Not Zero- Net Zero University Campus

WHAT? WHY? WHEN? HOW?

Green TERRE Foundation
Fast Forword to Net-ZerO

SCCN
Smart Campus Cloud Network

Context

Carbon Neutrality, reducing the carbon emission to net zero, has been identified by Intergovernmental Panel on Climate Change (IPCC) as the definite way out of the existential threat to our planet. What more, the social and economic benefits of Carbon Neutrality stand-out as new era of 'New and Clean Energy' take roots. Taking the clue, number of businesses, cities and more than 100 have now set or are considering a target of reducing emissions to net zero by around mid-century.

On 12th December 2020, on fifth anniversary of the Paris agreement, Green TERRE Foundation, (herein after called TERRE), a not-for-profit, section 8 company, as part of its Smart Campus Cloud Network, organized the virtual interaction with 12 Vice Chancellors from the well-known universities across the length and breadth of India. One university from Latin America (Peru) also participated. UNESCO, AICTE-All India Council of Higher Technical Institutes (Ministry of Education) and EESL-Energy Efficiency Services Limited (Ministry of Power) participated to interact with VCs at the highest level. All the VCs in the event took the pledge to attain net-zero emissions within the time span stipulated by IPCC. Since then, 250+ higher educational institutes have taken pledge on-line.

What is Carbon Neutrality?

The Intergovernmental Panel on Climate Change (IPCC) defines Carbon Neutrality as: "anthropogenic (human induced) greenhouse gas (GHG) emissions are offset by an equal number of emissions reduced, avoided, or sequestered within a given time horizon."

Human induced GHG emissions mainly include carbon dioxide (CO2) coming from burning of fossil fuel for electricity production and transport, methane (CH4) from refineries and bio-fermentation, fluorocarbons (HFCs and CFCs), Florine chemicals (SF6 and PFCs) mainly used in refrigeration and AC and nitrous oxides from agricultural practices. The IPCC concluded the need for halving the anthropogenic emissions of GHGs by 2030 and net zero by 2050 to remain consistent with 1.5C.

The 2015 Paris Agreement set a global goal to reach net zero emissions in the second half of the century. An increasing number of governments are translating that into national strategy, setting out visions of a carbon-free future to end their contribution to global warming.

Every country, city, financial institution and company should adopt plans for net zero -- and act now to get on the right path to that goal.

Objective

Overall objective is to fill the skill-gap among youths about Net Zero. Specifically, to make youth future-ready through hands-on and skill-building exercises by making campuses as living laboratories for transforming them into Net Zero-compliant-making them Carbon Neutral.

Why Carbon Neutrality is urgent and crucial?

Carbon dioxide (CO2) emissions are one of the main causes of climate change. CO2, and other greenhouse gases (GHG), traps in solar radiation and warms the surface of the Earth. The effects of global warming in the coming decades will be extreme catastrophic.

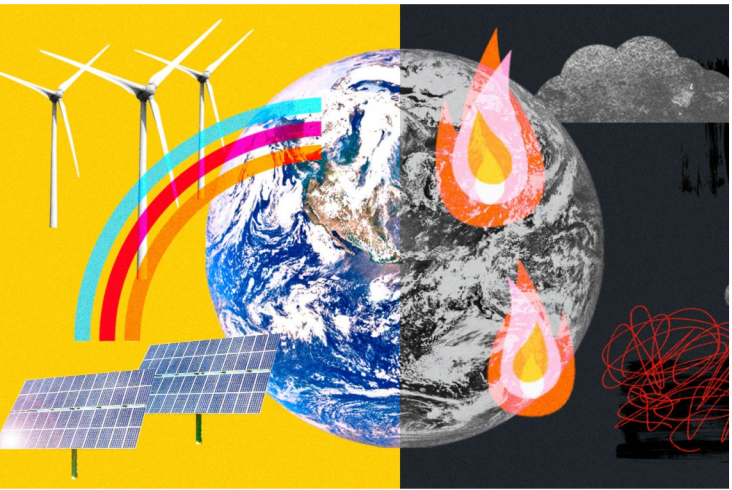
Climate change is the biggest challenge facing humanity today. While the Covid-19 pandemic has temporarily reduced emissions, carbon dioxide levels are still at record highs – and rising. The past decade was the hottest on record; Arctic Sea ice in October was the lowest ever, and apocalyptic fires, floods, droughts and storms are increasingly the new normal.

Biodiversity is collapsing, deserts are spreading, oceans are warming and choking with plastic waste. Pandemic recovery gives us an unexpected yet vital opportunity to attack climate change, fix our global environment, re-engineer economies and re-imagine our future.

What is needed to become Carbon Neutral World?

