SHIV NADAR
INSTITUTION OF EMINENCE DEEMED TO BE UNIVERSITY
DELHI NCR

Agile Group
Business Results - Redefined

Shiv Nadar Institution of Eminence

CARBON FOOTPRINT REPORT

Reporting period

1 April 2022 – 31 March 2023

Contents:

1.0 Terms used

Abbreviations	Full Form
CFP	Carbon Footprint
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
BY	Base Year (considered 2019-20)
AY	Assessment year for reporting period (Financial year)
GHG	Greenhouse Gases
IPCC	Intergovernmental Panel on Climate Change
Kg	Kilograms
$MTCO_2E$	Metric Tons of CO_2 Equivalent
LPG	Liquefied Petroleum gas
SNIOE	Shiv Nadar University
SNIoE	Shiv Nadar Institution of Eminence

2.0 SUSTAINABILITY COMMITMENT @ SNIoE

Present times have witnessed extreme climate scenarios and their unprecedented impact on the environment globally, may it be the records rains, land-slides, the killer heat wave setting new records or wild fires, snow avalanches or excessive floods in various global cities. All these varied natural catastrophes have, however, only highlighted to the excessive environmental degradation which is a result of the excessive human intervention and abuse of nature by the human being.

Realization of the dire state that the world is presently experiencing as a result of the wrath of the nature seems is evident from the multiple structured initiatives being planned by government agencies world over. The COP meets and the evidence of actions taken by the world leaders in furtherance to their commitment at Global and Local levels is seen, however the monster of climate devastation created over the years can be defeated only by the collective effort of all the institutions and the citizen community of the world.

SNIoE realized their responsibility and in line with the same, have made visible commitment not only to the national government but also the global community through the sustainability policies and pledge signed by them and reflected in the global sustainability reporting forums like “Times Higher Education Impact Ranking”.

SNIoE, realizes that as an Institution of eminence, it would be pertinent for the university to not limit the efforts to sustainability to their campus, rather, the effective output can be achieved only when the Institution becomes an inspiration and source of knowledge for the students and community and encourage them all to become the ambassadors of climate

change management, hence, SNIoE has organized many structured programs in this direction.

Amongst the key initiatives undertaken by the university in this direction during the reporting period include:

1. Enhancing the capacity of the solar power generation capability at the campus from 430KW during the previous year to a total of 1.5 MW
2. Transition to a cleaner fuel (PNG) in the campus cafeteria
3. Natural Resource conservation
4. Conservation, restoration and sustainable use of terrestrial ecosystems associated with the university including the biodiversity at campus
5. Enhance green cover at the campus, significantly increasing the carbon sequestration value.
6. Transition to cleaner fuel for transportation
7. Food waste reduction
8. Reuse of water
9. Energy Optimization and conservation
10. Enhanced awareness and student engagement

3.0 OBJECTIVES:

- Compute Scope 1, Scope 2 and Scope 3 Carbon Footprint for all activities operating from the SNIoE Campus for financial year 2022-23
- Compute the various components in each of the categories
- Analyze the change in carbon footprint in various categories as compared to previous year / base year
- Evaluate the impact of the change in the carbon footprint for the various components in each of the scope categories along with the main reason leading to the change.
- Identify opportunities for Improvement to further enhance SNIoE's performance on their sustainability journey
- Present a factual status of the overall performance through the assessment year on all the three scopes of emissions with a detailed reflection on the trends of change and the established reasons, to facilitate the leadership team at the university to take internal decisions to drive the overall sustainability program.

4.0 **REPORTING PERIOD**: FY 2022-23 (1 April 2022 to 31 March 2023)

- Performance for the current reporting period (FY 2022-23) is reviewed against the values of the previous reporting year FY 2021-22, FY 2020-21, FY 2019 - 20 & FY 2018-19.
- While the computed values are also available for the FY 2018-19, however the data for the FY 2018-19 is not referred for the comparison being not complete being the first year of the initiation of this initiative to compute the carbon footprint and complete data for the referred period was not complete to justify the reference and comparison.
- Further, for the year 2020-21, as the university operated in a hybrid mode with the academic activities mainly move to the on-line training mode due to the Covid pandemic and the movement of the students and staff was restricted, the Carbon Footprint values of the year 2020-21 are not considered to draw any trend and reflection of the values of the current assessment period
- Year 2019-2020, being a most close to normal operations, is considered as the base year to undertake analysis and reflect on the deviations from the base year values

5.0 SCOPE AND REPORTING BOUNDARY:

a) **Physical boundary**: All activities including academic and non-academic activities based out of the SNIoE Campus located at NH91, Tehsil Dadri, Greater Noida, Uttar Pradesh 201314

b) Operational boundary

Scope 1 Direct GHG emissions:

i. Captive power generation activities including the renewable power and the power from the combustion of fossil fuels (HSD) in stationary source of electricity generators, LPG consumption in canteen & laboratories
ii. Emissions associated with use of fossil fuel for horticulture activities
iii. Combustion of fuels in mobile sources - SNIoE owned & controlled vehicles and the fuel used for the horticulture activities
iv. Fugitive emissions from the Refrigeration / air-conditioning (HVAC) equipment installed, operated and discarded during the reporting period.

Scope 2 Indirect emissions:

i. Purchased electricity including renewable and non-renewable power

Scope 3 Other Indirect GHG emissions from:

i. Commuting of Teaching Staff, Non-Teaching Staff, Students and Sub-contractors.
ii. Business Air travel and associated hotel stay
iii. Material procurement, consumption and disposal.
iv. Waste management and disposal.
v. Upstream and downstream activities

6.0 DEPLOYED METHODOLOGY:

In the spirit of the SNIoE leadership team to Educate, Empower and Engage all stakeholders, the Carbon Footprint (CFP) computation methodology was designed to engage as many stake holders as possible and required. A team including teaching & non-teaching staff along with the students was established and external consulting partner (Agile Group), with proven credentials, was engaged to provide the required knowledge support, handhold and guide through the various stages of Carbon Footprint determination engagement, including strategy design, competence enhancement, format design, data collection and validation, CFP computation using "AgileCFToolkit" ©. The computed value for the reporting period is subsequently analyzed and evaluated against the previous year and the base year for determination of the trend of increase or decrease and reflect on the reasons for the change.

The Carbon Footprint is computed using the "AgileCFToolkit" © for the data points provided by the respective functions. The Carbon Calculator is updated with the most authentic and relevant emission factors and assessment methodology in line with the global framework and the ISO 14064 standard. Several recognized national and international standards and global frameworks have been referred for the computation of the footprint of the University. The GHG emission factors are taken from reliable sources including India GHG protocol, CEA, GRI, WRI & DEFRA data bases, as well as computed using the IPCCC published methodologies to get more accurate values in Indian context.

The report highlights the key emission sources of the university and reflects the trend as compared to the previous years considered as the baseline data. Further, improvement strategies and operational initiatives are planned based on the analyzed output.

SNIoE is committed to achieve Net Zero status in its journey to deploy sustainable practices at the campus. The comprehensive EHS Policy promotes environment friendly & low emission practices in areas of water, energy, waste, habitat protection etc. One such practice is assessing carbon footprint of its activities and undertake initiatives to reduce the carbon foot print aiming to becoming carbon neutral campus. Cross functional team including teaching & non-teaching staff and student community representatives is engaged in deployment of the identified management programs and monitoring the same to ensure an ownership and motivation to keep the CFP initiatives a sustained effort towards being a Carbon Neutral Campus.

Key steps in the Carbon Footprint Journey:

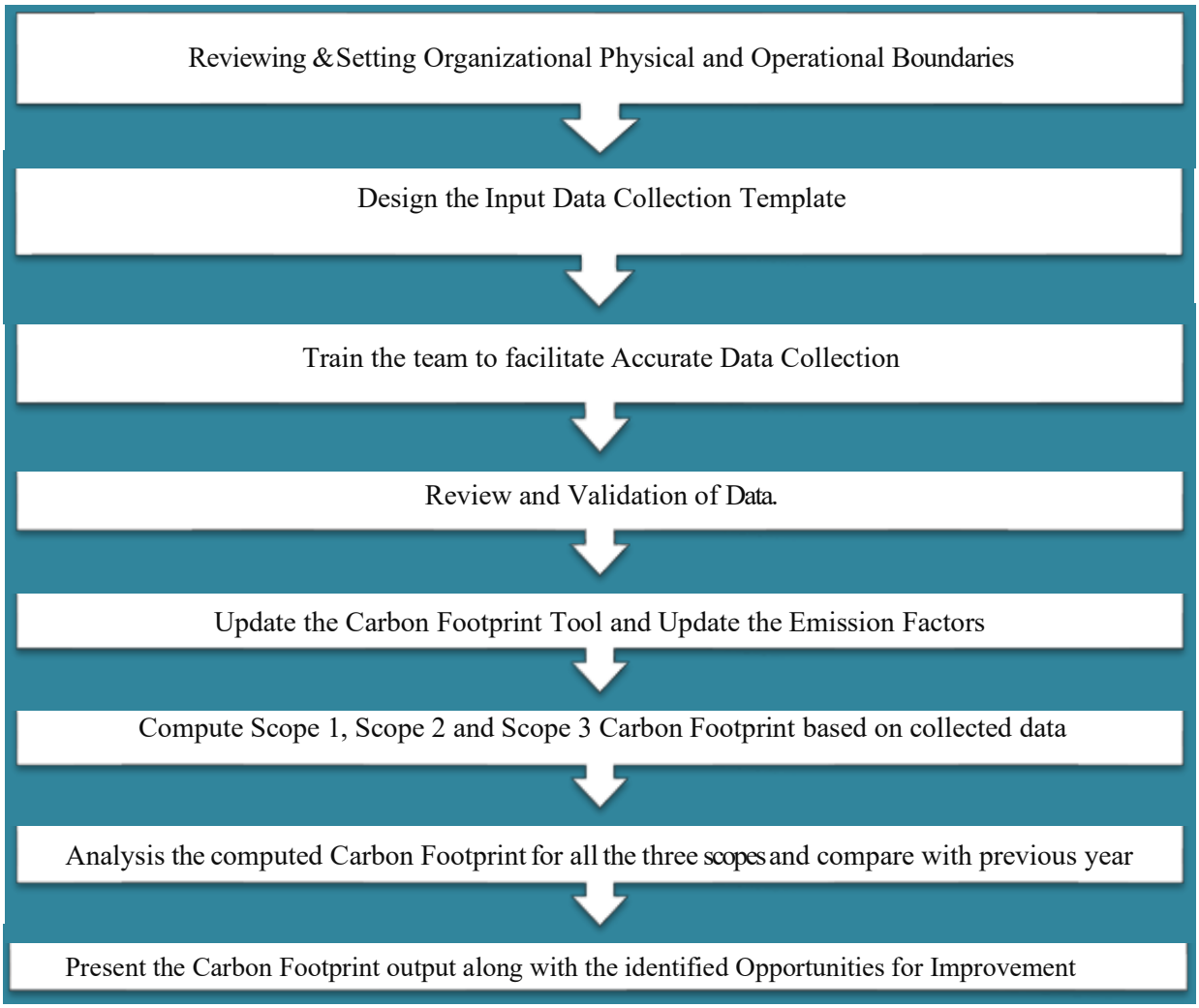


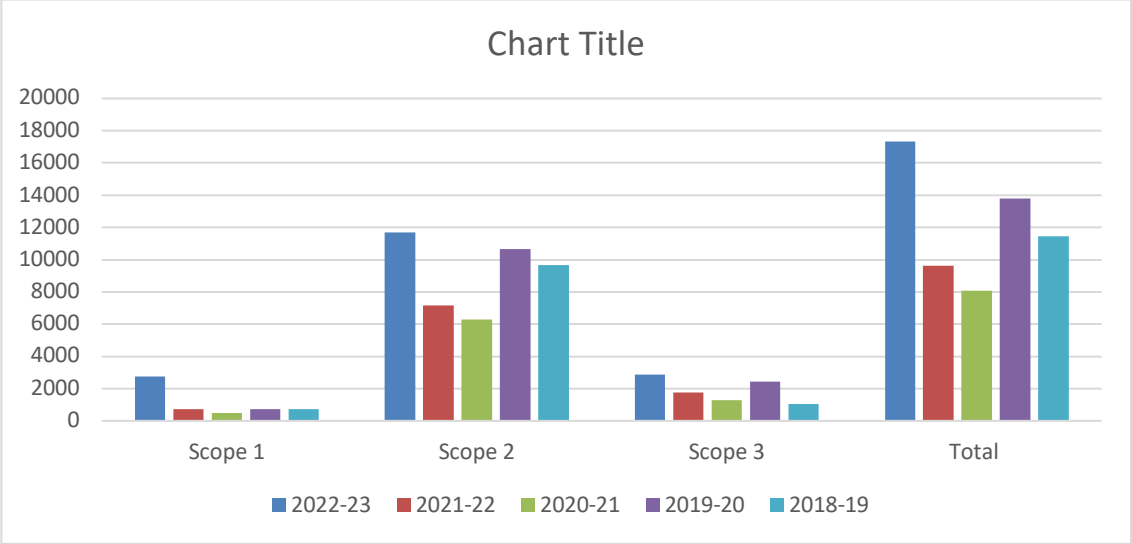
Figure 1: Flowchart Showing Adopted Methodology for Estimation of Carbon Footprint

7.0 COMPUTED RESULT

Computed values of the CFP for Scope 1, Scope 2 & Scope 3 for previous Four years.

GHG Emissions	Scope 1	Scope 2	Scope 3
MT CO_2e (2018-19)	743	9668.4	1,029
MT CO_2e (2019-20)	738	10,649	2,427
MT CO_2e (2020-21)	497	6277	1292
MT CO_2e (2021-22)	1219	7168	1753
MT CO_2e (2022-23)	**2765**	**11679**	**2870**

The computed value is arrived at considering the Emission Factors in Indian Context as obtained from the India GHG Protocol and the published methodologies by IPCCC, WRI, DEFRA and GHG Protocol. The computation of the carbon footprint is undertaken using global defined protocols and International ISO 14064 standards.

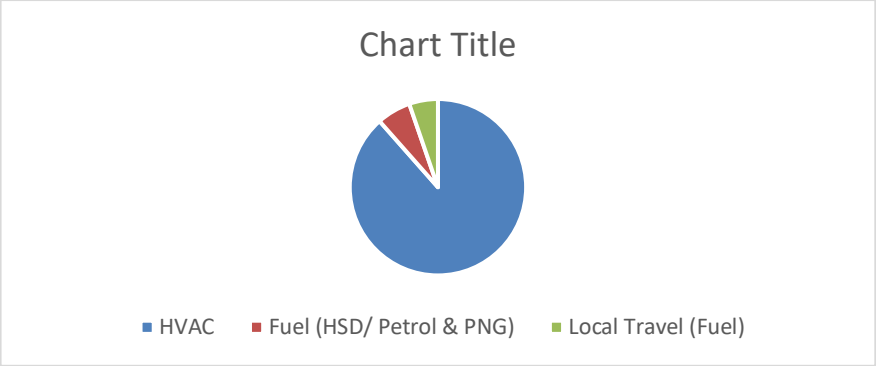


Comparing the cumulative value of the Carbon Footprint for all Scope 1, 2, & 3 against the corresponding value for the base year, there is an overall increase of 25%. The increase is mainly on account of the increased Scope 1 value which increased by 2.75 times, while the scope 2 & scope 3 increased by 10% and 18% respectively.

8.0 ANALYSIS OF THE GHG EMISSIONS

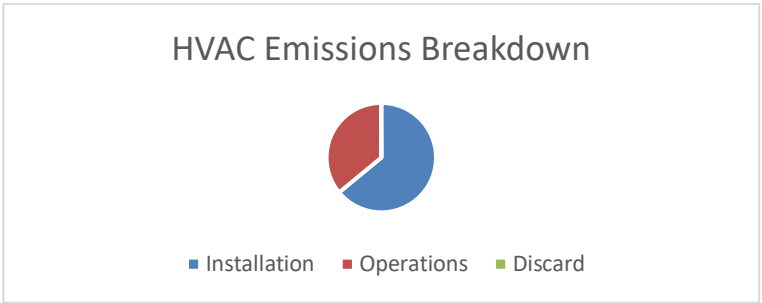
8.1 Scope 1 - Carbon Footprint Analysis:

- The Net Scope 1 Carbon Footprint computed could be divided into three main categories:
  - HVAC
  - Fuel for captive power creation and direct usage on campus
  - Fuel for Transport by Company controlled and Owned vehicles



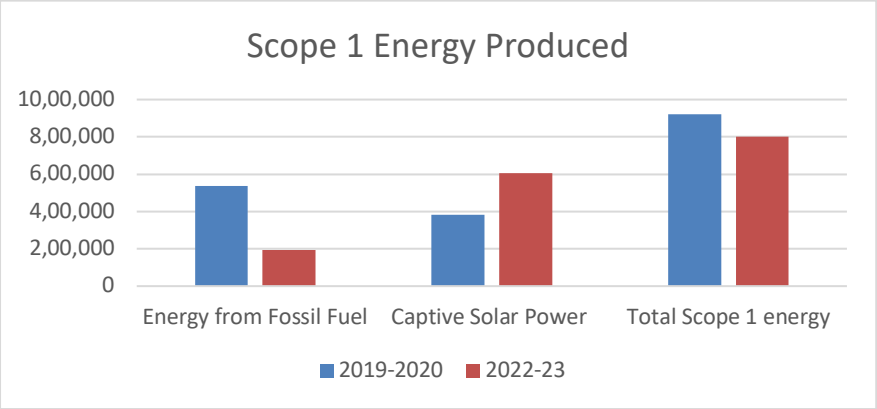
As evident, the HVAC contributes about 88.5% of the total Scope 1 Carbon Footprint emissions for the reporting period. While the contribution from the use of Fossil fuel for energy at campus was 6.2% and for the vehicular emission by company controlled and owned vehicles contributed 5.3%

Further, comparing against the base year 2019-20, there is a significant increase in the emissions on account of HVAC and the same is on account of new installation of HVAC systems as part of the increased built-up area, including the emissions on account of Airconditioned Student Hostels. The increase is contributed on account of the new HVAC installation, discard of the earlier HVAC system and ongoing operations of the installed HVAC systems.

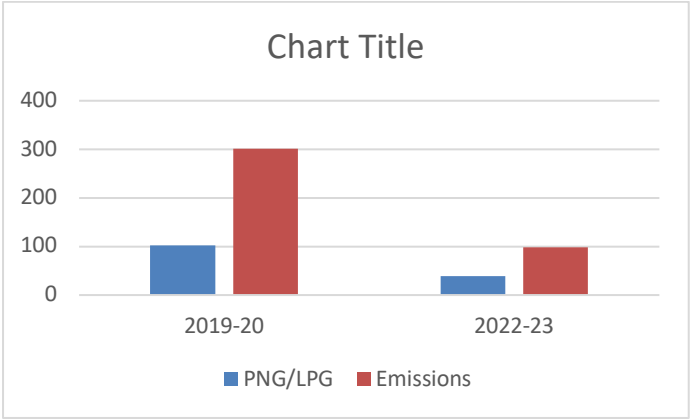


Overall Energy production within Scope 1:

- An overall **13% Reduction** in the **Total Energy** created at campus (leading to Scope 1 emissions) was observed for the reporting period as against the base year.
- **64% Reduction** was on account of the energy created by the use of **Fossil fuel** at campus
- **58% Increase** in the clean and green power created at campus using the captive solar power plan is observed in the reporting period as against the base year (2019-20).



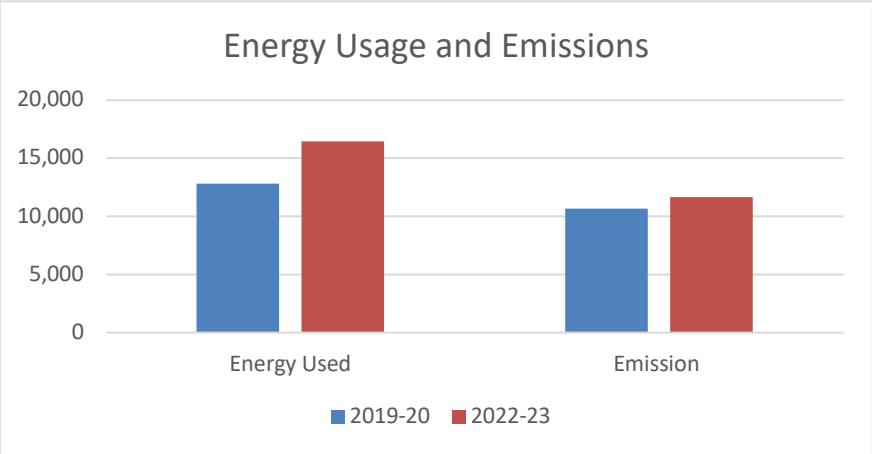
- Also, there has been a significant reduction in the use of the Fuel at Cafeteria used in the reporting period as against the Base Year. While there is a net reduction in the amount of Fuel used in the cafeteria by about 62.44%, the net contribution in emission reduction on account of the absolute quantity of the fuel (PNG/ LPG) consumed along with the transition to a less emitting fuel (PNG 13.3% less emitting than LPG), there is a significant 67.5%redution in the emissions from the use of the Fuel in the cafeteria.



8.2 SCOPE 2 GHG EMISSIONS

Scope 2 accounts for the indirect GHG emissions resulting from the generation of electricity which is subsequently purchased and consumed by the university.

There has been a 28% increase in the absolute grid power consumption during the reporting period as against the corresponding value for the base year which has contributed to an overall increase of 10% in the scope 2 emission for the reporting period as against the base year.

