.

An average of 2.7 lakh litres/day of wastewater is generated from various parts of the Main campus to the Sewage Treatment and Recycling plant. It is also proposed to modernize the existing Sewage Treatment Recycling Plant to improve the treated water quality standards for flushing toilets in the new buildings.

Solar Energy

As part of its commitment to climate action, CIT has deployed renewable energy technologies, such as the 300 kW solar system on the rooftops of its academic buildings and hostels, which generates 4.104 GJ of power daily and 128.88 GJ monthly.

All the air conditioners installed in the Departments follow the energy conservation policy (3-Star Quality Rating System).

Bio Gas Power Plant

Disposal of food and vegetable waste from hostel mess has been an perennial issue for the hostel administration. A biogas plant of has been installed towards utilisation of these food/vegetable waste for biogas generation to reduce the dependence of LPG.



Roof Mounted Solar Panels (Chennai Institute of Technology)



Biomass and Wind (Chennai Institute of Technology)

Description:

S.No	Type	Location	Amount of the energy produced (GJ) per year
1	Solar Energy	Roof top of the academic buildings and Hostels	1545.55
2	Biomass	Near Mess Hall	92.79
3	Wind Power	Energy Lab	4.49

- The 300 kW solar energy system installed on the rooftops of the academic buildings and hostels generates an average of 4.468 GJ of power per day and 134.1 GJ per month. By using biomass, we generate 92.79GJ power per year.
- By using wind, we generate 4.49 GJ power per year.

13.4.2 Achieve by

Target Date: 2035

Chennai Institute of Technology is committed to developing a carbon-neutral campus and has a well-defined zero-emission policy aimed at achieving this goal by 2035.

Other Details

Publications contributing to SDG13

1. Experimental analysis of solar desalination system performance with graphene and graphitic carbon nanopaint-coated solar absorbers
2. Experimental analysis of hemispherical combustion geometry of diesel engine (neem oil) biodiesel with nano additives
3. A hybrid optimization for distributed generation and D-STATCOM placement in radial distribution network: a multi-faceted evaluation
4. Comprehensive energy and enviro-economic performance analysis of a flat plate solar water heater with a modified absorber
5. Combustion performance and emission characteristics of aloe vera diesel– emulsified fuel in a DI diesel engine
6. Cu MOF-biocarbon functional catalysts as adsorbent for oxygen-linked carbon capture via thermo-catalytic pyrolysis: A low-carbon fuel synthesis strategy
7. Optimizing smart microgrid performance: Integrating solar generation and static VAR compensator for EV charging impact, emphasizing SCOPE index
8. Effect of heat input on the hazardous gas emissions from galvanized steel during cold metal transfer welding
9. Biodiesel blends for eco-friendly CRDI-VCR engines: enhancing combustion and engine performance to minimize pollutant emissions
10. Studies on fuels and engine attributes powered by bio-diesel and bio-oil derived from stone apple seed (*Aegle marmelos*) for bioenergy
11. Phytochemical analysis of the methanolic extract from the mangrove species *Avicennia marina* plant species inhabited in coastal water
12. Multi-scale characteristics of drought propagation from meteorological to hydrological phases: variability and impact in the Upper Mekong Delta, Vietnam
13. Pyrolysis of Biomass Using Renewable Energy as A Heating Medium : A Review
14. Exploring the use of Biodegradable Polymer Materials in Sustainable 3D Printing
15. Impact of corrugated duct and heat storage element on the performance of a low-cost solar air heater under forced air circulation: an experimental study
16. A Comprehensive Review and Analysis of the Allocation of Electric Vehicle Charging Stations in Distribution Networks
17. Reshaping agriculture using intelligent edge computing

