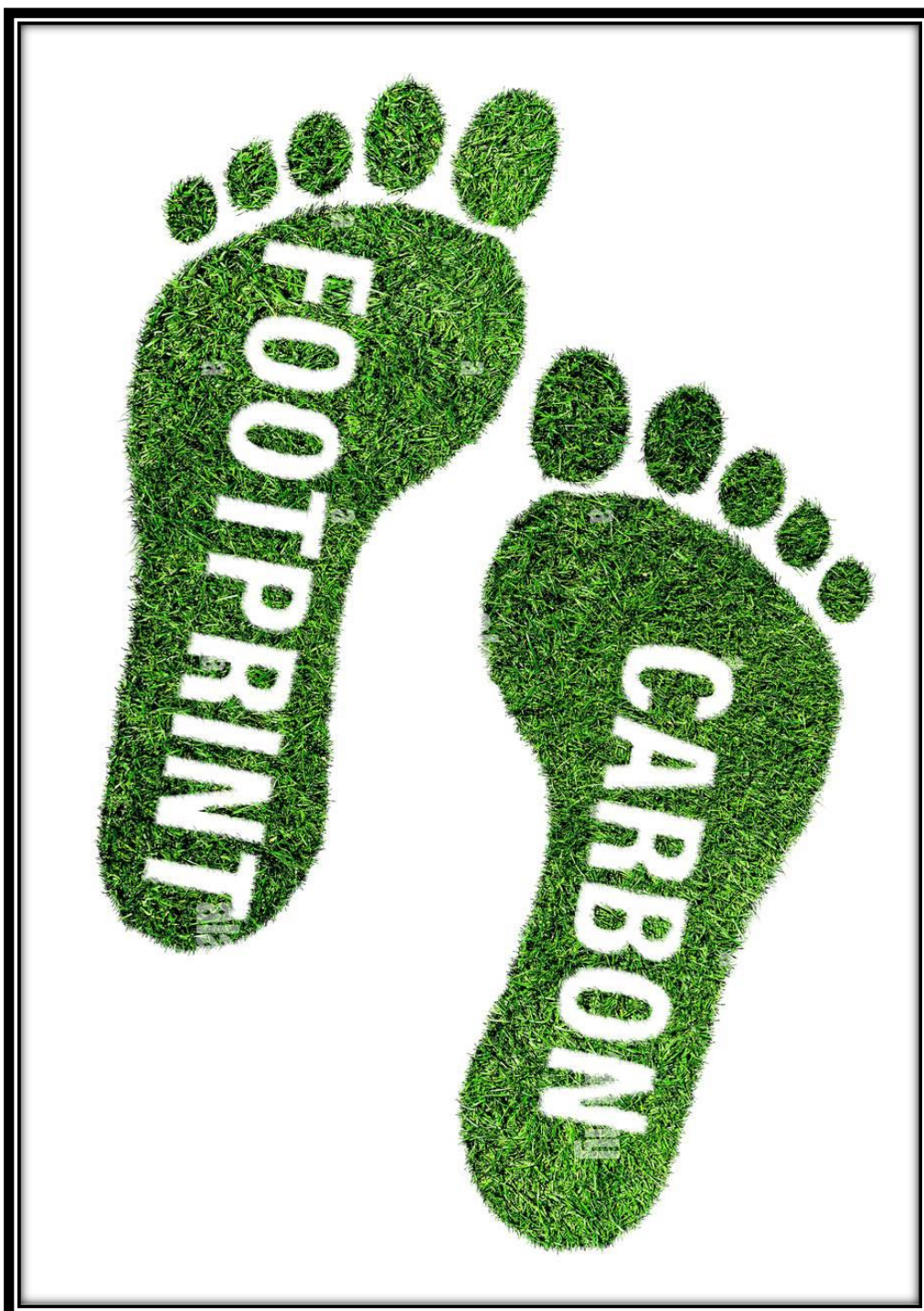


FIJI NATIONAL UNIVERSITY
CARBON FOOTPRINT REPORT 2022



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1. Executive Summary

The Fiji National University (FNU) is the largest University in Fiji, with its campuses and centers spread across 28 different locations throughout the country. FNU was formally established in 2010 by a merger of six state-funded tertiary institutions in Fiji: Fiji Institute of Technology, Fiji School of Medicine, Fiji School of Nursing, Fiji College of Advanced Education, Lautoka Teachers College, and Fiji College of Agriculture. A year later, the Training and Productivity Authority of Fiji was also merged with the University, and a new center, the National Training and Productivity Centre, was formed.