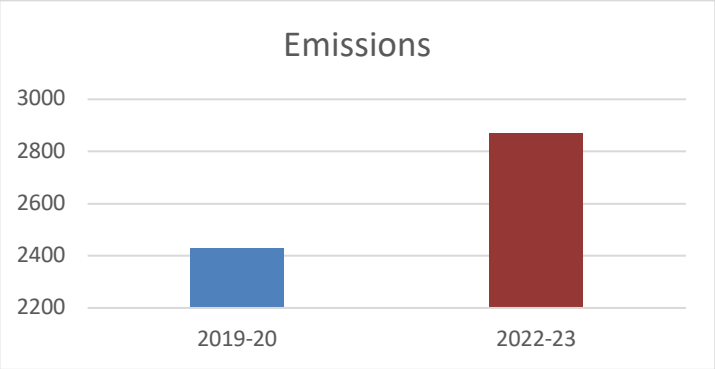


The increase is on account of an increase of 22.2% in the built-up area from the base year (2019-20). Further, considering the **Intensity ration** of the **Scope 2 emissions per Sq Ft**, there is a **Net Overall Reduction** of about **10.2%** against the corresponding value for the base year 2019-20.

8.3 SCOPE 3 GHG EMISSIONS

Scope 3 emissions are contributed by indirect activities including outsourced upstream & downstream activities and is the second highest CO_2e emission contributor at SNIOE.

During the FY 2022-23, an **18% increase in the overall Scope 3 emissions** could be achieved against the base year FY 2019-20.



Key contributor to the scope 3 emissions computation include:

Category	MT CO_2e	% Change from Base year (FY 2019-20)
Air Travel (2022-23)	**329**	**814%** ↑
Air Travel (2019-20)	36	
Travel of Employee & Sub-contractors (2022-23)	**685**	**46%** ↑
Travel of Employee & Sub-contractors (2019-20)	470	
Paper (2022-23)	**9**	**25%** ↓
Paper (2019-20)	12	
Waste (2022-23)	**5**	**55%** ↓
Waste (2019-20)	11.19	

A steep increase in the business-related Air Travel including the emissions relating to the associated Hotel Nights is the main contributor to the increase in the overall Scope 3 emissions. In addition, there is about 46% increase in the emissions relating to the travel by the employees and subcontract staff and the vendors for business related activities. Both the factors are a result of the onsite activities and movement of the teams in the post covid scenario.

Overall, the Scope 3 emissions per Sq ft Built up area has seen a reduction of 3.2% from the base year 2019-20.

9.0 CARBON SEQUESTRATION:

As it is evident in today's scenario, climate change and global warming are the most alarming issues upon which appropriate action must be taken at every level today to handle the imminent climate crisis. It is of immense importance that the ecosystem services provided by the trees, shrubs and soil are taken into consideration while looking at different options for greenhouse gas emission reduction and mitigation. Carbon dioxide is one of the most prevalent natural greenhouse gases contributing heavily to the global warming phenomenon. One of the major reasons for its high concentration is the anthropogenic activities undertaken.

Shiv Nadar Institution of Eminence, has a 286acre campus with rich flora & fauna and the university has been maintaining its biodiversity effectively. While SNIoE has been computing its carbon footprint for the past four years, the university has also started to compute the carbon sequestration at the campus for past two years. Further, structured efforts have been Institutiond at the campus to not only maintain the existing green cover but to also further increase the same. In addition, the new plantation of the trees and shrubs has also been selected considering high sequestration index of the plantation.

Study Scope for Carbon Sequestration Value Computation

In this study scope for carbon sequestration, a total of **18638 trees** on the campus**; 1,10,704 shrubs** and **71.6 hectares of grass cover in the campus of Shiv Nadar Institution of Eminence was computed.** The year of plantation for calculating per year value for trees and shrubs is 2017 based on data provided by Shiv Nadar Institution of Eminence (Charl De Villiers, 2014). The process considered the carbon sequestration of the whole university campus with a focus on the three components of the terrestrial carbon pool (trees, shrubs and grass cover).

Carbon Sequestration Value Computation:

1. Data has been given by SNIoE for three main carbon pools: Trees, Shrubs and Soils under grass cover area. Data has been collected for the three terrestrial carbon pools for the above-mentioned parameters by Shiv Nadar Institution of Eminence.
2. Carbon sequestration for 18638 trees on the campus; 1,10,704 shrubs and 71.6 hectares of soil carbon stock under the planted species of grass was computed.
3. Carbon sequestration methodology is based on weight estimation (for trees) and allometric equation (for shrubs) (the annual value of carbon equivalent sequestered for the year 2022-2023) and allometric equation (total carbon sequestered until now).
4. Data was then verified and processed for computation of carbon sequestration value.

5. Herewith are the methodologies used for the computation of carbon sequestration value.

Results and Inference:

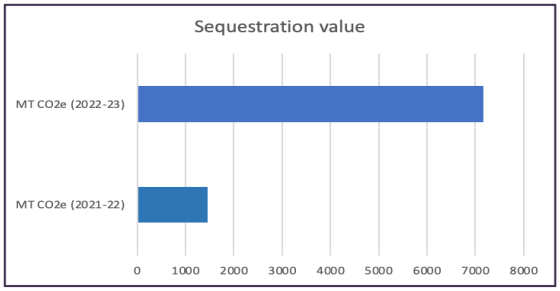
Annual carbon sequestration values:

Annual Carbon Sequestration Value (Year: 2022-2023)			
S. No.	**Category**	**Total quantity of trees/shrubs/ area considered respectively**	**Value ($MTCO_2e$)**
1.	Annual Carbon equivalent sequestered in metric tons (Trees)	18638	495.585
2.	Annual Carbon equivalent sequestered in metric tons (Shrubs)	1,10,704	509.6
3.	Total carbon equivalent sequestered by soil under different grass species in metric tons	71.6 ha	6163.836
4.	**Total**		**7,169.08**

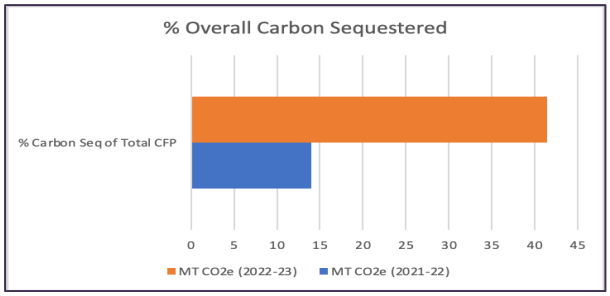
Inference Carbon Sequestration Computation:

Terrestrial carbon pools of Shiv Nadar Institution of Eminence studied and analyzed for this year have sequestered **7,169.08 MT CO2e** for the year 2023.

Total carbon stock calculated SNIoE has a very rich diversity of trees, shrubs and herbs in a very significant quantity. The vegetation is responsible for many ecosystem services making it very essential for the environment and both its abiotic and biotic components and life processes. The sequestered quantity makes for a significant sink for the greenhouse gas emissions on the campus and the vegetation has great potential for sequestering carbon in the future as well. It must be noted that considering the year of plantation for a major percentage of trees and shrubs being 2017, the vegetation is still young and thus holds immense potential for long-term carbon sequestration in the future as well.



Carbon Sequestered value (2022-23) v/s (2021-2022)



% of Overall CFP sequestered (2022-23) v/s (2021-22)

10.0 Limitations, Assumptions and Considerations:

- Carbon sequestration value computation involves a lot of variables like the girth of the plant, per year increment, soil type, vegetation type, damage to the plant and considering the aspect that other than natural forests present in the university and wild grasses near the natural lake, the vegetation is altered and has human interference e.g., maintenance, hedging, etc. However, due considerations to the possible factors have been given to the extent as much as possible at every stage.
- Calculation of the amount of carbon dioxide sequestered by shrubs and trees per year undertaken with due care to the complexity of the variables involved and is based on the information of age factor as a dividing factor, using an established documented process.
- The university maintains the vegetation for ornamental purposes and the health of the plants. Through maintenance or accidental loss, loss of carbon sequestration potential is observed.
- SNIoE's vegetation is still young and needs more time to mature and has more potential for carbon stock storage in its terrestrial carbon pools.
- Age is calculated and assumed from the year of plantation for the shrub and tree species till the reporting year, as SNIoE provided us. Limitations were observed in ascertaining the exact age from the sapling stage for the trees and shrubs.
- In the soil carbon estimation, there is an increment in the OC% value, which could be explained due to periodic manuring of the soil. The increase in the resultant sequestered value for the soil computed basis the details provided by the university could be justified on the basis this practice.
- The data used for computation of CF was as provided by SNIoE as is considered to be accurate.
- The electricity units taken for the actual electricity meter bills and the same is considered to be accurate. Calibration error and accuracy limitations in the monitoring and measuring equipment used by SNIoE in data generation is expected.
- Limitation in availability of India centric GHG emission factors including the scope 3 Extraction and T&D emission factors, the values are either take from global database and further computed to India centric operational practices or else computed using published global methodologies.
- SNIoE has carefully followed the Carbon Sequestration Guidelines that have been shared with them with careful recording protocols and standard/calibrated instruments recommended for data collection and duly taken into consideration by the university.
- All the data that has been provided from the SNIoE is considered as it as and correct with the conformation from the functional champions.

- All the trees are taken under consideration regardless of their diameter in the Net-carbon sequestration estimation because, in the annual methodology, all the given trees are segregated into two categories (Diameter >=11 inches and Diameter <11 inches)
- Shrub annual sequestration value has been calculated by using age as the dividing factor based on the methodology followed for tree annual carbon sequestration value. In addition, it has been based on the input from the university that shrubs are maintained at a certain height and gain maturity in one year, thus incremental change in girth is taken into consideration as factoring of age.
- Soil sample collection is done at a depth of 30 cm for SOC stock calculation in grass cover areas of Selection-1 grass and wild grass.

11.0 OVERALL CARBON FOOTPRINT INFERENCE:

Basis the detailed carbon footprint computation undertaken at the university campus for all the three scopes, scope1, scope 2 & scope 3 and comparing the value for each of the scope with the corresponding value of the previous year, especially the base year (2019-20), it is evident that:

1. Scope 1 has shown a significant increase from the corresponding value of the base year. The main contribution for the steep increase in the emissions on account of HVAC component could be attributed to the increased build-up area at the campus, including the airconditioned hostel.
2. While there are many initiatives undertaken at the university to reduce the overall energy conservation, there is a net increase of 28% in the absolute energy consumed at the campus which can be attributed to an increase in the buildup area at the campus.
3. Further, the overall breakdown of the emission at SNIoE reflect that the Scope 1 is 16% of the total Carbon footprint while Scope 2 contributed 675 to the total Carbon Footprint count and the scope 3 contributes 17% to the overall count of the Carbon footprint count.
4. Further with the net carbon sequestration value for the year computed based on the data provided, it is observed that 41% of the total carbon footprint is presently offset by the sequestration value on account of the carbon sink created with the plantation on the campus.

