

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:

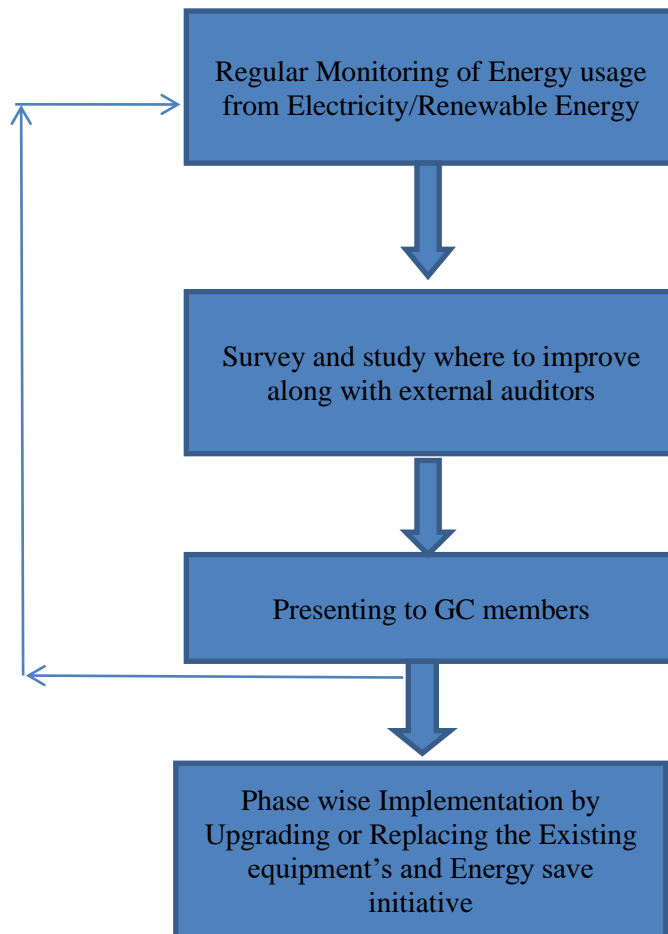
- a. Opportunities for integrating renewable energy sources such as solar panels should be explored during renovations and new builds.
- b. Feasibility studies and assessments should be conducted to determine the potential for renewable energy generation on-site.

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.



Biogas plant – 100 kg capacity

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 passenger 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.



Electric Vehicle



Electric Bike

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



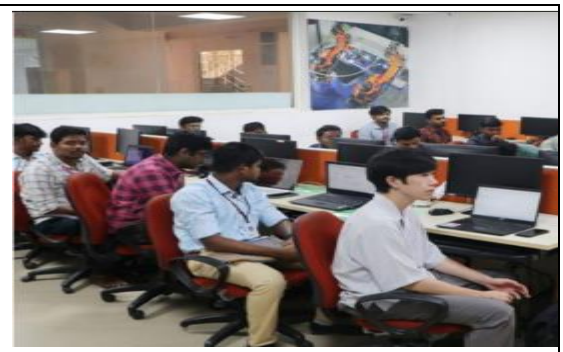
Bicycle usage inside the campus

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.



Paperless registration



Digital notes



Paperless meeting



Paperless labs

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

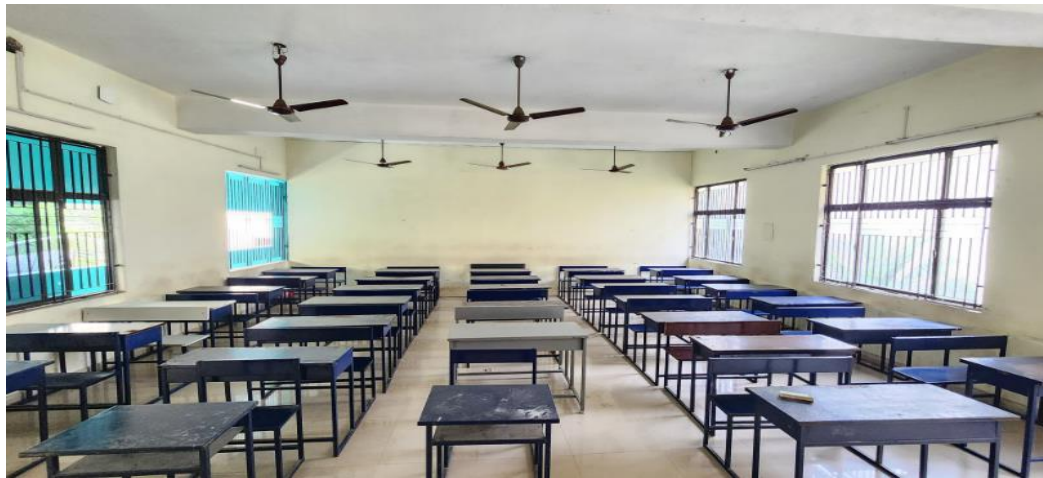
Energy efficiency plan in place to reduce overall energy consumption

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 help reduce energy costs. By using wind, we generate 1,247 kWh of power per year.



