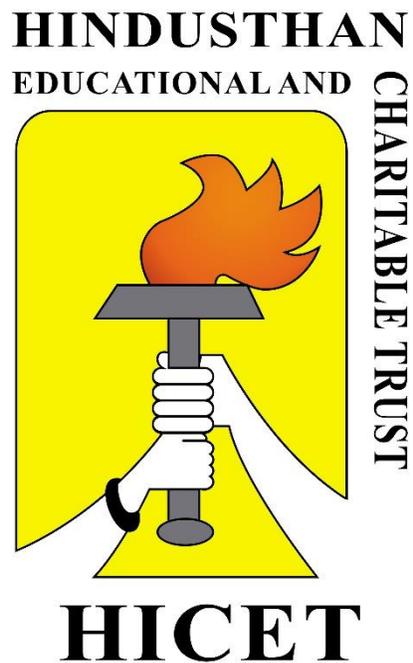# HINDUSTHAN COLLEGE OF ENGINEERING AND TECHNOLOGY

Coimbatore 641032, Tamil Nadu, India

Phone: 0422-4242424, Website: www.hicet.ac.in

CLIMATE ACTION PLAN: A ROADMAP TO ACHIEVE CARBON NEUTRALITY (SCOPE 1 & 2) BY 2050

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1. Introduction and Vision

1.1 Purpose and Scope:

The purpose of this initiative is to achieve carbon neutrality by 2050 through the systematic reduction of greenhouse gas emissions across all campus operations. The scope encompasses sustainability efforts in energy consumption, transportation, waste management, building infrastructure, and community engagement.

1.2 Vision Statement:

To achieve carbon neutrality by 2050, contributing to global climate change mitigation and promoting a sustainable campus environment.

2. Alignment with Green House Gas (GHG) Protocol Frameworks

2.1 Scope 1 (Direct Emissions):

The roadmap addresses direct emissions from on-campus sources like fossil fuel combustion in buildings and vehicles (e.g., through electrification of transportation and energy-efficient upgrades).

2.2 Scope 2 (Indirect Emissions):

It includes strategies for reducing emissions from purchased electricity, such as transitioning to renewable energy sources like solar and wind power.

3 Key GHG Protocol Principles

3.1 Relevance:

The roadmap captures emissions that are significant and relevant to the institution's operations, such as energy use, transportation, and waste.

3.2 Completeness:

It outlines a comprehensive approach, including baseline measurements, carbon sinks, and sectoral strategies.

3.3 Consistency:

The plan proposes consistent tracking of emissions through tools and periodic reporting to ensure comparability over time.

3.4 Transparency:

The use of MRV (Monitoring, Reporting, and Verification) systems ensures open and clear documentation of progress. Annual sustainability reports further reinforce transparency.

3.5 Accuracy:

Plans for smart meters and third-party auditing ensure data accuracy, minimizing uncertainty in emissions measurement.

4. Components of GHG Protocol Compliance

4.1 Baseline Establishment:

The documentation of 2023 emissions as a baseline aligns with GHG Protocol standards for establishing a reference point.

4.2 Sectoral Focus:

The roadmap details emission sources (e.g., energy use, transportation, and waste) and includes sinks, such as green spaces, for a balanced perspective.

4.3 Carbon Offset Strategies:

Initiatives like reforestation and direct carbon capture align with the GHG Protocol's emphasis on offsets to counterbalance emissions.

5. Current Carbon Footprint Assessment

5.1 Carbon Inventory:

- Assessment of energy consumption across campus buildings, laboratories, and student hostels.
- Evaluation of transportation-related emissions from faculty, staff, and student travel.
- Calculation of emissions from waste production and disposal practices.
- Examination of water usage and its environmental impact, including energy costs.
- Assessment of food-related emissions from campus cafeterias and supply chains.

5.2 Baseline Emissions:

- Documentation of the emission baseline (2023) with emissions expressed in CO_2-equivalent terms.
- Sector-wise emission breakdown to identify significant emission sources.
- Emission Sources and Sinks
- Identification of carbon sinks (e.g., campus green spaces) and opportunities for new carbon sequestration projects.

6. Carbon Neutrality Targets

6.1 Short-Term Goals (2025-2030):

- Reduction in total emissions by 10-15% by 2030.
- Transition of energy use to 30% renewable sources by 2030.
- Reduction in single-occupancy vehicle use on campus by 20%.

6.2 Medium-Term Goals (2031-2040):

- Achieving a 30-40% emissions reduction by 2040.
- Transition to 50% renewable energy consumption by 2040.
- Establishment of zero-waste practices, with a 75% recycling rate.
- Implementation of sustainable food sourcing initiatives in campus cafeterias.

6.3 Long-Term Goals (2041-2050):

- Achievement of carbon neutrality by 2050.
- 100% renewable energy usage across campus.
- Electrification of campus transportation and use of alternative low-carbon options.
- Carbon offset initiatives such as reforestation and afforestation.