18. A review on the modification of polypropylene carbonate (PPC) using different types of blends/composites and its advanced uses
19. Fractional perspective evaluation of chikungunya infection with saturated incidence functions
20. How Do Microalgae Biodiesel Blends Affect the Acoustic and Vibration Characteristics of the Direct Injection Diesel Engine: An Experimental Examination
21. Effect of hybridization and stacking sequences on mechanical properties and thermal stability of aloe vera-roselle-glass fiber reinforced polymer composites
22. MOFs as Versatile Catalysts: Synthesis Strategies and Applications in ValueAdded Compound Production
23. IoT- and GIS-Based Environmental Impact Assessment of Construction and Demolition Waste Dump Yards
24. Virtual power plant
25. Artificial Intelligence and Mathematical Models of Power Grids Driven by Renewable Energy Sources: A Survey
26. Artificial Intelligence - Enabled Smart Grids: Enhancing Efficiency and Sustainability
27. Computational Intelligence Router of Machine and Artificial Intelligence Learning for the Expansion of Agriculture's Manufacturing Sector
28. Investigational study of significance of propanol addition in performance and emission distinctiveness of compression ignition engine fuelled through cotton seed oil blended with diesel
29. Effects of oxyhydrogen on the CI engine fueled with the biodiesel blends: A performance, combustion and emission characteristics study
30. Experimental investigation on carbon dioxide reduction by using postcombustion carbon capture system in a spark-ignition engi
31. Advances in Upgrading Biomass to Biofuels and Oxygenated Fuel Additives Using Metal Oxide Catalysts
32. Exhaust Gas Recirculation on a Nano-Coated Combustion Chamber of a Diesel Engine Fueled with Waste Plastic Oil
33. Computational Fluid Dynamics Study of a Steam Reformer Unit Performance to Produce Hydrogen Fuel for PEM Fuel Cell Applications
34. Emission examination of lemongrass biodiesel and novel nanoparticle blends in research diesel engine

35. Emission investigation on the effect of ultrasonic irradiation in neat biodiesel fuelled engine
36. Analysis on the properties and emission characteristics of corn biodiesel subjected to improved transesterification
37. Combustion and emission characteristics of diesel engine fueled with nanocatalyst and pyrolysis oil produced from the solid plastic waste using screw reactor
38. Challenges in planning and operation of large-scale renewable energy resources such as solar and wind
39. Prediction of Future Extremes During the Northeast Monsoon in the Coastal Districts of Tamil Nadu State in India Based on ENSO
40. Performance evaluation of geopolymers concrete using E-waste and M-sand
41. Impact of nano additives in DI diesel engine to investigate performance and emission characteristics by using biodiesel blended with diesel
42. Experimental investigation on emission reduction in diesel engine by using biodiesel with catalytic converter
43. Performance improvement in compact single cylinder IC engines for fuel efficient racing application
44. Analysis of geofabrics in highway pavement materials
45. Analysis of using biogas resources for electric vehicle charging in Bangladesh: A techno-economic-environmental perspective
46. Experimental analysis of DI diesel engine using dual biofuel blended with diesel
47. Rational design and fabrication of surface tailored low dimensional Indium Gallium Nitride for photoelectrochemical water cleavage
48. Image processing system for detecting and recovering from cotton leaf disease using the android application
49. Consequences of exhaust gas temperature on emissions in CI engine fuelled with Calophyllum inophyllum methyl ester blends with diesel
50. Impact of performance degradation and capital subsidy on the revenue of rooftop PV system
51. Combined impact of EGR and injection pressure in performance improvement and NOx control of a DI diesel engine powered with tamarind seed biodiesel blend
52. Improvement of ternary fuel combustion with various injection pressure strategies in a toroidal re-entrant combustion chamber

53. Performance analysis of neem and palm bio-diesel blend on diesel engine - A review
54. Effects of Nano Additives in engine emission Characteristics using Blends of Lemon Balm oil with Diesel
55. Influence of methanol impurity in hydrogen on PEMFC performance.

Patents contributing to SDG13

1. Artificial intelligence (AI) based antenna for weather forecast (Design No. 395425-001)
2. An intelligent method for load balancing in cloud computing using machine learning techniques (Application No. 202341071162 A)