12.0 RECOMMENDATIONS:

Basis the analysis of the computed Carbon Footprint and its comparison with the performance over the previous years, the following recommendation are proposed for further review to finalize the structured improvement initiatives at the SNIoE:

- Optimize resource usage through enhanced efficiency in processes and controls
- Avoid wastage through the use of technology and engagement of the human resource at campus
- Work towards water neutral campus
- Transition / expansion of clean energy source with aim to achieve 100% green power
- Undertake "Zero Cost" Improvement projects with the participation of Students, Faculty & Non-teaching staff
- Usage of new & energy efficient technologies to reduce energy consumption
- Increase green cover with plantation of trees with high carbon sequestration index
- Engage stake holders within the campus and from nearby society through increased participation in structured events like Earth-day, Environment-day, Safety weeks, etc.
- Ensure effective management of Integrated Management System
- Adopt, deploy and achieve certification to water efficiency management system ISO 46001
- Ensure energy optimization and conduct of regular energy audit
- Encourage use of e-vehicles at campus
- Encourage and promote paperless documentation for official communication and academic activities like online submission of assignments / providing notes
- Sub-metering to identify high consumption areas of electricity to be able to drive specific optimization initiatives
- For the carbon sequestration, increase the sample size and follow a uniform sampling methodology for data collection to enhance the data accuracy and reliability.
- The soil sampling must be taken before the manuring practice of the horticulture department to avoid any adhoc increase in the soil carbon trapped in the soil grassland
- Review the possible impact of key events towards GHG emissions (example: Increased use of electricity, extended operating hours, use of special equipment).

SHIV NADAR UNIVERSITY

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Business Results - Redefined

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Kg	Kilograms
$MTCO_2E$	Metric Tonnes of CO_2 Equivalent
LPG	Liquefied Petroleum gas
SNU	Shiv Nadar University

2.0 INTRODUCTION

Present times have witnessed extreme climate scenarios and their unprecedented impact on the environment globally, may it be the records rains in Australia or the killer heat wave setting new records in UK and Europe or wild fires in US, Europe and snow avalanches in alpines in Italy or floods in Iran or excessive floods in many cities of India. All these varied natural catastrophes have, however, only highlighted to the excessive environmental degradation which is a result of the excessive human intervention and abuse of nature by the human being.

Covid times, is known as one of the most disturbing global events in the recent past. While it leaves us with many sad remembrances, however, many may recall the improved environmental conditions which became evident and identified during the initial phase of global lockdown. While Lockdown is not a solution however, it provides evidence that the nature has the power of healing itself, If the human being stops contributing to its degradation.

Past one year has seen an enhanced focus and multiple initiatives including the United Nation Climate Change Conference (COP 26), UN Climate and SDG Synergies Conference, held in Tokyo or the climate change workshops & seminars at various levels only demonstrate visible commitment of both the government and non-governmental institutions towards improving the climate scenario.

The commitment, however, needs to go beyond the passionate statements, discussions and commitments made from the podium by the world leaders and a lot needs to be done to actually and positively contribute to the improved global environment.

Global warming, is still one of the most relevant and sever global issue having impact not only limited to business operations but to the overall survival of every human kind. Educational institutions are not an exception to the impact of the climate change and their commitment to the cause is also evident through the various sustainability initiatives undertaken by these institutions including structured reporting forums like Times Higher Education World Ranking, UNAI, Stars to name a few. Further, the ministry of higher education, India the apex educational fraternity in India, University Grants commission (UGC), AICTE have instituted schemes to motivate the educational institutions in India to sign a pledge for Net Zero Emissions and undertake sustainability initiatives to help contribute to the overall goal of our country and world at large, while NAAC accreditation

also have required the educational institutions to make their humble contribution towards a sustainable institution.

Many global universities have made their commitment to embrace sustainable practices and have embarked on this journey. A few of the global universities and colleges have achieved significantly against the established UN sustainability goals (SDGs) and are motivating many others to follow.

3.0 SUSTAINABILITY COMMITMENT FROM SNU

Shiv Nadar University (SNU), realizes its responsibility towards sustainable environment and has committed to contribute to the overall socio-environmental sustainability by embarking on a journey to make the campus not only "Carbon Neutral Campus", but also work on other UN sustainability goals across various functions at the campus.

The sustainability commitment of the leadership team at Shiv Nadar University could be evidenced through multiple initiatives undertaken as part of the structured sustainability framework with specific targets and timelines. The entire sustainability initiatives being driven from the office of the Director Administration and closely monitored and reviewed by the vice-chancellor herself is a true evidence of leadership commitment to the cause.

As part of the comprehensive sustainability drive and focus, new initiatives including the plantation of trees, shrubs & soil to create a carbon sink and compute the "Carbon Sequestration" have been formally introduced. Further, the university has planned to participate in Global Reporting and Benchmarking surveys including the Times Higher Education Impact Ranking" and be a member of the "United Nation Academic Impact" (UNAI) program.

Carbon Footprint computation is one such initiative which is undertaken by the university covering all academic, non-academic, sports, recreational, biodiversity and residential activities at the campus. This being an annual exercise, the CFP is computed and analysis is undertaken to reflect the key elements contributing to the overall emissions and then identify specific initiatives which could be planned and executed to drive the university to a sustainable and green campus in true sense.

4.0 OBJECTIVES:

- Compute Scope 1, Scope 2 and Scope 3 Carbon Footprint for all activities operating from the SNU Campus for financial year 2021-22
- Compute the various components in each of the categories
- Analyze the change in carbon footprint in various categories as compared to previous year / base year
- Evaluate the impact of the change in the carbon footprint for the various components in each of the scope categories along with the main reason leading to the change.
- Identify opportunities for Improvement to further enhance SNUs performance on their sustainability journey
- Present a factual status of the overall performance through the assessment year on all the three scopes of emissions with a detailed reflection on the trends of change and the established reasons, to facilitate the leadership team at the university to take internal decisions to drive the overall sustainability program.

5.0 REPORTING PERIOD: FY 2021-22 (1 April 2021 to 31 March 2022)

- Performance for the current reporting period (FY 2021 - 22) is reviewed against the values of the previous reporting year FY 2020-21, FY 2019 – 20 & FY 2018-19.
- While the computed values are also available for the FY 2018-19, however the data for the FY 2018-19 is not referred for the comparison being not complete being the first year of the initiation of this initiative to compute the carbon footprint and complete data for the referred period was not complete to justify the reference and comparison.
- Further, for the year 2020-21, as the university operated in a hybrid mode with the academic activities mainly move to the on-line training mode due to the Covid pandemic and the movement of the students and staff was restricted, the Carbon Footprint values of the year 2020-21 are not considered to draw any trend and reflection of the values of the current assessment period
- Year 2019-2020, being a most close to normal operations, is considered as the base year to undertake analysis and reflect on the deviations from the base year values

6.0 SCOPE AND REPORTING BOUNDARY:

a) **Physical boundary**: All activities including academic and non-academic activities based out of the SNU Campus located at NH91, Tehsil Dadri, Greater Noida, Uttar Pradesh 201314

b) Operational boundary

Scope 1 Direct GHG emissions from:

i. Captive power generation activities including the renewable power and the power from the combustion of fossil fuels (HSD) in stationary source of electricity generators, LPG consumption in canteen & laboratories
ii. Combustion of fuels in mobile sources - SNU owned & controlled vehicles and the fuel used for the horticulture activities
iii. Fugitive emissions from Refrigeration/air-conditioning equipment installed and operated

Scope 2 Indirect emissions from:

i. Purchased electricity including renewable and non-renewable power

Scope 3 Other Indirect GHG emissions from:

i. Commuting of Teaching Staff, Non-Teaching Staff, Students and Sub-contractors.
ii. Business Air travel and associated hotel stay
iii. Material procurement, consumption and disposal.
iv. Waste management and disposal.
v. Upstream and downstream activities

7.0 DEPLOYED METHODOLOGY:

In the spirit of the SNU leadership team to Educate, Empower and Engage all stakeholders, the Carbon Footprint (CFP) computation methodology was designed to engage as many stake holders as possible and required. A team of including teaching & non-teaching staff along with the students was established and external consulting partner with proven credentials @ AgileGroup, was engaged to provide the required knowledge support and handhold and guide through the various stages of Carbon Footprinting engagement, including strategy design, competence enhancement, format design, data collection and validation, CFP computation using "AgileCFToolkit"© and then analyze and evaluate the computed outcome for their trend and compare with the previous year performance details.

The Carbon Footprint is computed using the "AgileCFToolkit"© for the data points provided by the respective functions. The Carbon Calculator is updated with the most authentic and relevant emission factors and assessment methodology in line with the global framework and the ISO 14064 standard. Several recognized national and international standards and global frameworks have been referred for the computation of the footprint ofthe University. The GHG emission factors are taken from reliable sources including India GHG protocol, CEA, GRI, WRI & DEFRA data bases, as well as computed using the IPCCC published methodologies to get more accurate values in Indian context.

The report highlights the key emission sources of the university and reflects the trend as compared to the previous years considered as the baseline data. Further, improvement strategies and operational initiatives are planned based on the analyzed output.

SNU is committed to making to having a sustainable campus, and as a first step in that direction has achieved EHS certification. The comprehensive EHS Policy promotes environment friendly & low emission practices in areas of water, energy, waste, habitat protection etc. One such practice is assessing carbon footprint of its activities and undertake initiatives to reduce the carbon foot print aiming to becoming carbon neutral campus. Cross functional team including teaching & non-teaching staff and student community representatives is engaged in deployment of the identified management programs and monitoring the same to ensure an ownership and motivation to keep the CFP initiatives a sustained effort towards being a Carbon Neutral Campus.

Key steps in the Carbon Footprint Journey:

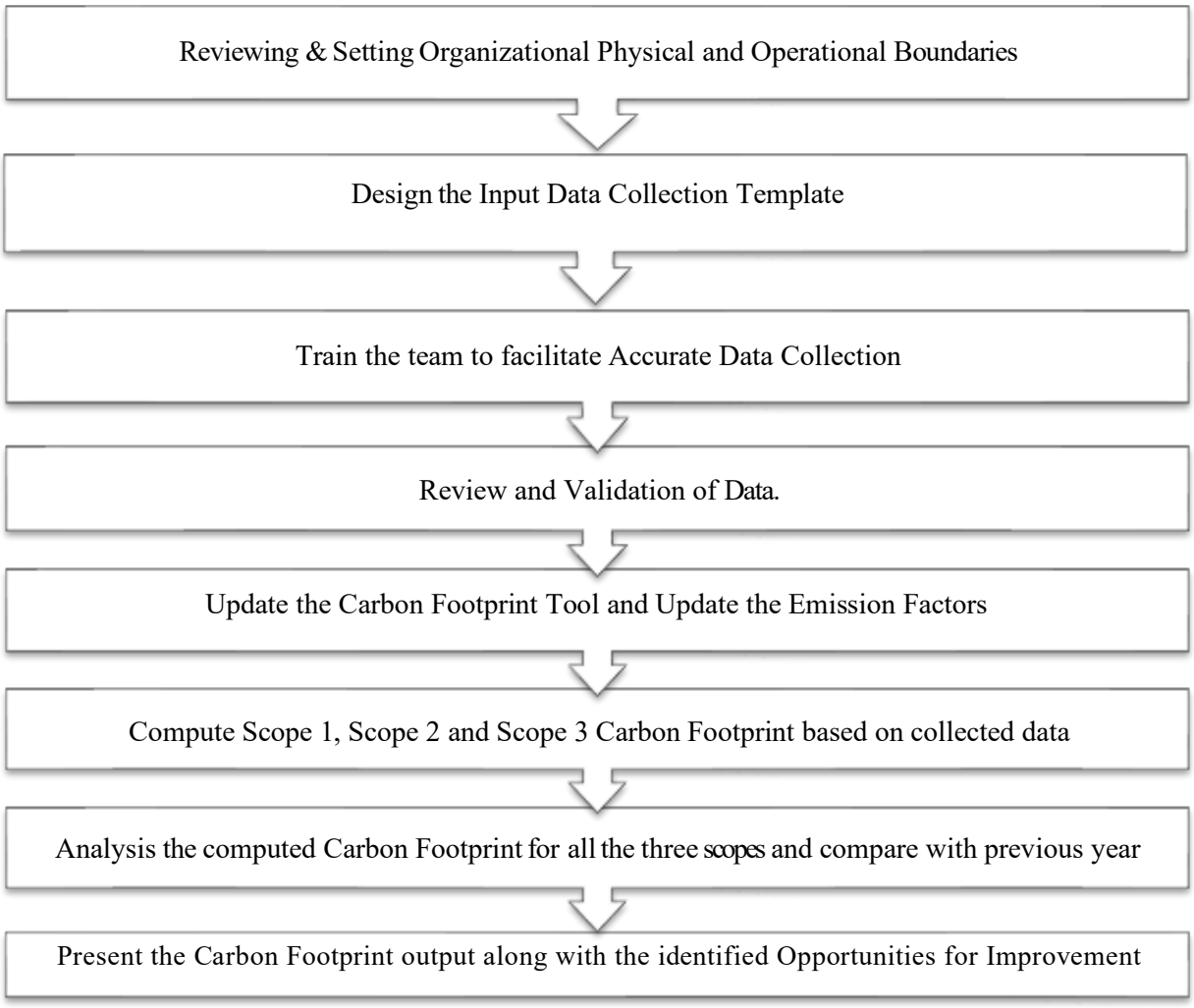


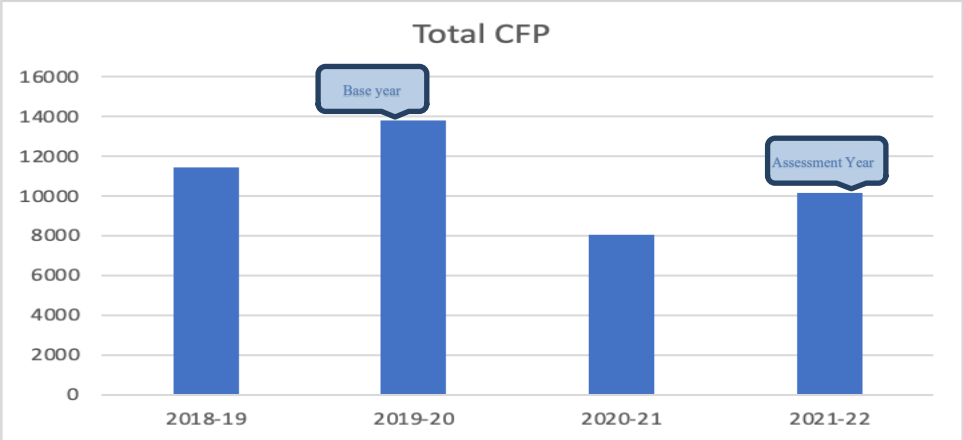
Figure 1: Flowchart Showing Adopted Methodology for Estimation of Carbon Footprint

8.0 COMPUTED RESULT

Computed values of the CFP for Scope 1, Scope 2 & Scope 3 for previous three years.

GHG Emissions	Scope 1	Scope 2	Scope 3
MT CO_2e (2018-19)	743	9668.4	1,029
MT CO_2e (2019-20)	738	10,649	2,427
MT CO_2e (2020-21)	497	6277	1292
MT CO_2e (2021-22)	**1219**	**7168**	**1753**

The computed value is arrived at considering the Emission Factors in Indian Context as obtained from the India GHG Protocol and the published methodologies by IPCCC, WRI, DEFRA and GHG Protocol. The computation of the carbon footprint is undertaken using global defined protocols and International ISO 14064 standards.

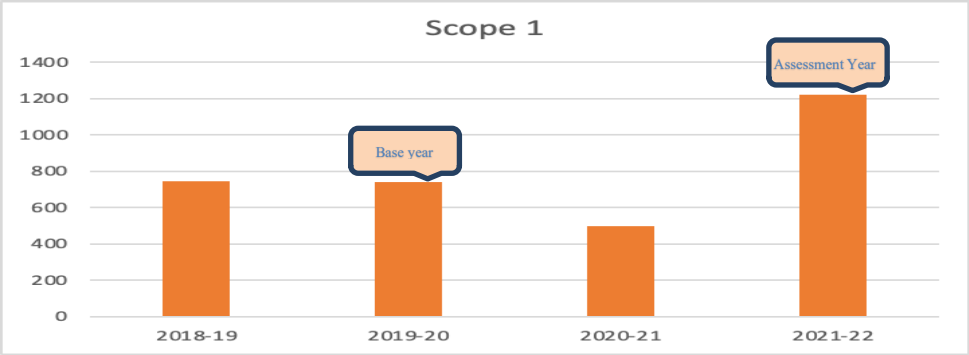


Comparing the cumulative value of the Carbon Foot-print for all Scope 1, 2, & 3 together, there is a **30% reduction in the cumulative CFP as compared to the base year 2019-20.**

9.0 ANALYSIS OF THE GHG EMISSIONS

9.1 SCOPE 1 GHG EMISSIONS

- **A nominal 2% decrease in Scope 1 emissions** for FY 2021-22 from base year FY 2019-20 could be achieved inspite of additional lead for the HVAC on account of new facility (Hostels) added during the year. The reduction could be achieved due to 28% reduction in emissions due to the captive power generation using fossil fuel.



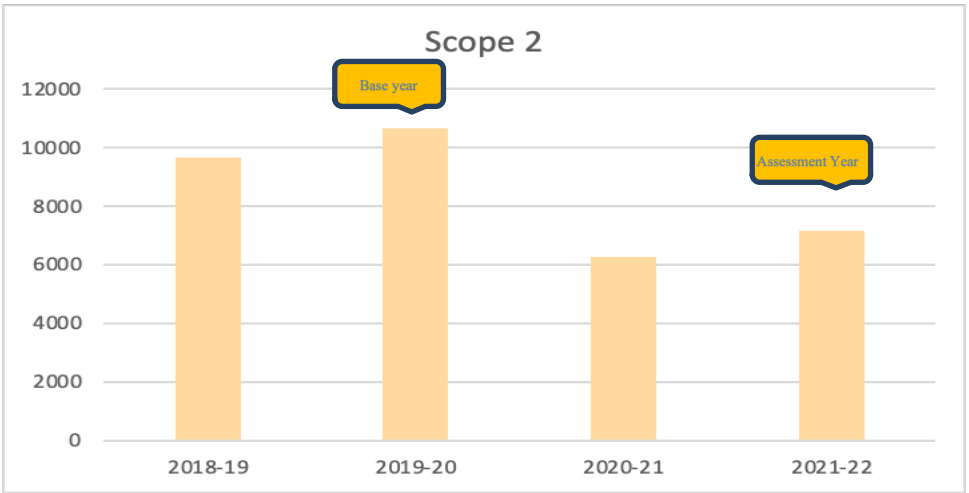
Contributing components of Scope 1 Emission

- **Captive power generation**: 28% reduction in the CO_2e emissions from the base year could be achieved on account of reduced consumption of fossil fuel for the captive power generation.
- **Business travel:** 1% increase in the CO_2e emissions from the base year was observed on account consumption of fossil fuel for local Business Travel using company owned and controlled vehicles
- **HVAC:** A 31% increase in the CO_2e emissions from the base year was observed on account increased capacity on account of additional HVAC infrastructure deployed for the increased built-up area (hostels) at the university.

Category	MT CO_2e
Fuel (2021-22)	179
Fuel (2019-20)	169
Business Travel (2021-22)	179
Business Travel (2019-20)	177
HVAC (2021-22)	524
HVAC (2019-20)	399

9.2 SCOPE 2 GHG EMISSIONS

Scope 2 accounts for the indirect GHG emissions resulting from the generation of electricity which is subsequently purchased and consumed by the university.



A 33% reduction in the Scope 2, CO_2equivalent emission was obtained on account of reduced overall power consumption and transition to cleaner power during the assessment period as against the base year value for the same criteria.

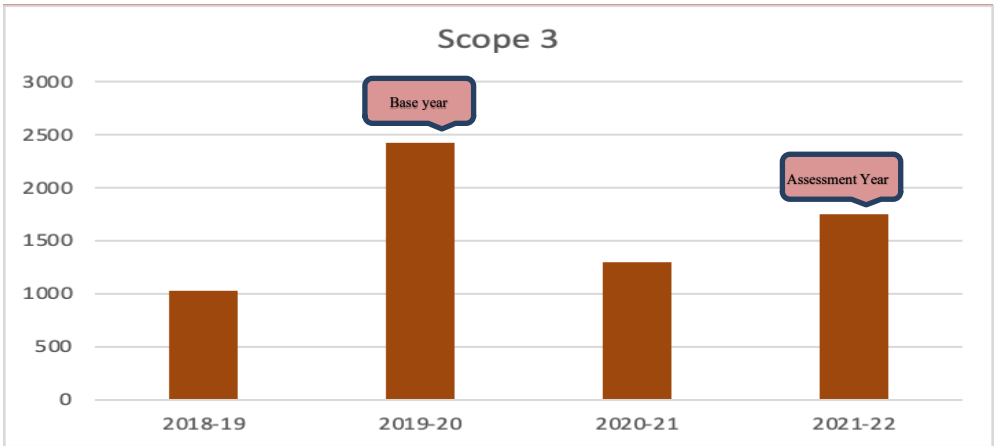
Further, as part of the sustainability program, leadership team at SNU is evaluating the options to further reduce the dependance on grid power through:

- Power Purchase agreement and sourcing of green power from IEX
- The feasibility of setting up a captive **Solar Power Generation** facility at the campus.

9.3 SCOPE 3 GHG EMISSIONS

Scope 3 emissions are contributed by indirect activities including outsourced upstream & downstream activities and is the second highest CO_2e emission contributor at SNU.

During the FY 2021-22, a **28% reduction in the overall Scope 3 emissions** could be achieved against the base year FY 2019-20.



Key contributor to the scope 3 emissions computation include:

Category	MT CO_2e	% Reduction from FY 2019-20
Air Travel (2021-22)	**30**	**17%** ↓
Air Travel (2019-20)	36	
Travel of Employee & Sub-contractors (2021-22)	**178**	**62%** ↓
Travel of Employee & Sub-contractors (2019-20)	470	
Paper (2021-22)	**7.1**	**41%** ↓
Paper (2019-20)	12	
Waste (2021-22)	**173**	**1477%** ↑
Waste (2019-20)	11.19	

While overall there is a reduction in CO_2e emissions in all the scope 3 categories, there is a very steep 1447% increase in the CO_2e emissions in the category of waste disposal resulted from the a very high value of mixed waste on account of construction and accumulated waste during the covid pandemic period.