S.No	Type	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 energy-efficient, 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

Sensor-Controlled LED Lighting

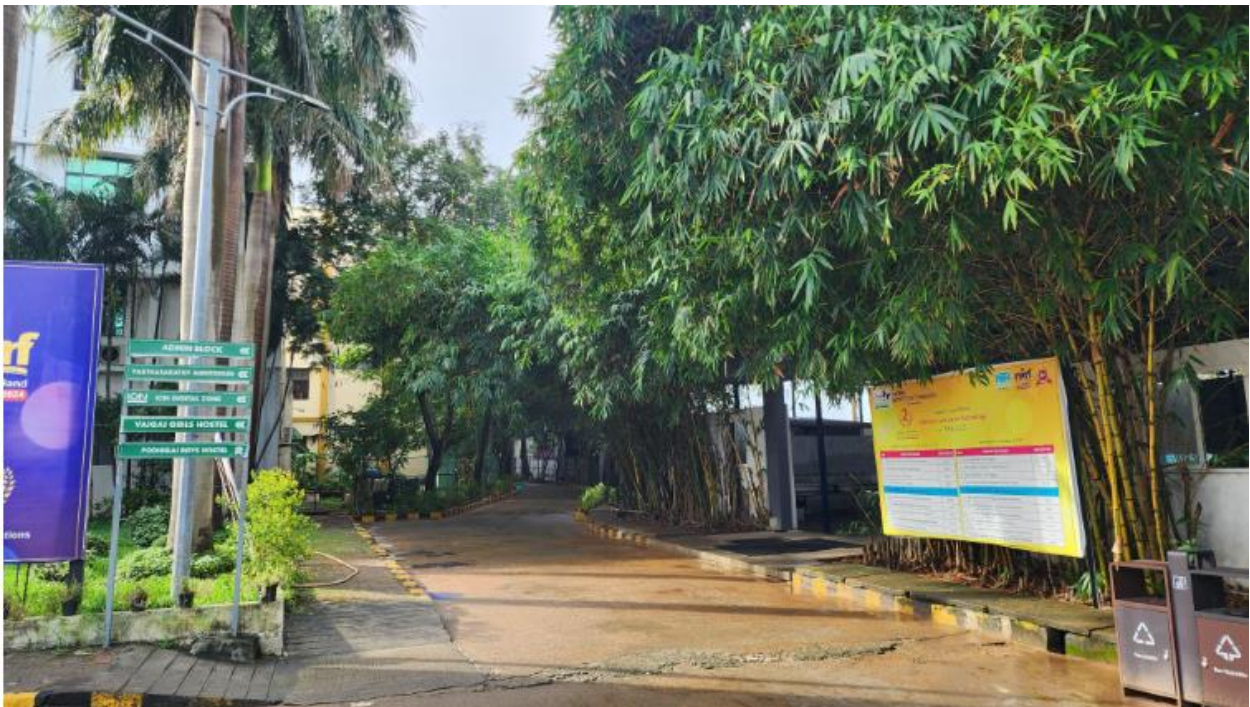
The CFL lights in the existing academic buildings and the hostels are replaced with LED lamps which saves around 60% of energy and some of the labs are upgraded with LED lights with sensors.

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Total		1211	23585



4.Plantation:

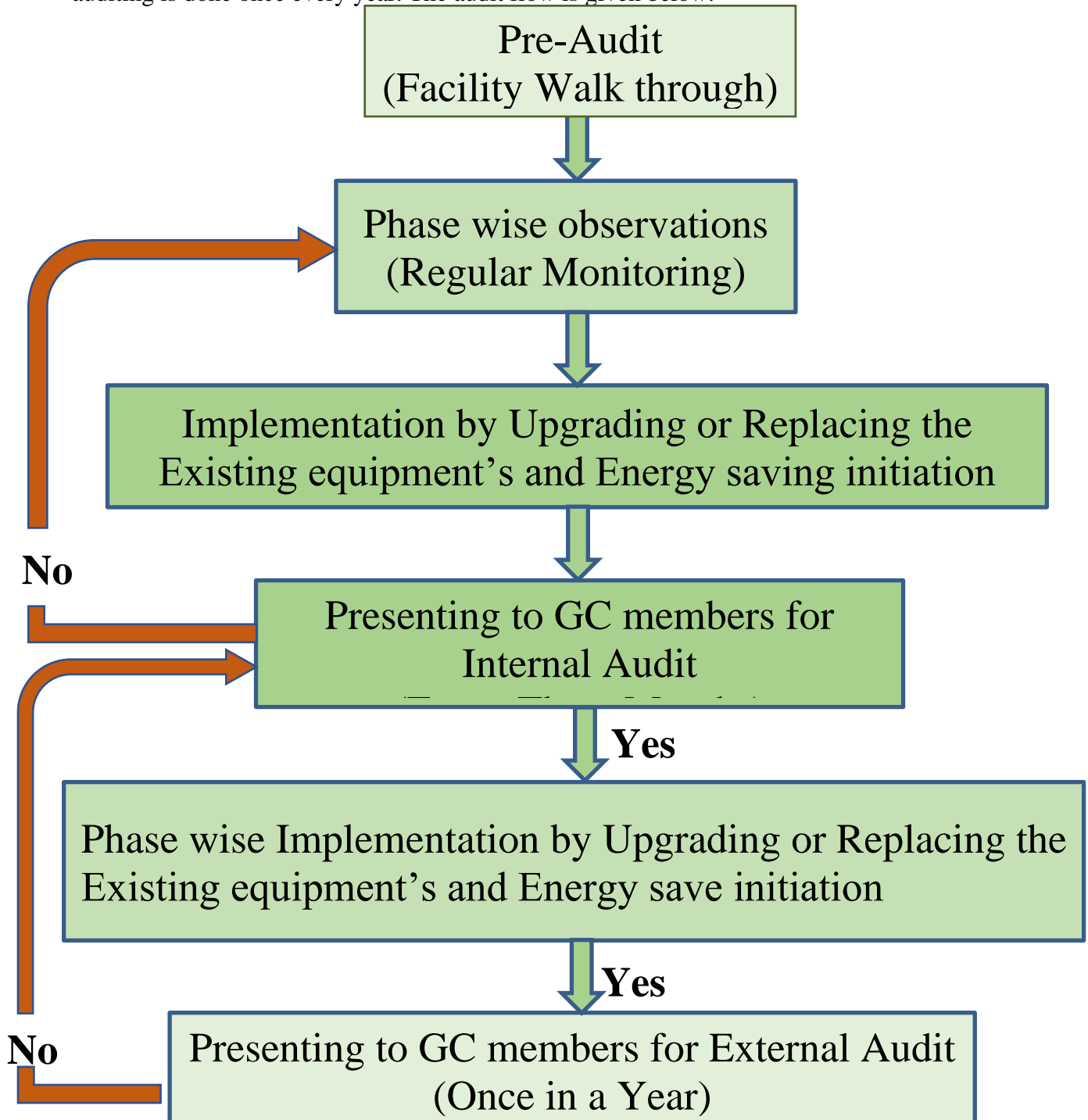
Our institute is a green campus, tropical, serene, with a landscape. Students and staff are urged to plant more trees to clear the campus of litter and plastic. Swacch Bharat Abhiyan is being pursued at our college to keep the campus safe. Tree plantation projects help to foster the eco-friendly climate,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

 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


Mr. Ameerudeen
General Manager


Mr. Gopikumar
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: 

[[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: 

 UNIMECH SYSTEMS (INDIA)

 UNIMECH SYSTEMS (INDIA)

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

IV. Energy Savings Comments

Total oil Savings Identified is 26.3 KLOE/Annum.

1. Some Blue star AC are BEE rated 4 star. Replace it.
2. Review or replacing for chiller is
3. LED lamps need to be replaced for FTL
4. Pumps performance needs to be reviewed by noting the time and head.
5. Rooftop Solar grid performance to be maintained and improved.

The suggestions/actions to be incorporated at the possible earliest to save energy.

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


Name / Organisation	Chennai Institute of Technology				
Address	Sarathy Nagar, Kundrathur, Chennai-69				
Coordinator Incharge	Dr.M.D Vijayakumar				
Audit on product	Engineering college				
Evaluator(S)	Mr.Ameerudeen & Mr.Gopikumar				
Energy Saved (KLOE)/Annum	26.3				
Executive Summary Chennai Institute of Technology					
S.No	Energy Conservation Measures	Annual Savings		Investment	Payback
		Kwh	Rs		
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 Annual kWh Savings by EB	1,56,000	15,60,000	22,00,000	35	
Annual Savings in (KLOE) by EB consumption			26.3		


Save Energy! Stay Sustainable!

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

(Note:Add separate sheets for calculation)

Item Description	Equipment list	
	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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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

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.



[Signature]
HEAD - QHSE



[Signature]
FOR IGNITE ENGINEERING

IGNITE ENGINEERING

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 in divesting 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's 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 will 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 address emerging challenges and opportunities.

7. AFFORDABLE AND CLEAN ENERGY



7.4 Energy and the Community

7.4.1 Programmes For Local Community To Learn About Importance Of Energy Efficiency And Clean Energy:

1. a. Arranging pledge program for local community people from industry

Chennai Institute of Technology took an initiative to adopt with the pledge of Government of India for the conservation of energy. The institute encouraged industrial people from Gokul Autotech Pvt.Ltd by taking the pledge on energy saving.

- I pledge to use energy more mindfully and take necessary steps to reduce energy usage in my home and office.
- I will devote my time in taking small steps like switching off the extra lights while I am in the room, turning off the appliances like Tv, computer monitors, ACs and cars/Bikes at the traffic signals.
- The efficient utilisation will help me save money and consequently help in fighting climate change.
- I pledge to take responsible actions in doing my part to improve the environment and help contributing to sustainable growth of the planet Earth.