7. Emission Reduction Strategies

7.1 Energy Efficiency Improvements:

- Retrofitting campus buildings with energy-efficient technologies (LED lighting, energy-efficient HVAC systems).
- Setting energy-saving targets for departments, especially laboratories and classrooms.
- Installation of smart energy meters for real-time energy usage monitoring.

7.2 Renewable Energy Transition:

- Expansion of solar PV systems to increase the reliability on renewable energy capture.
- Exploration of wind energy systems as viable renewable sources.
- Increase in renewable energy supply through partnerships with utility providers.

7.3 Sustainable Transportation:

- Promotion of electric vehicles (EVs) with installation of charging stations on campus.
- Expansion of bicycle racks and bike-sharing programs to encourage cycling.
- Collaboration with local authorities to enhance public transportation routes to and from campus.

7.4 Sustainable Manufacturing and Supply Chain:

- Engagement with vendors and suppliers to source sustainable materials for campus construction and maintenance.
- Adoption of green procurement policies prioritizing low-carbon products and services.

7.5 Building and Infrastructure Upgrades:

- Development of a green campus master plan with sustainable building practices, including LEED certification.
- Enhancement and optimization of water-saving technologies, such as rainwater harvesting and efficient fixtures.

7.6 Waste Management:

- Implementation of a zero-waste policy aiming for a 75% recycling rate by 2030.
- Establishment of composting programs for organic waste.
- Partnerships with recycling firms for proper e-waste disposal.

8. Carbon Offset and Sequestration Strategies

8.1 Carbon Offsetting Projects:

- Investment in carbon offset projects, such as reforestation and forest protection, to counterbalance emissions.
- Partnerships with environmental organizations for carbon-neutral campus initiatives.

8.2 Direct Carbon Capture:

- Exploration of direct air capture technologies and campus-based carbon sequestration projects like bioenergy with carbon capture and storage (BECCS).

8.3 Nature-Based Solutions:

- Increase in tree planting on campus, focusing on native species that absorb carbon and support biodiversity.
- Development of campus gardens or small-scale agroforestry projects to absorb carbon.

9. Monitoring, Reporting, and Verification (MRV)

9.1 Data Collection and Monitoring Tools:

- Implementation of a carbon footprint tracking tool for emissions data measurement.
- Installation of smart meters and energy tracking systems for real-time energy usage monitoring.

9.2 Regular Reporting:

- Publication of annual sustainability reports, including emissions reductions, energy use, and waste management progress.

9.3 Third-Party Auditing:

- Engagement of third-party auditors for verification of emissions reductions and carbon neutrality claims.

10. Policy, Governance, and Stakeholder Engagement

10.1 Leadership and Accountability:

- Establishment of a Sustainability Task Force with representation from faculty, students, and staff.

- Designation of a Chief Sustainability Officer (CSO) to oversee the progress of sustainability efforts.

10.2 Policy Development:
- Development of campus-wide policies for energy consumption, waste management, and green procurement.
- Implementation of incentives for departments and faculty to engage in sustainability practices.

10.3 Stakeholder Involvement:
- Engagement of students, faculty, and staff through sustainability workshops, campaigns, and events.
- Encouragement of student-led sustainability initiatives and clubs.

11. Financial Plan and Investment
11.1 Cost-Benefit Analysis:
- Conducting financial analysis for proposed emission-reduction projects, including long-term savings and upfront costs.

11.2 Funding and Investment:
- Sourcing funds through grants, donations, and green financing options like green bonds.
- Formation of partnerships with businesses for sustainable technology and discounted equipment.

11.3 Green Financing:
- Exploration of green bonds or other financial instruments to fund renewable energy and infrastructure projects.

12. Risks and Challenges
12.1 Identify Barriers:
- Recognition of financial constraints or budget limitations for energy-efficient upgrades.

- Identification of technological barriers, such as the feasibility of certain carbon capture methods.

12.2 Adaptation Strategies:

- Development of strategies to overcome barriers, such as phased implementation or prioritizing low-cost energy efficiency measures.
- Partnerships with sustainability-focused companies for expertise and resources.

13. Review and Continuous Improvement

13.1 Progress Review:

- Conducting biennial reviews of the roadmap and adjusting strategies based on technological advancements and financial conditions.

13.2 Adjustments and Refinements:

- Refinement of emission-reduction targets as needed, especially with the availability of new carbon offset projects or technologies.

13.3 Sustainability beyond Carbon Neutrality:

- Consideration of future sustainability initiatives beyond carbon neutrality, including water conservation, biodiversity preservation, and sustainable food sourcing.

14. Communication Plan

14.1 Internal Communication:

- Regular communication with the HICET community through emails, newsletters, and campus events to update progress on carbon neutrality.

14.2 External Communication:

- Publication of the roadmap and sustainability achievements through external media and platforms to engage the broader community and stakeholders.

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