FNU is a dual-sector University offering excellent Technical and Vocational Education and Training (TVET) alongside excellent Higher Education (HE). The University plays a vital role at the local, regional, national, and global levels. It is dedicated to becoming a leader and champion of climate change to accomplish the Sustainable Development Goals (SDGs) and be good environmental stewards. FNU is committed to enforcing environmentally friendly initiatives for a greener and more sustainable ecosystem.

With FNU's strategic alignment and focus on sustainability to support the National and Global community towards reducing greenhouse gas emissions, the monitoring of ongoing emissions is critical to achieving the objectives. A carbon footprint can broadly be defined as measuring the greenhouse gas emissions that are directly and indirectly caused by activity.

The FNU's 1st Carbon Footprint Report was prepared in 2021 analyzing data from the years 2018 to 2020 which was based on GHG Scope 3 Protocols. Due to constraints on data availability, for the year 2019, the data were analysed for Scope 1, scope 2, and Air Travel for Scope 3 whereas only Scope 1 & 2 was analysed for the years 2018 & 2020. Based on this, the year 2019 was set as the University's baseline for the comparison of future carbon emissions.

The year 2019 saw a total emission of 2,989 tonnes of CO₂ with 66% contribution from power consumption and emissions from fuel and air travel each contributing 17%.

Carbon footprinting is a critical step in achieving sustainability goals at FNU. Thus, FNU has committed to transitioning to a sustainable institution with the adoption of strategies and methods to measure, monitor, and mitigate the University's carbon footprint. The continuous preparation of the carbon footprint report assists the University in constantly monitoring its emissions and ensuring the implementation of strategies to reduce its emissions to fulfill its Strategic Plan target as well as its Sustainability Plan and meet the Global Net Zero Emissions by 2050 initiative.

2. Methodology

The methodology adopted for the carbon footprint study is the GHG Protocol Corporate Standard which employs a 3 Scope methodology for calculating the carbon footprint. The table below indicates the 3 scopes and focus areas that will help determine the University's carbon footprint.

Scope	Type	Focus
Scope 1	Direct emissions	Fuel Combustion Emission – Vehicular Fuel Combustion Emission - Generators
Scope 2	Indirect emissions	Purchased Electricity
Scope 3	Other indirect emissions	Business Travel – Air

Scope 3 has 15 categories as defined by the Greenhouse Gas Protocol. These include:

- i. Purchased goods and services.
- ii. Capital goods.
- iii. Fuel- and energy-related activities (not included in Scope 1 or Scope 2)
- iv. Upstream transportation and distribution
- v. Waste generated in operations.
- vi. Business travel
- vii. Employee commuting
- viii. Upstream leased assets
- ix. Downstream transportation and distribution
- x. Processing of sold products.
- xi. Use of sold products.
- xii. End-of-life treatment of sold products.
- xiii. Downstream leased assets
- xiv. Franchises
- xv. Investments

Many of the above categories are limited in a University setting and are not usually applicable, hence, has not been selected for reporting, such as categories x, xi, xiv, etc.

Other categories have a high potential and application in the University environment, however, due to the limitation of data, can not be accounted for in the emissions analysis.

Based on the GHG guidelines, the categories for scope 3 that the University will report on are selected on the principles of the relative size of emissions and data availability and quality.

The University will consider enhancing data collection in selective applicable areas in the future to expand the scope of three reporting.