1.b. Educating Students on Renewable Energy

Students are often given lectures, and workshops are conducted to bring awareness about these alternate sources of energy.



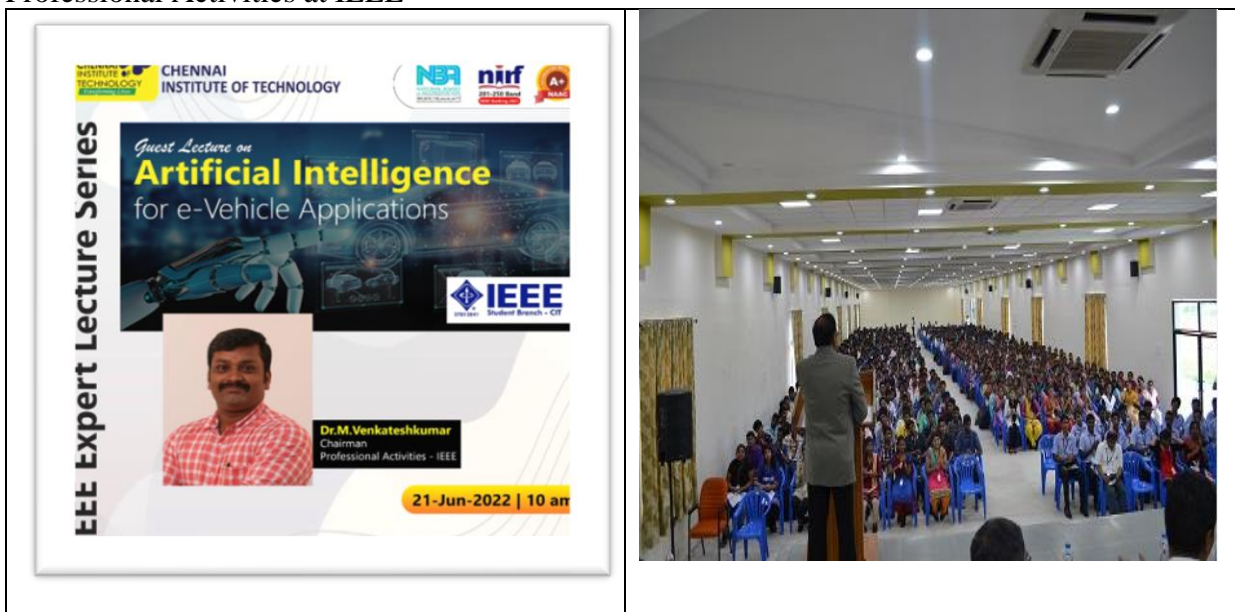
2. Training program for other colleges and industry employees

Training program arranged for various colleges and industry technicians to explore the critical topic of energy harvesting through renewable energy sources. The session focused on practical insights into how renewable energy technologies can be integrated to enhance energy efficiency and sustainability across sectors. The workshop aimed to create awareness about how technologies such as solar, wind, and biomass can be harnessed efficiently for energy generation. The hands-on experience on energy harvesting was provided to the participants.



3. Guest Lecture

The guest lecture, titled "Artificial intelligence for e-Vehicle applications," was held on June 21, 2022, at 10 am. It was part of the IEEE Expert Lecture Series organized by the Institution, and the lecture was transported by Dr. M.Venkateshkumar, the Chairman of Professional Activities at IEEE



4. National Level Workshop

The institution has conducted One-day National Level Workshop on **Hybrid energy, focusing on solar, wind, and e-vehicle technologies, October 14, 2022**, organized by the Centre for New Energy Systems. This workshop aimed to provide hands-on training and knowledge dissemination about the integration and applications of hybrid energy systems in the context of renewable energy and electric vehicles to the students.



7.4.2 Pledge Towards 100% Renewable Energy

Chennai Institute of Technology took an initiative to adopt with the pledge of Government of India for the conservation of energy. The students and the faculty members are encouraged to save energy and practise the pledge for the same and to internalise the energy saving.

The pledge has been disseminated through notice boards in the departments, corridors and laboratories. Students are encouraged towards energy saving once a week by wearing uniform non-ironed Polo T-shirts to stick to it. Yearly twice the pledge taken by all the communities inside the campus. Also the institute encouraged industrial people from GokulAutotech Pvt.Ltd taking the pledge



Students taking Pledge- Energy saving



Industrial Staff from Gokul Autotech Pvt.Ltd taking Pledge – Energy Saving



Sample - Pledge displayed in Notice Board

Pledge

- I pledge to use energy more mindfully and take necessary steps to reduce energy usage in my home and office.
- I will devote my time in taking small steps like switching off the extra lights while I am in the room, turning off the appliances like Tv, computer monitors, ACs and cars/Bikes at the traffic signals.
- The efficient utilisation will help me save money and consequently help in fighting climate change.
- I pledge to take responsible actions in doing my part to improve the environment and help contributing to sustainable growth of the planet Earth.