A growing coalition of countries, cities, businesses and other institutions are pledging to get to net-zero emissions. 137 countries have committed to carbon neutrality, as tracked by the Energy and Climate Intelligence Unit and confirmed by pledges to the Carbon Neutrality Coalition and recent policy statements by governments. Necessary approach must include:

- To build a truly global coalition for Carbon Neutrality by 2050.
- To align global finance and policies with the Paris Agreement and the Sustainable Development Goals, the world's blueprint for a better future.
- Secure a breakthrough on adaptation and resilience to help those already facing dire impacts of climate change.



Why Universities and Higher Educations Institutes

Educational institutes have the potential to make a shift in social, economic and ecological spheres since they are in a position to apply the theory in the education system into practicality and shape the minds of the youth towards a better future.

> “Next Pandemic would be Climate Pandemic
>
> World War III with Nature

Educational systems worldwide are moving towards such positive changes realizing their responsibility to address their impact on the environment and encourage the young generation to work more responsibly. Universities, working in transdisciplinary ambience, bridge the cross-sectoral and interlinked Sustainable Development Goals while implementing the solutions, especially the SDG 13 on Climate Change.

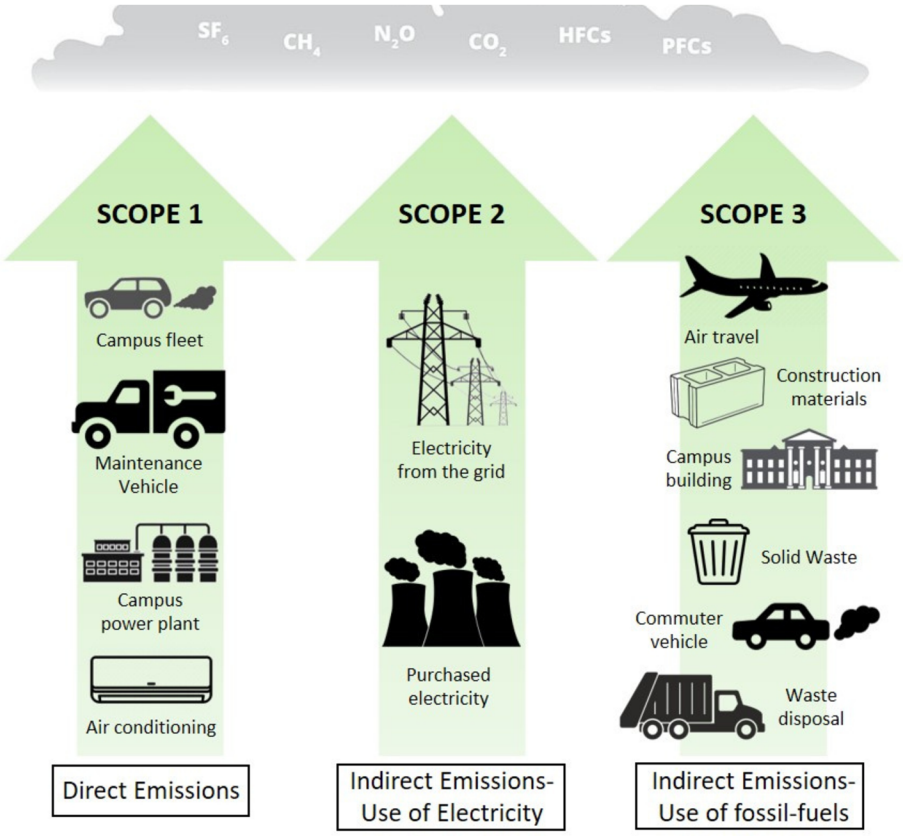
Dynamic and energized College campuses can demonstrate ambitious carbon emission reductions and such accomplishments can trigger actionable awareness on carbon neutrality. Time targets for carbon emission reductions and finally net-zero in universities and colleges may vary. But the time to begin the action is NOW. Going forward into the “Decade of Action”, when only a decade is in hand to meet the targets, achieving the net-zero campuses (as part of SDG13) is the most appropriate step.

The advantages are obvious. Firstly, universities have sole ownership of large campuses, which may even have standalone energy systems. The lack of wider stakeholders makes it easier to implement change. Secondly, they have an engaged population of students who will be enthusiastic to test new ways of doing things. Universities have a relatively untapped wealth of academic expertise that can advise on and even lead new energy projects. Finally, some synergies can be put back into the education of students.

Net Zero in longer run results into cost saving due to enhanced energy efficiency practices, use of solar energy, water conservation and recycling, waste reuse and recycle, plantation of trees that provide economic benefits. It is also environmental and social benefit.

> “The university campuses should increasingly be used as the living labs’ to test new technologies.

