Annual Carbon Emission Report

for

Thapar Institute of Engineering & Technology, Patiala

Scope and Boundary:

The framework for accounting greenhouse gas (GHG) emissions at Thapar Institute of Engineering & Technology (TIET) is established by considering the following aspects:

[1] Organizational Boundaries: The organizational boundaries of TIET include all the departments, school, faculties, campuses, and affiliated entities that are under the direct operational control of the university.

[2] Operational Boundaries: The operational activities within the organizational boundaries which contribute to GHG emissions. It includes direct GHG emissions from on-campus sources, such as energy use, transportation, heating, cooling, waste management, etc.

Scope of GHG Emissions: The GHG emissions can be classified into two scopes as per the Greenhouse Gas Protocol (GHGP) guidelines:

Scope 1: Direct GHG emission from sources owned or controlled by TIET, such as emissions from university-owned vehicles, on-site fuel combustion, and refrigerants.

Scope 2: Indirect GHG emission from the consumption of purchased electricity, heat, or steam. This includes emissions generated off-site but resulting from the university's energy consumption.

In order to ensure consistent and comparable data for analysis and decision-making, financial year (FY) is considered as the reporting period for GHG accounting. For example: GHG accounting for FY 2021-2022 denotes all the GHG emissions between April 2021 and March 2022. Moreover, FY 2020-2021 is considered as the baseline year for reporting of GHG emission in this report. The GHG emission from various sources within organizational and operational boundaries are reported

in tonnes of carbon dioxide equivalent (tCO_2e) for the FY 2020-2021, 2021-2022, 2022-2023, and 2023-2024. The details can be found in the following table:

Emission Source	**Reporting Year**			
	FY 2020-2021 (Baseline Year)	**FY 2021-2022**	**FY 2022-2023**	**FY 2023-2024**
Scope 1				
LPG used in Hostel/Canteens	43.83	221.08	528.57	721.04
LPG used in Staff Residence	145.95	145.95	159.65	149.8
LPG used in Laboratory	0.34	0.38	0.34	0.31
Diesel used in DG sets	81.27	33.43	84.60	59.73
Diesel used by institute owned vehicles	1.04	1.69	4.21	4.06
Petrol used by institute owned vehicles	0.35	0.50	0.61	0.53
Refrigerant used in Laboratory	10.70	10.70	10.70	12.13
Scope 2				

Purchased electricity	4001.73	7294.94	14337.27	15313.52
Total Scope 1 and Scope 2 Emissions (tCO_2 eq.)	**4285.22**	**7708.69**	**15125.95**	**16261.14**

Limitation Disclosure:

To calculate the total Scope 1 and Scope 2 emissions, data is collected from various units of the institute, including Departments, Schools, Maintenance Unit, Administrative Unit, etc. However, it should be noted that the amount of refrigerant used in refrigeration and air conditioning is currently not considered in this calculation due to the lack of a system that can accurately measure the amount of refrigerant consumed in a year. Moreover, it's important to mention that the refrigerants used in laboratories are included in Scope 1 emissions.

For this report, the emission factors are sourced from the United Nations Framework Convention on Climate Change. In cases where country-specific emission factors are not available, the emission factors recommended by the United States Environmental Protection Agency are utilized.

Future Considerations and Sustainable Action Plan:

In order to actively reduce TIET's carbon footprint in the future, the institute administration has put into effect a comprehensive sustainable action plan. To achieve a 25% reduction in GHG emission by 2030, the administration is working towards a long-term goal of carbon neutrality. We aim to achieve Net Zero by 2070, in line with the target of the Government of India. This plan encompasses various initiatives and scheduled sustainable actions, including:

(a) EV charging stations
(b) Solar panels on roof top
(c) Solar water heating system
(d) Flaring of CH_4 at STP
(e) E-rikshaw for commuting inside campus

(f) LED lighting

(g) Sensor-based switches

(h) Smart electric meter

(i) Radiant cooling

(j) Ground water recharge well

(k) Tree plantation

(l) Waste reduction, reuse, and recycling

(m) Awareness campaign and Environmental education

(n) Installation of BLDC fans in new buildings

(o) 3 MW Solar plant

(p) No vehicle day on Wednesday

It's important to highlight that many of the activities mentioned above are already integrated within the institute. These existing initiatives comprise the installation of a solar water heating system, utilization of Installation of EV charging stations, E-rikshaws for transportation, adoption of LED lighting fixtures, incorporation of BLDC fans in new constructions, introduction of a no-vehicle day on Wednesdays, deployment of smart electric meters, construction of groundwater recharge wells, implementation of plantation drives, launch of awareness campaigns and environmental education programs, and adoption of radiant cooling systems. These measures have already played a significant role in diminishing the institute's carbon footprint.

Nevertheless, it's crucial to acknowledge that the institute administration is actively engaged in advancing the implementation of additional sustainable endeavors in the foreseeable future. These forthcoming initiatives aim to bolster the institute's sustainability endeavors, fostering a more environmentally conscious operation. Furthermore, a proposal for a 3 MW solar plant within the campus is underway, promising significant reductions in the campus's carbon footprint. The administration remains committed to perpetually enhancing and broadening the existing sustainable practices, striving for even more substantial reductions in the institute's carbon emissions.