7.4.3. Energy Efficiency Assessments, Workshops, Research Renewable Energy Options

Chennai Institute of Technology plays a key role in assisting local industries to improve energy efficiency and adopt clean energy solutions. The institute provides **energy audits and efficiency assessments**, helping businesses identify areas of energy wastage and implement cost-effective solutions to optimize consumption. The institution also conducts **workshops and training programs** on energy management, empowering industry professionals with the knowledge to adopt sustainable practices and technologies. Additionally, its **research and development efforts** focus on renewable energy, collaborating with local industries to implement innovative clean energy systems, such as solar and wind power. This comprehensive approach not only supports industries in reducing operational costs but also contributes to a more sustainable and energy-efficient industrial ecosystem, especially in the **SIDCO area**, where the institute's proximity to local businesses facilitates direct collaboration.

i) Energy Efficiency quality audit awareness program

A Energy Efficiency quality audit meet awareness was held at Gokul Auto Tech, by our institute personnel, the team of quality supervisors were get beneficiary based on the awareness training program for two days.



ii) Energy Efficiency quality audit

An energy efficiency audit for Gokul Autotech Pvt. Ltd. was conducted on December 1, 2022, by **Dr. M.D. Vijayakumar**, Professor and Head of the Department of Mechanical Engineering, Chennai Institute of Technology. The purpose of this audit was to raise awareness about energy wastage and provide actionable recommendations to reduce energy consumption, optimize efficiency, and lower operational costs for the company.



**CHENNAI
INSTITUTE OF TECHNOLOGY**
(Autonomous)



Accredited by
NBA **nirf**
CSE, ECE, EEE, MECH, MCT
175th Rank
(NIRF Ranking 2022)



**CHENNAI
INSTITUTE OF TECHNOLOGY**
(Autonomous)



NIRF
151 - 200 Band
(Engineering 2022)



Energy audit report for Gokul autotech Pvt. Ltd.

Date of Audit : 1-12-2022 and 2 -12-2022
Audit Period : 2 days
Prepared By : Dr. M.D. Vijayakumar

Name of auditor/consulting firm : Dr. M.D. Vijayakumar, Professor & Head
Dept. of Mechanical Engineering
Chennai Institute of Technology, Kundrathur

Contact Information : Mobile: 9994473738
E.Mail: mech@citchennai.net

Total Energy Consumption : 1,10,000 kWh per month.

Energy Cost : 22,00,000 INR per month.

Peak Load : 150 kW.

Average Load : 145.83 kW.

Lighting consumption : 8500 kWhr per month

Manufacturing equipments consumption: 99000 kWhr per month

Other systems consumption: 2500 kWhr per month

Energy Efficiency Assessment

This section highlights areas identified as inefficient and provides suggestions for improvement:

The current lighting system uses traditional fluorescent lamps, leading to high energy consumption. The HVAC systems operate without optimal temperature control, causing excess energy use. Air compressors are running longer than necessary due to air leaks.

Renewable Energy Opportunities

In addition to energy efficiency improvements, **Gokul Autotech Pvt. Ltd.** can consider adopting renewable energy solutions:

1. Install solar panels on the factory rooftop to generate electricity, reducing reliance on the grid and lowering energy bills.
2. Evaluate the feasibility of installing small wind turbines on-site to harness wind energy.

3. Consider implementing battery storage systems to store excess energy generated by solar panels for use during peak demand.

Action Plan and Recommendations

Based on the audit findings, the following action plan has been proposed:

1. **Immediate Actions** (0-3 months):

Replace all lighting with LED bulbs; Conduct a leak survey for compressed air systems and repair leaks.

2. **Short-Term Actions** (3-6 months):

Install variable speed drives in the compressed air system.

3. **Medium-Term Actions** (6-12 months):

Initiate feasibility studies for solar panel installation on the factory rooftop.

4. **Long-Term Actions** (1+ years):

Investigate additional renewable energy sources (e.g., wind energy).

Prepared by

M. D. VIJAYA KUMAR

Verified by

Mr. S. Ganes

iii) Energy smart workshop: Unlocking efficiency for a sustainable future

The "Energy Smart: Unlocking Efficiency for a Sustainable Future" workshop, conducted on August 17, 2022, brought together faculty members from various colleges and industry technicians to explore the critical topic of energy harvesting through renewable energy sources. The session focused on practical insights into how renewable energy technologies can be integrated to enhance energy efficiency and sustainability across sectors. The workshop aimed to create awareness about how technologies such as solar, wind, and biomass can be harnessed efficiently for energy generation. The hands-on experience on energy harvesting was provided to the participants.