Types and Sources of Emissions from University Campus



An important part of the process of achieving carbon neutrality is to focus on monitoring and evaluating the carbon emissions on campus. Emissions are usually classified into three groups or 'scopes'

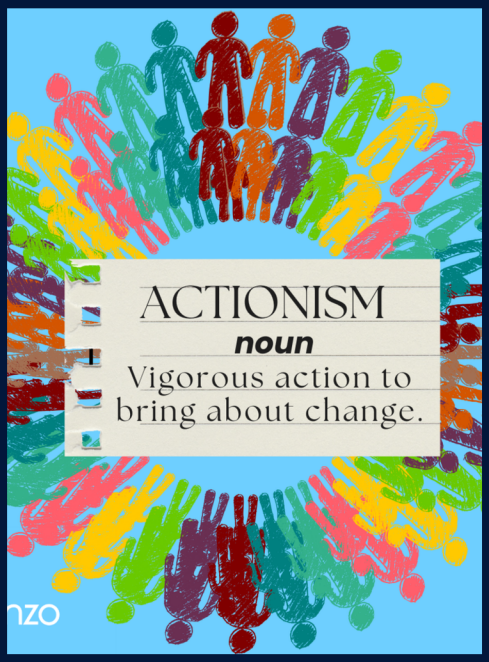
The assessment of emissions and the calculation of a carbon footprint have continuously gained attention, especially as a starting point for reducing one's impact and eventually achieving carbon neutrality.

Scope 1: Direct emissions owing from the university's owned facilities, such as burning fossil fuels on-site

Scope 2: Indirect emissions owing from the generation of purchased energy, such as electricity, heat, or steam

Scope 3: Other indirect emissions, such as business travel, waste handling, and other activities controlled by other organizations.

What is needed from universities & HEIs to become Carbon Neutral



As large producers of carbon, universities are not exempt from the global target and they have a responsibility to follow and set a good example to the community and other organizations. The university students should graduate from universities with an increased knowledge of climate change and sustainability. The young minds should be made potential to leave university with the confidence to spread climate literacy throughout the general population.

It's difficult to know where to begin when it comes to reducing the carbon emissions of your institution. The best place to start is by approaching the experts; those who can calculate your current emissions, develop a plan, and eventually provide you with a certificate to acknowledge your carbon neutral status. Once your carbon footprint has been calculated, the next step is to implement methods of reducing your institution's carbon emissions. While reducing your institution's carbon emissions is important, it must also continue to run effectively and achieve its function as a university.

Digitalisation for Decarbonisation

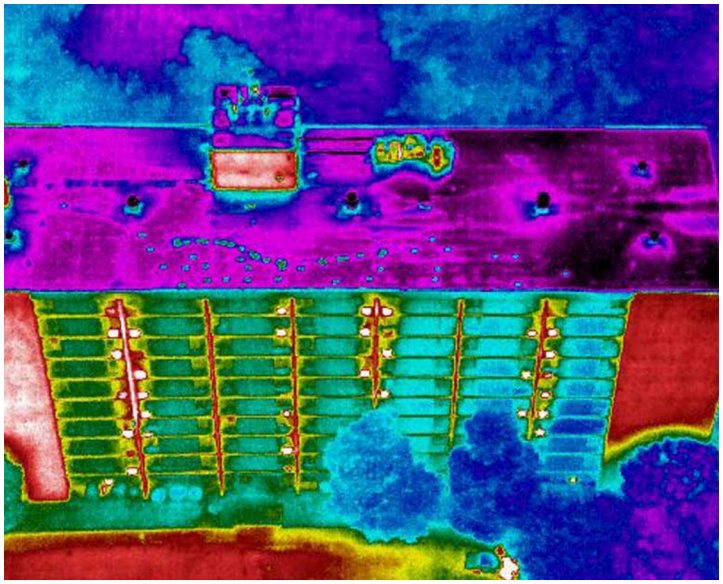
Data and digital technologies have proven to be crucial in achieving a Carbon Neutrality. They can help reduce greenhouse gas (GHG) emissions, strengthen resilience to climate-related natural hazards and improve organizational capacity to act. Mobile technologies, wearables and sensors, cloud computing and big data technologies are redefining business models.

Digital technologies from smart meters to supercomputers, weather modeling and AI, could reduce emissions by 20% by 2050 in the three highest emitting sectors: energy, materials, and mobility. Digital technologies—such as sensors, networked devices, and data analytics are already changing how energy is used and consumed across the economy.

In the energy sector, digital use cases can deliver up to 8% of greenhouse gas (GHG) reductions by 2050. This would be achieved via enhancing efficiency in carbon-intensive processes and enhancing energy efficiency in buildings, as well as by deploying and managing renewable energy using artificial intelligence.

In materials, digital use cases can provide up to 7% of GHG reductions by 2050. This would happen by improving mining and upstream production and relying on foundational technologies such as big data analytics and cloud/edge computing. In addition, use cases leveraging blockchain could enhance process efficiency and promote circularity.