10.0 CARBON SEQUESTRATION:

As it is evident in today's scenario, climate change and global warming are one of the most focused upon issues upon which appropriate action must be taken at every level today to handle the climate crisis. It is of immense importance that the ecosystem services provided by the trees, shrubs and soil are taken into consideration while looking at different options for greenhouse gas emission reduction and mitigation. Carbon dioxide is one of the most prevalent natural greenhouse gases contributing heavily to the global warming phenomenon. One of the major reasons for its high concentration is the anthropogenic activities undertaken.

It is of immense importance that the ecosystem services provided by the trees, shrubs and soil are taken into consideration while looking at different options for greenhouse gas emission reduction and mitigation. Carbon dioxide is one of the most prevalent natural greenhouse gases contributing heavily to the global warming phenomenon. One of the major reasons for its high concentration is the anthropogenic activities undertaken.

Shiv Nadar University has been computing its carbon footprint since 2019. Now in the reporting year 2021-2022, they are going to calculate its carbon sequestration potential on the campus by different components of terrestrial carbon pool including trees, shrubs and grass cover (Carbon sequestered in the soil) for the first time. Since, this year is the pioneer year for carbon sequestration potential on the campus, annual and net values, both should be considered. As the net value will help to estimate the increment in carbon sequestration potential next year and an approximate annual value will provide a rough and close idea of sequestered carbon per year by considering age as the determining factor as per the methodology used by Charl De Villiers, 2014 (Charl De Villiers, 2014).

Carbon sequestration implies the transfer of atmospheric CO_2 into other long-lived global pools including oceanic, pedologic, biotic and geological strata to reduce the net rate of increase in atmospheric CO_2.

Study Scope for Carbon Sequestration Value Computation

In this study scope for carbon sequestration, a total of **17,281 trees** on the campus**; 1,10,704 shrubs** and **33.9439 hectares of grass cover under three different species of grass in the campus of Shiv Nadar University was computed. The year of plantation for calculating per year value for trees and shrubs is 2017 based on data provided by Shiv Nadar**

University (Charl De Villiers, 2014)**. The process considered the carbon sequestration of the whole university campus with a focus on the three components of the terrestrial carbon pool (trees, shrubs and grass cover).**

Carbon sink pools taken into consideration are the trees, shrubs and soil covered under different types of grasses.

Results

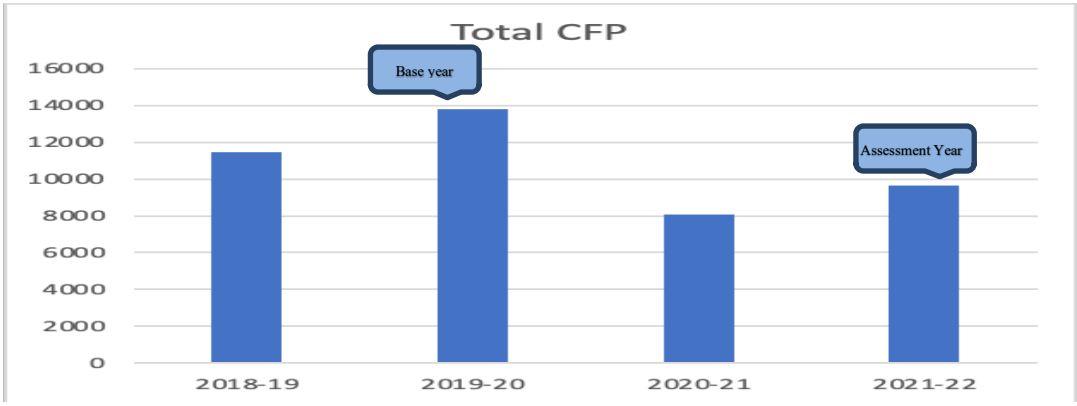
1. Annual Carbon sequestration Values:

Annual Carbon sequestration Value (Year: 2021-2022)			
S. No.	**Category**	**Total quantity of trees / shrubs / area considered respectively**	**Value ($MTCO_2e$)**
1.	Annual Carbon equivalent sequestered in metric tonnes (Trees)	17,281	442.61
2.	Annual Carbon equivalent sequestered in metric tonnes (Shrubs)	1,10,704	509.6
3.	Total carbon equivalent sequestered by soil under different grass species in metric tonnes*	33.944 ha	502.26
4.	**Total**		**1,454.47**

*The value computed for this parameter is the **net carbon stock** value since in this case carbon sequestered by the soil below the three different types of grass species has been computed and **annual** computation of carbon stock for soil is not possible.

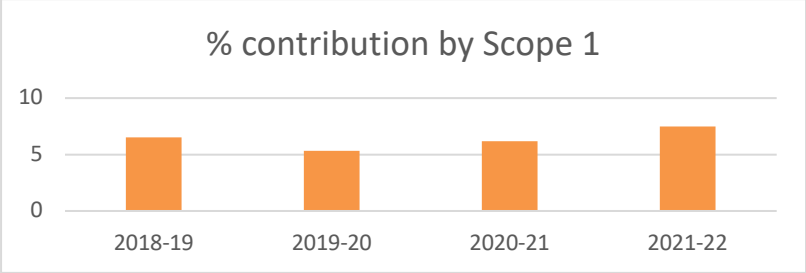
11.0 OVERALL INFERENCE AND CONCLUSION:

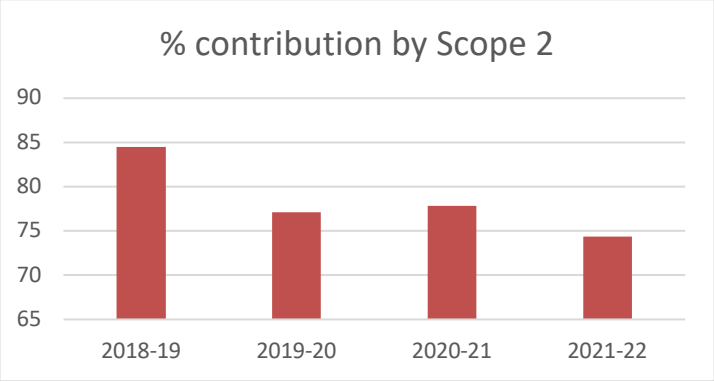
Comparing the cumulative CO2equivalent emissions generally for over the past four years (including periods of incomplete and covid pandemic affected period), a general decrease in the overall emissions could be observed.



Further analysis of the data computed for the past 4 years indicate a general trend of scope-wise contribution as follow:

Scope 1 contribution to the overall CFP has generally remained within the 5 -7 Percent of the total Cumulated CFP for the assessment period

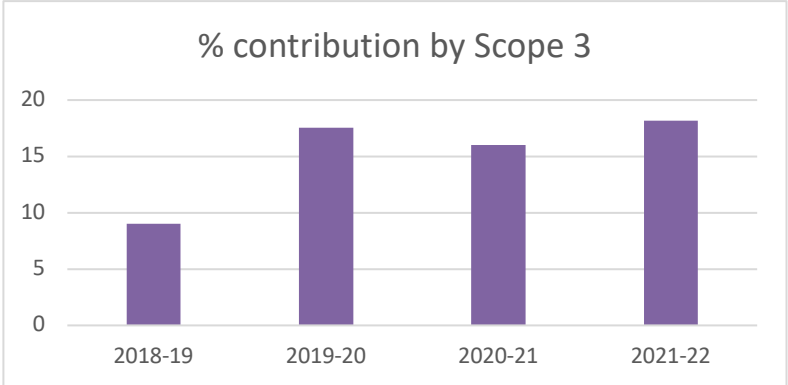




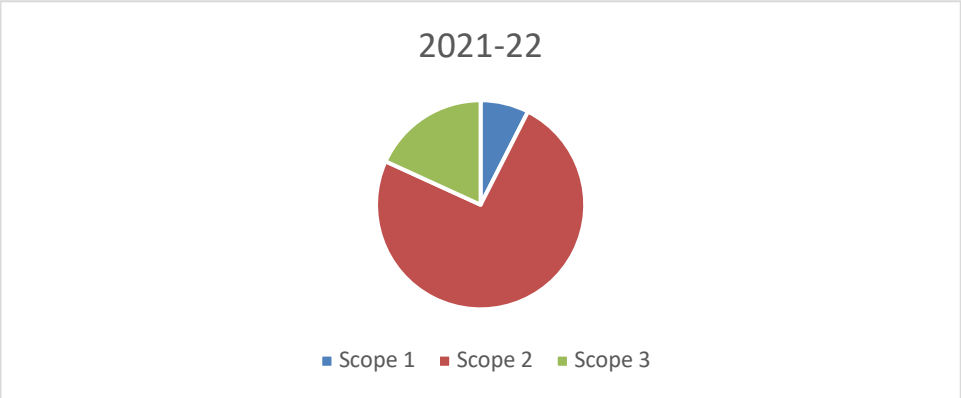
Scope 2 Contribution to the overall CFP has generally stayed in the 85 – 74 % contribution of the overall CFP for the Assessment Period.

The trend of Scope 2 emissions has also indicated a gradual declining trend over the years with the least % contribution in the present assessment period

Scope 3 emissions over the years have generally remained in the 9-18 % range of the total CFP contribution. While in absolute value it has reduced by 28% from the base year, the % contribution for the reporting period has remained at 18% as in the base year.



Overall % contribution by each of the scopes to the cumulative CFP value has stayed almost uniform with a very slight variation over the years.



Interesting inference is also the fact that Scope 2 emission is the major contributor to the overall CFP contribution, generally ranging in the 74-85 % contribution of the overall CFP.

Further, on account of multiple Energy Optimization initiatives undertaken by the university over the years including, but not limited to the "General reduction in the absolute power consumption, and Transition to Cleaner power, including setting up a captive Green power generation facility, further reduction in the absolute Scope 2 emissions can be planned.

Further, the overall Carbon Sequestration by the Trees, Shrubs and the Soil planned and maintained at the campus has resulted in the creation of a carbon sink value of **1,454.47 MTCO$_2$e.,** which effectively results in **15% of the net CFP is neutralised on account of the green cover at the campus**

12.0 LIMITATIONS :

Following limitations were encountered during the implementation of the activity:

- The data used for computation of CF was as provided by SNU as is considered to be accurate.
- The electricity units were taken from the actual electricity meter bills and the same is considered to be accurate.
- Calibration error in the monitoring and measuring equipment used by SNU in data generation is expected.
- Limitation in availability of India centric GHG emission factors including the scope 3 Extraction and T&D emission factors, the values are either take from global database and further computed to India centric operational practices or else computed using published global methodologies.

Constraints

- Carbon sequestration value computation involves a lot of variables like the girth of the plant, per year increment, soil type, vegetation type, damage to the plant and considering the aspect that other than natural forest present in the university and wild grasses near the natural lake, the vegetation is altered and has human interference e.g., maintenance, hedging, etc. However, considerations of possible factors have been as much as possible at every stage.
- Calculation of the amount of carbon dioxide sequestered by shrubs and trees per year is difficult due to the complexity of the variables involved and the assumption of using age factor as a dividing factor though based upon documented process increases uncertainty, thus the value calculated is an approximate value.
- The university maintains the vegetation for ornamental purposes and the health of the plants. Through maintenance or accidental loss, loss of carbon sequestration potential is observed.
- SNU's vegetation is still young and needs to be given more time to mature further and have more potential for carbon stock storage in its terrestrial carbon pools.
- Age is calculated and assumed from the year of plantation for the shrub and tree species till the reporting year. Limitations were observed in ascertaining the exact age from the sapling stage for the trees and shrubs.