iv) Research works contributing to SDG7

1. Efficient implementation of low-power decoders through reversible logic gates with minimal transistor count
2. Optimizing resource allocation in energy enabled multi cluster cognitive radio network for hybrid connectivity
3. An improved Energy efficient clustering protocol life time of a WSN based on IoT
4. Kinetic Energy Harvesting: Empowerment Communities through innovative speed breaker power generation.
5. Experimental investigation of the mechanical properties of aluminium 8011/SiC/Graphite Hybrid Composite
6. Optimization of performance and Emission Characteristics of compression ignition engine supplemented with pentanol-Rapessedoil- Diesel Composition
7. Experimental in investigation of performance and Emission characteristics of diesel Engine supplemented with Butanol-Olive oil-Diesel Composition

v) Publications contributing to SDG7

1. Mariraja, R., Harichandran, R., Vijayakumar, R., & Nichelson, A. (2024). Experimental analysis of solar desalination system performance with graphene and graphitic carbon nanopaint-coated solar absorbers. *Desalination*, 592, 118141.
2. Raman, R., Gor, M., Meenakshi, R., Jayaseelan, G. M., Chaturvedi, A., Taqui, S. N., ... & Kalam, M. A. (2024). Solar energy measurement and monitoring model by using internet of things. *Electric Power Components and Systems*, 52(10), 1796-1807.
3. Jakeer, S., Rupa, M. L., Reddy, S. R. R., & Rashad, A. M. (2023). Artificial neural network model of non-Darcy MHD Sutterby hybrid nanofluid flow over a curved permeable surface: Solar energy applications. *Propulsion and Power Research*, 12(3), 410-427.
4. Johnson, J. G., Ramya, G., Sripriya, T., SamuthiraPandi, V., Sudha, K., & Umamaheswari, K. (2023, December). An Intelligent Design of Solar Energy Powered Smart Residence Controlling System Using Novel Power Grid Principles. In *2023 International Conference on Intelligent Technologies for Sustainable Electric and Communications Systems (iTech SECOM)* (pp. 397-402). IEEE.
5. Rangasamy, S., Khansadurai, A. M., Venugopal, G., & Udayakumar, A. K. (2023). Graphene-based O-shaped metamaterial absorber design with broad response for solar energy absorption. *Optical and Quantum Electronics*, 55(1), 90.
6. Partheeban, P., Shiva, M., Vishnupriyan, J., Ponnusamy, R., Kumar, T. S., & Anuradha, B. (2022, December). Solar Energy optimisation using IoT and deep learning-a review. In *2022*

International Conference on Data Science, Agents & Artificial Intelligence (ICDSAAI) (Vol. 1, pp. 1-3). IEEE.

vi) Patents contributing to SDG7

1. Advanced Energy storage system using lithium-sulfur(Li-s)Batteries, 202341080267 A
2. Five Stage constant current charging technique for Lithium-Ion Battery, 202341077563 A
3. Sustainable drive:Solar and wind –Powered EV charging network, 202341073494 A
4. Method of using Waste Plastic oil as fuel on diesel engine, 202341041331 A
5. Electro magnetic energy Absorber, 202341002106 A

7.4.4 Inform and Support Governments In Clean Energy And Energy-Efficient Technology Policy Development

The institute's support for renewable energy aligned remarkably with climate changes, reducing greenhouse gases and cleaner energy contributing towards environmental stewardship, innovation and education goals.

Gokul Autotech Pvt.Ltd

The Chairperson of the Institute also owns Gokul Autotech Pvt. Ltd(GAT). GAT is an industry manufacturer of wide variables of metal die casting. Via Chennai Institute of Technology, GAT maintains close ties with academics, research and development facilities to identify issues that industries face and to discover solutions through a variety of industrial and research projects. Gokul Autotech has a unit of 3MW solar power plant installed in Tenkasi District in adherence with TANGEDCO (Tamil Nadu Generation and Distribution Corporation Limited). This supports the surrounding jurisdictions through the substations. The generation of 3MW power contributing to TANGEDCO plays a vital role in supplying clean, renewable energy towards the state's sustainable goals relying reduction of fossil fuels on the other hand meeting the rising demand for them but also reducing carbon emissions, fostering greener for the community. Through this continuous generation of power, the institutes hold pride in participating in the transition to a cleaner efficient power grid. This highly contributes to the growth of clean energy infrastructure, benefiting not just the power grid but the entire community's well-being. Adhering to the policy regulations, the Institute along with Gokul Autotech will set up systems to track and evaluate the results of divestiture initiatives. To monitor the process and inform stakeholders of the institute's commitment, regular power generation reports will be published. To make sure that from Carbon-Intensive Energy Industries Policy is effective and in line with changing sustainability objectives, the collaborative team with faculties in a rotating roster will learn, practise industrial exposure and review it regularly.

SAVE ENERGY **SAVE NATION**

GOVERNMENT OF TAMIL NADU
ELECTRICAL INSPECTORATE

Web Site: www.tnel.in.gov.in Phone: 22500 184, 22500 227,
E-mail: ceiba@tnel.in.gov.in 22500 430, 22500 789
22500 036

From: The Chief Electrical Inspector to Government, Plot. No.A-40/B, SIPCOT Industrial Growth centre, Oragadam, Sriperumbudur Taluk, Kancheepuram District-602105.

To: **M/s. Gokul Autotech Private Limited,**
326/2A, 326/4, 326/6B, 326/5B, 340/1, 339/2(P), 326/6A, 327/1A, 327/1B, 327/1C(P), 327/2(P), of Karisalkulam Village, Thiruvengadam Taluk, Tenkasi District - Inspection under Regulation 43 of Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010, on 16.11.2022 - Approval - accorded.