In mobility, digital use cases could decrease up to 5% of GHG emissions by 2050, according to our research. This would mean leveraging sensing technologies like IoT, imaging and geo-location to gather real-time data to drive system decision-making. It would ultimately improve route optimization and lower emissions in both rail and road transport.



In education Sector:

Technologies such as data analytics, IoT and blockchain are increasingly helping universities monitor and tackle the Scope 3 impacts. The universities should establish baseline carbon footprint, to identify emission reduction strategies and track the progress towards achieving the set carbon emission target. It also enables to understand the full impact across all scopes of the campus.

Drones and satellite imagery are more advanced and accessible than ever before, making surveying and monitoring large areas of land more efficient, faster and cost-effective. Using this technology, projects can be monitored for health, enabling faster identification of ecosystem threats and prompt action to protect them.

ROLES & RESPONSIBILITIES

of Universities & HEIs

01

The role of universities will be to initiate the actions and align the campus activities towards carbon neutrality in their campuses.

02

The students should be the primary role models to kick start the activities under the supervision of faculties.

03

The universities should become a part of Smart Campus Cloud Network by registering and signing the pledge of Carbon Neutrality.

04

The universities should provide all the required data as and when needed during the monitoring and implementation stages.

05

A letter of Intent or MoU should be signed between the University and TERRE to execute the project in the campuses.

06

The universities should document their best practices and share the success stories with other universities

ROLES & RESPONSIBILITIES

of Green TERRE Foundation

01

TERRE will act as a knowledge and technical partner to universities guiding them to prepare a roadmap for Net Zero Campus

02

TERRE is intended to provide the guidance and mentor the entire process at each and every stage.

03

TERRE will provide the reference resources for Net Zero such as tool-kit, brochures, primer and guidelines.

04

It will arrange the technical experts from national & international organizations to guide the students on emerging technologies.

05

TERRE will also provide internship opportunities and enable green jobs for the students aligning to their field of interest.

06

It will facilitate the participation of students and universities to participate in conferences likeUNFCCC & UN Biodiversity COPs

STEPS FOR NET ZERO CAMPUS

01 ESTABLISH

The first step is to establish a core group or a carbon team to undertake proactive actions in the university campus.
The formation of core group will be followed by core group meeting including Vice Chancellor and TERRE's delegates.

02 IDENTIFY

The next step is to identify all the direct & indirect sources of CO2 emissions of the educational campus.
In order to do so TERRE will ask for the primary data from the university and plan the baseline survey in the campus. It will also help universities to identify the various sources of CO2 emissions.

03 CALCULATE

Upon receiving the data, the experts from TERRE will visit the campus to carry out the base-line surveys.
This step includes measuring the CO2 emissions based on accurate and complete raw data. It will specify the current carbon footprint of the campus.

04 PRIORITISE

After baseline survey the university will be able to set target and prioritise the emission reduction activities.
The core group should start developing strategies based on the baseline report

05 REDUCE

Formulate the strategies into a actionable roadmap.
Identify opportunities and implement CO2 emission reduction activities in the campus. (Energy Conservation, Energy Efficiency & Renewable Energy)

06 OFFSET

Any remaining CO2 emissions should be offset by purchasing certified carbon credits or creating a sink (Tree Plantation)

07 VERIFY

Document and Validate all Carbon Neutral activities as require by a standard-compliant declaration of achievement of neutrality

08 SUSTAIN

Device monitoring structure or switch to Net Zero digital tracker to sustain Carbon Neutrality on the university campus

TERRE's MILESTONES

- Not Zero-Net Zero Conceptualized and Inaugurated:
  12th December 2020
- Floated in the universities under Ministry of Education, India - AICTE:
  12th December 2020 – May 2022
- Structuring and Strategy Development:
  June 2022 onwards
- Global Launch: 16th November 2022, Sharm El Sheikh, Egypt @COP 27
- National (India) Launch:
  1st May 2023
- MoU Signed with AICTE, Ministry of Education: 29th July 2023, Delhi, India
- 1st Regional workshop of Universities & HEIs in Western India:
  19th Aug 2023, Pune University, India
- 2nd Regional workshop of Universities & HEIs in Southern India:
  25th Sept 2023, SRMIST, Chennai, India
- 3rd Regional workshop of Universities & HEIs in Northern India:
  07th Nov 2023, University of Delhi, India
- MoU Signed with EESL under Ministry of Power: 17th Jan 2024, New Delhi, India
- 4th Regional workshop of Universities & HEIs in Eastern India:
  20th Feb 2024, IIT Guwahati, India
- Development and initialisation of '100 days-5 year action plan for Net Zero Universities': 15 August 2024