Carbon Neutral University & Higher Educational Institutes

• Context

On **2nd Dec 2021**, PM Narendra Modi declared that 'Today India is moving forward on the subject of climate with great courage and unprecedented ambition that by the year 2070, India will achieve the target of Net Zero carbon emission'. PM Modi was addressing **COP26** of United Nations Framework Convention on Climate Change in Glasgow, UK.

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 and EESL (Energy Efficiency Services Limited) 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.

• Objective

- Contribute to India's resolve to be Carbon Neutral by 2070
- Building the and climate resilient India through 'Not Zero-Net Zero' pledge.
- Get Monetary benefits to institutions due to reduction in electricity bill.
- Transformation to Electricity generated from clean energy sources.
- Mitigate of the load on the grid to supply reliable energy.
- Import reduction and moving towards Atma-Nirbhar Bharat.
- Assist in reaching India's ambitious target of renewable energy and NDCs.
- Launch above movement by getting **75 universities** to start making road map for carbon neutral **campus before 15th August 2023, on occasion of "Azadi ka Amrut Kal'**

• What is Carbon Neutrality

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

The IPCC concluded the need for net zero CO2 by 2050 to remain consistent with 1.5C.

The 2015 Paris Agreement set a global goal (couched in legalese) 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.

Offsetting of emissions include creating carbon-sink like afforestation and carbon credits .

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.

- ## 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 :

1. To build a truly global coalition for Carbon Neutrality by 2050.
2. To align global finance and policies with the Paris Agreement and the Sustainable Development Goals, the world's blueprint for a better future.
3. 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. 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**, as it is said that ***'Next Pandemic would be more severe and would be about sustainability.'***

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 neutrality 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 university campuses should increasingly be used as **'living labs'** to test new technologies. 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.

- ## Types of emissions from universities

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'**:

1. Emission owing to electricity or heat etc. produced on the campus itself
2. Emissions owing to imported electricity, fuel to provide for cooling or heating other spaces on campus
3. Emissions owing to indirect activities in the campus- fuel consumed owing to travelling, waste generated etc.

The details of each scope are in annex (attached to this note)

- ## What is needed from universities & HEIs to become carbon Neutral (including disclosure, monitoring, reporting and sharing

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 organisations. 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.

- ## Importance of using Digital technologies

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 modelling 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 optimisation and lower emissions in both rail and road transport.

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.

- ## Role of universities / HEIs and TERRE

Universities/HEIs:

1. The role of universities will be to initiate the actions and align the campus activities towards carbon neutrality in their campuses.
2. The students should be the primary role models to kick start the activities under the supervision of faculties.
3. The universities should become a part of **Smart Campus Cloud Network** by **registering** with the network and **signing the pledge** of Carbon Neutrality.
4. The universities should provide all the required data as and when needed during the monitoring and implementation stages.
5. A letter of Intent or MoU should be signed between the University and TERRE to execute the project in the campuses.

TERRE's SCCN:

1. TERRE's SCCN will act as a knowledge and technical partner to universities.
2. SCCN is intended to provide the guidance and mentor the entire process at each and every stage.
3. SCCN will provide the reference resources such as tool-kit, brochures, primer and guidelines. It will also arrange the technical experts from various national and international organisations to guide the students and faculties on new emerging technologies.
4. SCCN will also provide digital cloud dashboard to map and monitor the campus CO2 emissions throughout the process. The success stories of the universities will be shared globally through the dashboard.

- ## Milestones of Not Zero-Net Zero University Campus:

- Not Zero-Net Zero Conceptualised and inaugurated: 12th December 2020
- Floated in the universities under AICTE: 12th December 2020 – May 2022
- Structuring and Strategy Development: June 2022 onwards
- Global Launch: 16th November 2022, Sharm El Sheikh, Egypt @COP 27

- ## Proposal on the occasion of Azadi Ka Amrut Mahotsav

- Proposed National Launch: February 2023.
- Target 75 universities start road map for carbon neutrality by 15 August 2023.

The detailed steps are listed in the annexure:

- **Annexure**

Scope 1 emissions

Direct emissions- This Scope is concerned with on-campus emissions from facilities within the campus boundaries that include combustion (oil, natural gas), majorly from heating and cooling systems contributing to direct emissions. It also targets the emissions from the existing stock of buildings on campus along with other capital infrastructure.

Estimate the number of litres (fuel) used for combustion-related activities of-

- Cooling and heating systems,
- Other machinery or activities which utilizes combustion as a part of a primary process on campus

Scope 2 emissions

Indirect emissions, Energy- Emissions from the imported electricity, heat or steam consumed by the organization, including purchased electricity represents the indirect emissions owing to the campus.
There is a need to monitor the electricity consumption every month and effectively reduce consumption over a period. Monitor the utility bills from the campus and review them over a set period to get the cumulative data on the total Kilowatt-hours.

Scope 3 emissions

Other indirect emissions- This includes emissions from commuting and business-related travel, transportation of materials, plastic and non-plastic waste; waste generated by the organization but managed by another organization.
For this, there is a need to monitor.

- The number of Airline Miles or railways miles travelled in the name of the University or the college,
- The quantity of fuel (in litres) used for commuting to and from the campus by the employees and students,
- Waste disposal in terms of metric tons

Step by Step Actions:

The initiative starts with first registering the campus with the network @www.sccnhub.com and then signing the pledge of carbon neutrality: ‘Not Zero-Net Zero’. A SCCN tool-kit will also

be provided to induct the process to the university team. Once that is done the below mentioned steps are to be followed:

ESTABLISH

- The first step is to establish a core group or a carbon team to undertake proactive actions in the university campus. The core group should consist of group of students not more than 8 from various departments and year as well as faculties.
- The formation of core group will be followed by coire group meeting inculding Vice Chancellor and TERRE's delegates.
- The meeting will be followed by MoU discussions.

IDENTIFY

- The next step is to identify all the direct & indirect sources of CO_2 emissions of the educational campus.
- In order to do so TERRE will ask for the primary basic 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.

CALCULATE

- Upon receiving the data the experts from SCCN will visit the campus to carry out the base-line surveys.
- This steps includes measuring the CO_2 emissions based on accurate and complete raw data. It will specify the current carbon footprint of the campus.

PRIORITIZE

- After baseline survey the university will be able to set target and prioritise the emission reduction activities.
- The university should start implementing a Carbon Reduction Plan through prioritization.

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Smart Campus Cloud Network

REDUCE

- Identify opportunities and implement CO_2 emission reduction activities in the campus. (Energy Conservation, Energy Efficiency & Renewable Energy)

OFFSET

- Any remaining CO_2 emissions should be offset by purchasing certified carbon credits or creating a sink (Tree Plantation)

DOCUMENT

- Document and Validate all Carbon Neutral standards require a standard-compliant declaration of achievement of neutrality

SUSTAIN

- Device monitoring structure to sustain Carbon Neutrality on the university campus

END