Letter No. 847/SPP/CEIG/D3/SC/2022-2, Dated 28.11.2022

Sir,

Sub: Electricity - 3 MW Solar Power Plant - New Electrical Installations of voltage exceeding 650V and upto and including 33 kV and upto 650V at the premises of M/s. Gokul Autotech Private Limited, SF. Nos.326/1, 326/3, 326/5A, 326/7, 326/2A, 326/4, 326/6B, 326/5B, 340/1, 339/2(P), 326/6A, 327/1A, 327/1B, 327/1C(P), 327/2(P), of Karisalkulam Village, Thiruvengadam Taluk, Tenkasi District - Inspection under Regulation 43 of Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010, on 16.11.2022 - Approval - accorded.

Ref: 1. This office letter No. 847/SPP/CEIG/D3/Drq/2022, dt. 14.11.2022.
2. Your letter No. & dt. Nil, received on 16.11.2022.
3. This office letter No. 847/SPP/CEIG/D3/Reg-43 Inspection/2022, dt. 15.11.2022.
4. The Electrical Inspector/Tirunelveli letter No. SPP 847/E/TIN/R 43/2022-1, dt. 16.11.2022.
5. Your letter No. & dt. Nil, received on 22.11.2022.
6. This office letter No. 847/SPP/CEIG/D3/TC/2022-1, dt. 28.11.2022.

Approval is hereby accorded under Regulation 43 (5) of Central Electricity Authority (Measures relating to safety and Electric Supply) Regulations, 2010 to commission the Electrical Installations inspected on 28.09.2022 at the above premises for 1 x 3.3 MVA Solar Duty Transformer, 1 x 3 MVA Solar Inverters and other equipments as detailed in annexure subject to complying with the terms and conditions of the supplier.

The date of energiation of the installation should be intimated to this office. The equipment's permitted should be commissioned within six months from the date of issue of this letter falling which fresh permission should be obtained.

Under Regulation 46 (7) of Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010, the owner of the installation shall maintain and operate the installations in a condition free from danger and as recommended by the manufacturer or by the relevant codes of practice of the Bureau of Indian Standards.

(Sd/-) Chief Electrical Inspector to Government
//True Copy/Forwarded//

Encl: Annexure containing List of Electrical Equipments (03 Pages)
Copy to: Ms.Asian Windmill Spares and Services, Plot No.58, Door No.12/821, 2nd Floor, Tamil Gudimagan Nagar, 5th Street, Kovilambakkam, Chennai-600 126. (With Annexure)

Copy to: The Superintending Engineer/TANGEDCO Ltd/Tirunelveli Electricity Distribution Circle/Maharajapuram, Tirunelveli - 11 (With Annexure)

Copy to: The Senior Electrical Inspector/Colombatore (With Annexure)

Copy to: The Electrical Inspector/Tirunelveli (With Annexure)

The Balance Inspector fees of Rs.20930/- has been received in this office vide challan No. 20221122003736, dt.22.11.2022 paid to this office of the Chief Accountant, PAO (Chennai (South)).

SOLAR ENERGY WHEELING AGREEMENT
SPG HTSC No: 079574720080

This agreement made at Tirunelveli on this 28th day of December Two Thousand Twenty Two (2022) between M/s. Gokul Autotech Pvt Ltd, Kancheepuram, having Registered Office at Plot No: A - 40/B, SIPCOT Industrial, Growth Centre, Oragadam, Sriperumbudur Taluk, Kancheepuram District - 602105. (herein after called the SOLAR Energy Generator) (which expression shall wherever the context so permits means and included the successor in interests, administrators and assigns) represented by MR.T.SATHISH KUMAR Authorized Signatory - partner as party of the first part and TANGEDCO and having its office at Tirunelveli (hereinafter called the Distribution Licensee), (which expression shall wherever the context so permits means and includes the successors in interests, administration and assigns) represented by The Superintending Engineer / Tirunelveli EDC/ Tirunelveli as party of the Second part.

For Gokul Autotech Pvt Ltd
Authorized Signatory

-2-

Whereas this Agreement is for Wheeling of energy from the SPG plant to the captive users mentioned herein the Agreement.

WHEREAS the party to the first part has established 3 MW Solar Power Plant SPG No. 079574720080 installed at SF No. 326/1, 326/3, 326/5A, 326/7, 326/2A, 326/4, 326/6B, 326/5B, 340/1, 339/2(P), 326/6A, 327/1A, 327/1B, 327/1C(P), 327/2(P) of A.Karisalkulam Village, Thiruvengadam Taluk, Tenkasi District Tamilnadu. The interlocking voltage is 11kV and connected to Thiruvengadam 33/11 kV fed by Kalingapatti 110/33-11kV Sub-Station. The SPG commissioned on 20.10.2022 through the Distribution Licensee/STU's transmission and distribution network for captive use under Non-REC Scheme under ISOA System as below.