Assumptions

- Parameters and careful recording protocols for data collection have been followed and duly taken into consideration by the university.
- Shrub annual sequestration value has been calculated by using age as the dividing factor based on the methodology followed for tree annual carbon sequestration value. In addition, it has been based on the input from the university that shrubs are maintained at a certain height and gain maturity in one year, thus incremental change in girth is taken into consideration as factoring of age.
- Soil sample collection is done at a depth of 15 cm for SOC stock calculation in grass cover areas of *Paspalum conjugatum, Zoysia tenufolia,* and Selection-1 grass and for wild grass, the depth taken into consideration is 30 cm.

13.0 RECOMMENDATIONS AND SUGGESTIONS

Basis the analysis of the computed Carbon Footprint and its comparison with the performance for the previous years, there is evidence of improvement in all sections and all scope of CFP. While the reduction in the carbon footprint can also be attributed to Covid Pandemic, the results are also a result of planned and structured initiatives.

To ensure the improvement is further achieved, the major focus areas may include:

- Optimize resource usage through enhanced efficiency in processes and controls
- Avoid wastage through the use of technology and human controlled processes
- Work towards water neutral campus
- Transition / expansion of clean energy source with aim to achieve 100% green power
- Undertake "Zero Cost" Improvement projects with the participation of Students, Faculty & Non-teaching staff
- Usage of new & energy efficient technologies to reduce energy consumption
- Increase green cover with plantation of trees with high carbon sequestration index
- Engage stake holders within the campus and from nearby society through increased participation in structured events like Earth-day, Environment-day, Safety weeks, etc.
- Ensure effective management of Integrated Management System
- Adopt, deploy and achieve certification to water efficiency management system ISO 46001
- Ensure energy optimization and conduct of regular energy audit
- Encourage use of e-vehicles at campus
- Encourage and promote paperless documentation for official communication and academic activities like online submission of assignments / providing notes
- Sub-metering to identify high consumption areas of electricity to be able to drive specific optimization initiatives
- Review the possible impact of key events towards GHG emissions (example: Increased use of electricity, extended operating hours, use of special equipment).

SHIV NADAR UNIVERSITY

Agile Group
Business Results - Redefined

SHIV NADAR UNIVERSITY

CARBON FOOTPRINT REPORT

Reporting period

1 April 2020 – 31 March 2021

Terms used

Abbreviations	Full Form
CFP	Carbon Footprint
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
FY	Financial year
GHG	Greenhouse Gases
IPCC	Intergovernmental Panel on Climate Change
Kg	Kilograms
LPG	Liquefied Petroleum gas
SNU	Shiv Nadar University

INTRODUCTION

Global warming, is one of the most relevant external issue having impact not only limited to business operations but to the overall survival of every human kind. The wrath of the environment is experienced by all and is evident in forms of killer Heat waves, Cloud bursts leading to Excessive Rain, Draught on account of no rainfall, Forest Fire, Hailstorm, Snowfall, Flooding, Cyclones and the Himalayan Tsunami on account of rapidly melting glaciers, being a few of the commonly used words in present world.

Global warming has been one of the most discussed topics, may it be the global leadership forums or at schools. While many countries have already shown their visible commitment to the cause, the seriousness to the entire moment is not visible through the involvement of industry central agencies and academic fraternity getting more visibly engaged in the journey with structured initiatives to enhance sustainable living. There is an urgent call to reduce the alarming impacts of global warming by cutting down the carbon footprints in every sector to avert the risks to India's population, economy and ecosystem.

Educational institutions have come forward worldwide and have pledges to play a significant role in this momentous journey. Many global universities have made their commitment to embrace sustainable practices public and have embarked on this journey. A few of the global universities and colleges have also achieved respected sustainable goals and are motivating many others to follow.

Large NGOs, private players, and even United Nations have come forward to provide a structured approach and guidelines for all those who may be interested to commit to this most important goal of the times by providing review and rating framework.

Apex educational fraternity in India, including the Ministry of Education, University Grants commission (UGC) and AICTE, NAAC are few of such bodies and forums which have contributed to sensitize and motivate all kind and level of participants in the educational ecosystem to make their humble contribution to the healthy and safe human survival.

SUSTAINABILITY COMMITMENT FROM SNU

Shiv Nadar University (SNU), is committed to the cause of sustainable ecosystem and as part of their commitment, initiated the Carbon Footprint determination since 2019 for all the activities including academic & non-academic operating from its 286 acres campus at NH91, Tehsil Dadri, Greater Noida, Uttar Pradesh.

Dedicated sustainable initiatives along with core academic and research activities has helped SNU obtain NAAC "A" Grade Accreditation & improve the university NIRF Ranking from 82 to 56 in the recently published national ranking by the ministry of education. A significant 26 rank jump amongst the national universities helps SNU motivate and set a benchmark for other universities.

The objective of computing the carbon footprint by SNU is to predict the trajectory of its emissions and help design their strategic and operational initiatives to lead SNU towards being a carbon neutral and sustainable campus.

OBJECTIVES & SCOPE OF CARBON FOOTPRINTING ACTIVITY

OBJECTIVES

- Compute Scope 1, Scope 2 and Scope 3 Carbon Footprint for all activities operating from the SNU Campus for financial year 2020-21
- Analyze the change in carbon footprint in various categories as compared to previous years
- Identify opportunities of Improvement to further enhance SNUs performance on their sustainability journey
- Lead SNU to be a carbon neutral campus.

REPORTING PERIOD: FY 20-21 (1 April 2020 to 31 March 2021)

- Performance for the current reporting period (FY 2020 - 21) is reviewed against the values of the previous reporting year (FY 2019 – 20). The data for the FY 2019-20 is considered more accurate over the FY 2018-19, due to a more structured and detailed data collection process established during this period.

BOUNDARY:

a) **Physical boundary**: All activities including academic and non-academic activities based out of the SNU Campus located at NH91, Tehsil Dadri, Greater Noida, Uttar Pradesh 201314

b) Operational boundary

Scope 1 Direct GHG emissions from:

i. Captive combustion of fuels in stationary sources- HSD in electricity generators, LPG consumption in canteen & laboratories
ii. Combustion of fuels in mobile sources - SNU Owned & Controlled vehicles
iii. Fugitive emissions from Refrigeration/air-conditioning equipment

Scope 2 Indirect emissions from:

i. Purchased electricity including renewable and non-renewable power

Scope 3 Other Indirect GHG emissions from:

i. Commuting of Teaching Staff, Non-Teaching Staff, Students and sub-contractors to and from university
ii. Material consumption
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DEPLOYED METHODOLOGY:

In the spirit of the SNU leadership team to Educate, Empower and Engage all stakeholders, the Carbon Footprint (CFP) computation methodology was designed to engage as many stake holders as possible and required. A team of including teaching & non-teaching staff along with the students was established and external consulting partner with proven credentials @ AgileGroup, was engaged to provide the required knowledge support and handhold and guide through the various stages of Carbon Footprinting engagement, including strategy design, competence enhancement, format design, data collection and validation, CFP computation using "AgileCFToolkit"© and then analyze and evaluate the computed outcome for their trend and compare with the previous year performance details.

Several recognized national and international standards and global frameworks have been referred for the computation of the footprint ofthe University. The GHG emission factors are taken from reliable sources including India GHG protocol, CEA, GRI, WRI & DEFRA data bases, as well as computed using the IPCCC published methodologies to get more accurate values in Indian context.

While the CFP was started in year 2019 using the values for FY 2018-19, the values of that period could have limitations of being incomplete or extrapolated as the initiatives started in mid of the year and all the required data was not completely available. Considering the limitation for FY 2018-19, the computed values for the FY 20190-20 is considered more reliable and is considered as the baseline values for all review and evaluation purposes.

The report highlights the key emission sources of the university and reflects the trend as compared to the previous year considered as the baseline data. Further improvement strategies and operational initiatives are planned based on the analyzed output.

SNU is committed to making to having a sustainable campus, and as a first step in that direction has achieved EHS certification. The comprehensive EHS Policy promotes environment friendly & low emission practices in areas of water, energy, waste, habitat protection etc. One such practice is assessing carbon footprint of its activities and undertake initiatives to reduce the carbon foot print aiming to becoming carbon neutral campus. Cross functional team including teaching & non-teaching staff and student community representatives is engaged in deployment of the identified management programs and monitoring the same to ensure an ownership and motivation to keep the CFP initiatives a sustained effort towards being a Carbon Neutral Campus.

Key steps in the Carbon Footprint Journey:

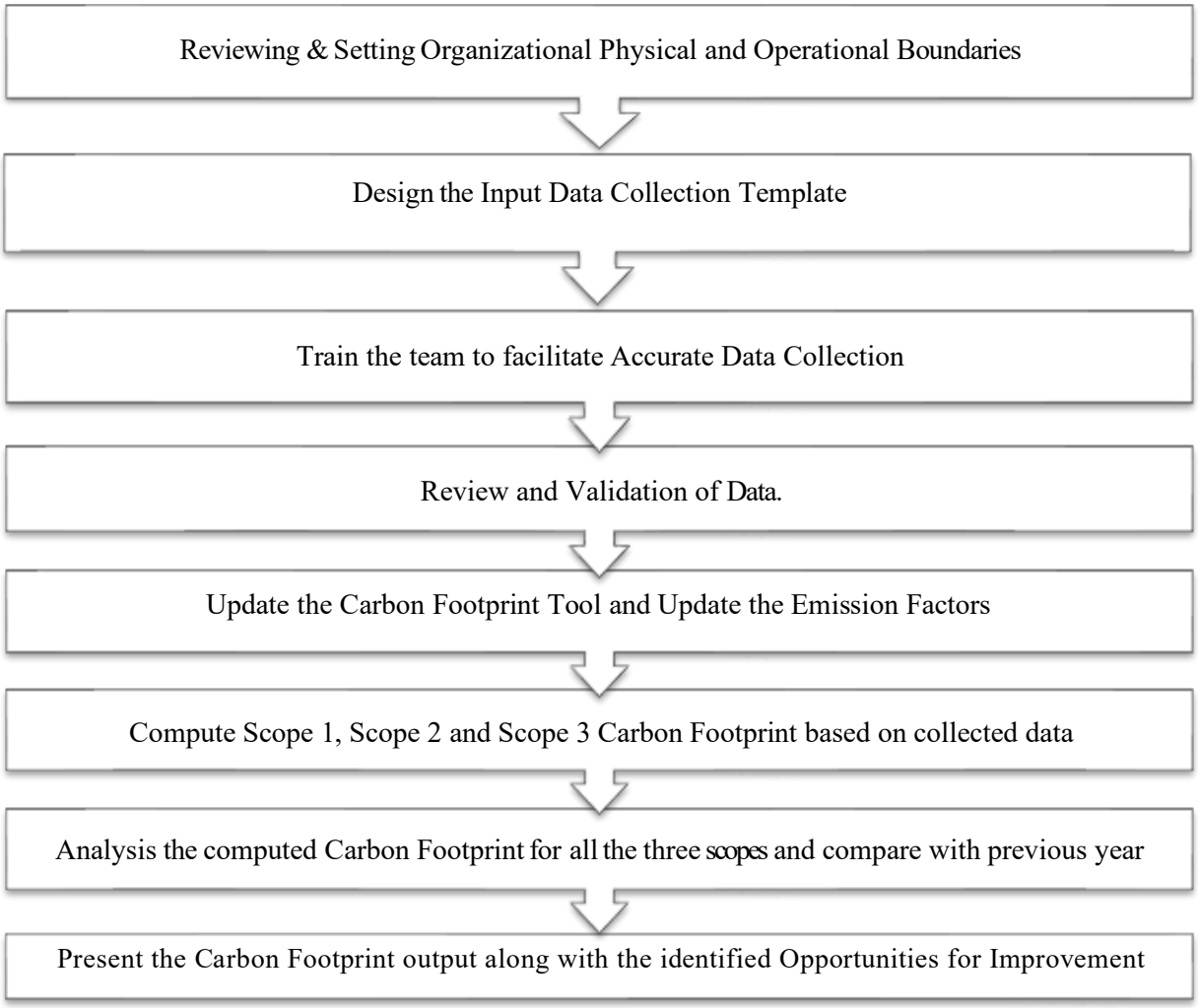

Figure 1: Flowchart Showing Adopted Methodology for Estimation of Carbon Footprint

LIMITATIONS DISCLOSURES

Following limitations were encountered during the implementation of the activity:

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- The electricity units were taken from the actual electricity meter bills and the same is considered to be accurate.
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COMPUTED RESULT

Computed values of the CFP for Scope 1, Scope 2 & Scope 3 for previous three years.

GHG Emissions	Scope 1	Scope 2	Scope 3
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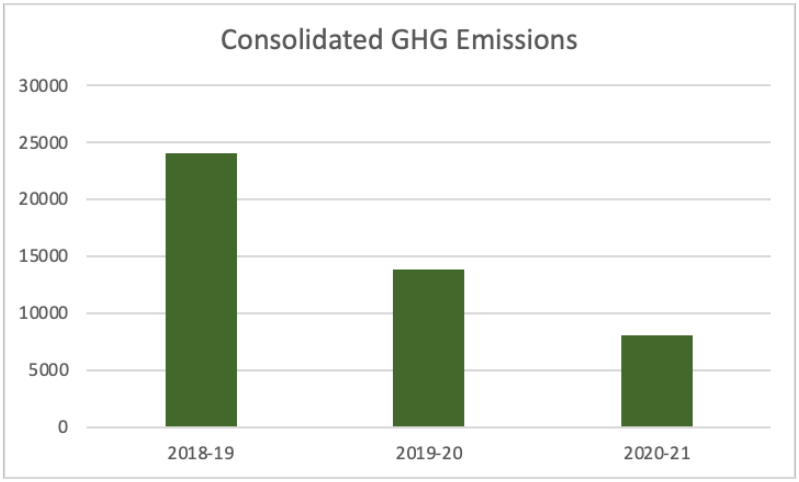
MT CO2e (2019-20)	738	10,649	2,427
MT CO2e (2020-21)	**497** ↓	**6277** ↓	**1292** ↓

The computed value is arrived at considering the Emission Factors in Indian Context as obtained from the India GHG Protocol and the published methodologies by IPCCC, WRI, DEFRA and GHG Protocol. The computation of the carbon footprint is undertaken using global defined protocols and International ISO 14064 standards.

The total consolidated Carbon Footprint including all three scopes is 8066 MT of CO_2e, which is an **overall 41.6% reduction** from previous year 2019-20.

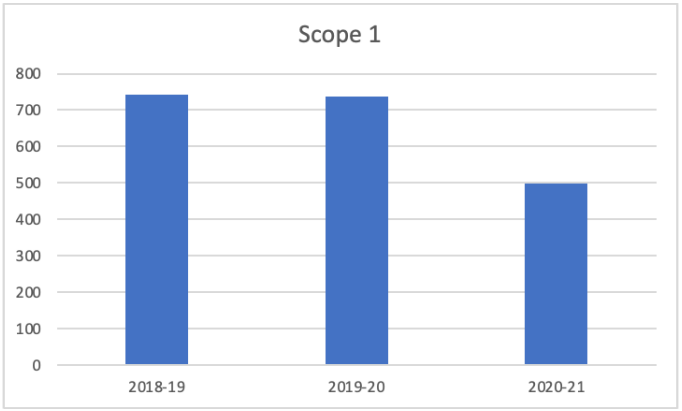


While the impact of Covid pandemic cannot be ruled out in this significant overall GHG Emissions. The efforts and initiatives undertaken by SNU team also had an positive contribution in their planned movement towards carbon neutrality.

ANALYSIS OF THE GHG EMISSIONS

SCOPE 1 GHG EMISSIONS

- **A 32.5% reduction in Scope 1 emissions** for FY 2020-21 from previous reporting period FY 2019-20, and about 33.1% reduction from the FY 2018-19



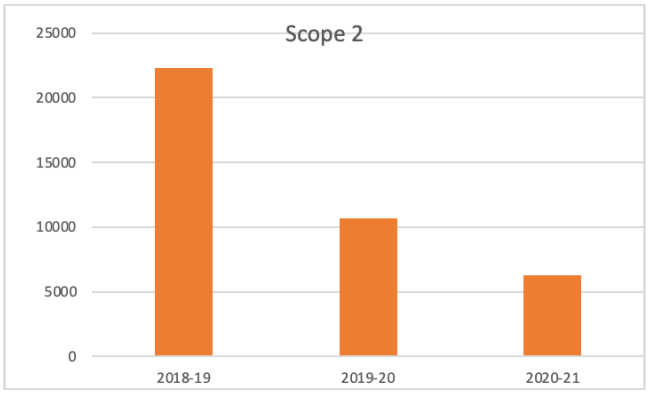
The significant reduction could be achieved mainly on account of the following factors:

- **Captive power generation**: 66.2% reduction in the CO_2e emissions from the previous year could be achieved on account of reduced consumption of fossil fuel for the captive power generation.
- **Business travel:** 76.9% reduction in the CO_2e emissions from the previous year could be achieved on account of reduced consumption of fossil fuel for Business Travel using company owned and controlled vehicles
- **HVAC:** No significant change in CO_2e emissions on account of HVAC Operations could be experienced during the year.

Category	MT CO2e
Fuel (2020-21)	57
Fuel (2019-20)	169
Business Travel (2020-21)	41
Business Travel (2019-20)	177
HVAC (2020-21)	399
HVAC (2019-20)	392

SCOPE 2 GHG EMISSIONS

Scope 2 accounts for the GHG emissions from the generation of purchased electricity consumed by the organization. **41.1% reduction in CO_2e emissions** for FY 2020-21 from previous reporting period FY 2019-20 was achieved.



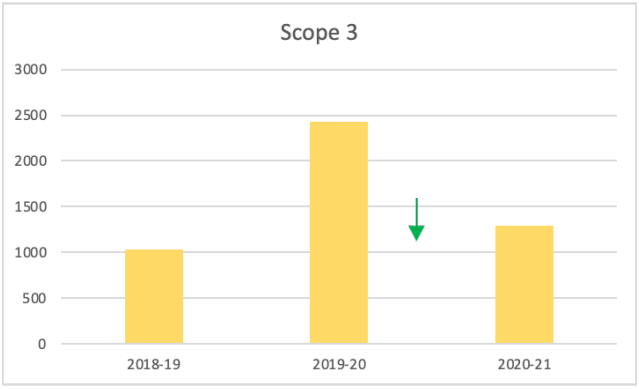
The total CO2e emissions due to purchased electricity for FY 2020-21 is computed to be **6277 MT CO2e** as against the value of **10,649 MT CO2e** for the previous year (FY 2019-20).

Overall reduction in the scope 2 emissions could be achieve on account of the overall reduced power consumption due to the work from home operational processes on account of covid pandemic and also due to a transition to procurement of **Green Power** through the captive **Solar Power Generation** facility at the campus. While during the reporting year solar power was only 4% of the total purchased power, the leadership team at SNU has committed to increase the share of green power in the overall power usage and is planning to achieve the same through the following to initiatives:

- Enhance captive solar power generation at campus
- Power Purchase agreement and sourcing green power from IEX

SCOPE 3 GHG EMISSIONS

Scope 3 emissions are contributed by indirect activities including outsourced upstream & downstream activities and is the second highest CO_2e emission contributor at SNU. During the FY 2020-21, **46.8% reduction in Scope 3 emissions** could be achieved from previous reporting period FY 2019-20. The reduction was however contributed by multiple planned activities in addition to the impact of covid pandemic on the business operations.



Key contributor to the scope 3 emissions computation include:

Category	MT CO_2e for FY 2020-21	% Reduction from FY 2019-20
Air Travel (2020-21)	**12.7**	**64.7%** ↓
Air Travel (2019-20)	36	
Travel of Employee & Sub-contractors (2020-21)	**237**	**49.6%** ↓
Travel of Employee & Sub-contractors (2019-20)	470	
Paper (2020-21)	**1.5**	**87.3%** ↓
Paper (2019-20)	12	
Waste (2020-21)	**1.7**	**84.8%** ↓
Waste (2019-20)	11.19	

RECOMMENDATIONS AND SUGGESTIONS

Basis the analysis of the computed Carbon Footprint and its comparison with the performance for the previous years, there is evidence of improvement in all sections and all scope of CFP. While the reduction in the carbon footprint can also be attributed to Covid Pandemic, the results are also a result of planned and structured initiatives.

To ensure the improvement is further achieved, the major focus areas may include:

Optimize resource usage through enhanced efficiency in processes and controls

- Avoid wastage through the use of technology and human controlled processes
- Encourage Reuse & Recycling initiatives, especially, in case of use of natural resources like Ground water.
- Work towards water neutral campus
- Transition / Expansion of clean energy source with aim to achieve 100% green power
- Undertake Zero Cost Improvement projects with the participation of Students, Faculty & Non-teaching staff
- Usage of new & energy efficient technologies to reduce energy consumption
- Increase green cover with plantation of Trees with high carbon sequestration index
- Engage stake holders within the campus and from nearby society through increased participation in structured events like Earth-day, Environment-day, Safety weeks, etc.
- Ensure effective management of Integrated Management System
- Adopt, deploy and achieve certification to water efficiency management system ISO46001
- Ensure energy optimization and conduct of regular energy audit
- Encourage use of e-vehicles at campus
- Encourage and promote paperless documentation for official communication and academic activities like online submission of assignments / providing notes
- Sub-metering to identify high consumption areas of electricity to be able to drive specific optimization initiatives
- Review the possible impact of key events towards GHG emissions (example: Increased use of electricity, extended operating hours, use of special equipment).