Sl. No.	Company Name	HT SC No.	EDC	HT.Tariff
1	M/s Gokul Autotech Pvt Ltd	09609411131	Chengalpattu EDC	HT /A/A

Whereas the SPG has got approval for Captive Generating Plant status vide Lr.No. 000128/L21/F. M/s. Gokul Autotech Pvt Ltd - 3 MW/2022 - 7 dated 20.07.2022. In the view of the following premises, the parties hereby agree and enter upon this EWA on this day on the following terms and condition.

TERMS AND CONDITIONS:

A	Generator	M/s. Gokul Autotech Pvt Ltd. HTSC - No. Yet to Assign Tirunelveli EDC.
B	Nature of Equity	Private Limited Company
C	Share Capital	Rs 51,60,000- (Rupees Fifty One Lakhs and Sixty Thousand Only)
D	Detail of User (Owners)	Captive User list as per Table -1
E	Capital held by the user in the proposed captive Generating Plant	Rs 51,60,000- (Rupees Fifty One Lakhs and Sixty Thousand Only)
F	Percentage ownership holding of Share capital by the user in the proposed CGP.	100%

Based on the documents furnished herein, as per the clause 184 of Electricity Act 2003, it is arrived that the captive User list as per Table -1 had 100% ownership in the proposed Generating plant M/s. Gokul Autotech Pvt Ltd, Tirunelveli EDC (HT SC No. Yet to be assigned) as per chartered Accountant Certificate (UDIN No.22237482ANMHIN6965) Dated 23.07.2022 and other documents furnished. Hence approval has been considered for wheeling under captive category. The approval for wheeling under captive category is valid only till such time the underlying Solar Power Plant is owned by M/s. Gokul Autotech Pvt Ltd, and there is no change in Ownership/shareholding of the CGP.

For Gokul Autotech Pvt Ltd
Authorized Signatory

Contribution of Gokul Autotech Pvt.Ltd to TANGEDCO

7.4.5 Assistance to Low Carbon Innovation

CITIL (Chennai Institute of Technology Incubation Lab) is an initiative by the institution committed to fostering entrepreneurship by providing mentorship, state-of-the-art technology, and specialized COEs for deep tech product development. We help ideas become successful enterprises by offering essential funding and all-encompassing support. The goal of CITIL is to turn creative ideas into profitable, long-lasting businesses. Our dedication is to giving companies the tools they need to succeed in the marketplace. CITIL open the door for the expansion of entrepreneurial initiatives by combining technology, specialized support, and mentorship. Start-up towards Climate Action Plan enhances the process of controlling the greenhouse gas emissions profile. The Plan reflects the dedication and involvement of the institution towards the control of CO₂ emissions encouraging, incubating, step-up and leading entrepreneurial pillars. Festa Solar Pvt. Ltd., deals with energy system integrators was initiated by the institute's CITIL and Gokul Autotech Pvt. Ltd that places time for training the institute's faculties and students. This provides a conduit to empowerment, innovation and triumph in the sustainable transformation journey. Listrik Motors, Quarz Motors and FT Motors Pvt. Ltd. were initiated by the incubated students from the institute which makes them incredibly proud that their entrepreneurial spirit drives advancements towards a greener and more sustainable future.

Start-ups with CITIL

S.No	Information
1.	<p>Startup Name: Festasolar Pvt Ltd</p> <p>URL: https://festasolar.com/home</p> <p>Incorporation Number/CIN: U70109TN2018PTC125820</p> <p>Date Established: 15.11.2018</p> <p>District of Registration: Chennai</p> <p>State Registration Number/DPIIT Recognition Number: DIPP152338</p> <p>Founder Name: Mr. Sampath Kumar</p> <p>Email address: festasolarchennai@gmail.com</p> <p>Description: Solar Panels</p>
2.	<p>Startup name: Listrik Motors Pvt.Ltd</p> <p>Incorporation Number/CIN: U74140DL2007PTC160476</p> <p>Date Established: 28.05.2021</p> <p>District of Registration: Kanchipuram</p> <p>Founder Name: Mr. Rosario</p>

	<p>Email address: listrikmotors@gmail.com</p> <p>Description: E-Bike Mobility</p>
3.	<p>Startup name: Quazr Motors Pvt.Ltd</p> <p>Incorporation Number/CIN: U34300TN2022PTC151997</p> <p>Date established: 07.05.2022</p> <p>District of Registration: Chennai</p> <p>State Registration Number/DPIIT Recognition Number: DIPP101644</p> <p>Founder Name: Mr. Ruban</p> <p>Email address: quazrmotor@gmail.com</p> <p>Description: E-Bike Precisions</p>
4.	<p>Startup name: FT Motors Pvt.Ltd (Sina Mobility)</p> <p>Incorporation Number/CIN: U34300KA2017PTC107271</p> <p>Date established: 14.07.2021</p> <p>District of Registration: Bangalore</p> <p>Founder Name: Mr. Rishabh</p> <p>Email address: sinamobility@gmail.com</p> <p>Description: Electric Vehicle Autocomponents</p>