As reported by Stanford University, “While Stanford has calculated and reported on the Business Travel and Commuter Emissions categories for several years, it has now started to compile data for additional categories, such as carbon emissions from air travel, purchased goods, and waste transport and landfill”. Source: <https://sustainable.stanford.edu/operations/energy-climate/planning/emissions-inventory>

In comparison to Stanford University, the Fiji National University is a very young Institution and still has a long way to go in terms of quality data recording, analysis, and reporting for its carbon emissions.

All campuses and centers have been accounted for in the calculation of carbon emissions, which include:

1. Nasinu Campus
2. Koronivia Campus, including Crop & Livestock Farms
3. School of Public Health, Tamavua Campus
4. School of Nursing, Tamavua Campus
5. Derrick Campus & adjacent Ono Street Hostels, Samabula
6. Pasifika Campus including Hoodless House, Kivi House, PCP Block & Waimanu Clinic
7. Fiji Maritime Academy
8. Narere Centre
9. Naceva Centre
10. McGregor House Lautoka
11. Nadi Campus
12. Natabua Campus Lautoka
13. Ba Campus
14. Navua Farm
15. Suva Hospitality & Textile Campus
16. Naduna Campus
17. Labasa Campus (LTD Building, Rosawa Centre & Rara Centre, and Naduna Campus)
18. Raiwai Campus
19. Navua Hotel
20. NTPC Namaka Centre
21. Maritime Centre Nadi
22. Natabua (vacant land), Lautoka
23. Legalega, Nadi
24. Ba Lot 2, opposite the main campus
25. Nabua Campus
26. Labasa Naiyaca Campus

The data collection was collated for the years 2021 & 2022 which was then analysed to determine the level of carbon emissions and comparisons against the baseline year of 2019.

3. Analysis

3.1. Scope 1: Direct Emissions

a. Emission from Fuel Combustion – Vehicular

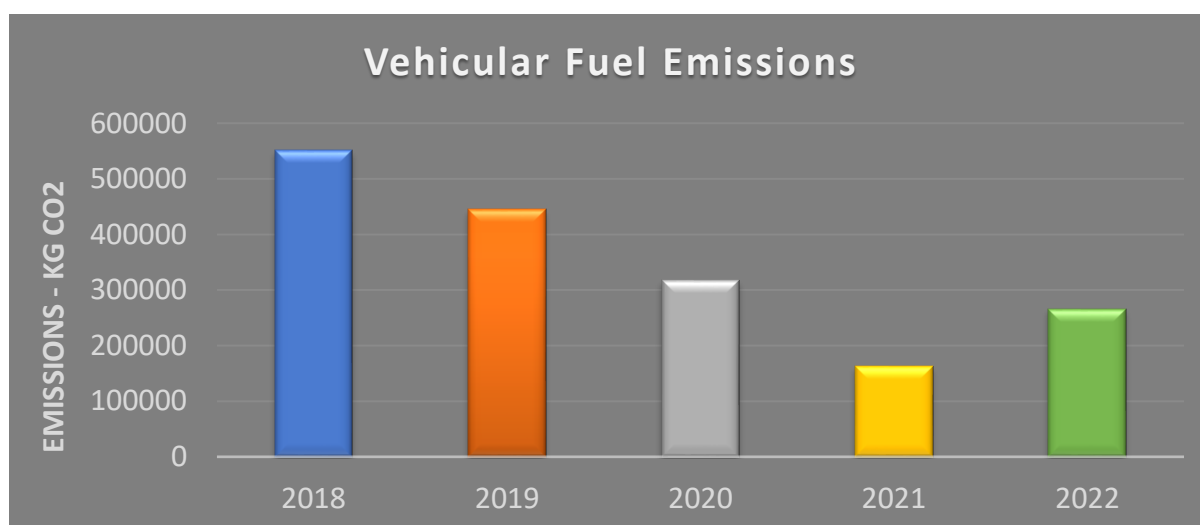
The emissions from fuel combustions through vehicles entirely constituted this category. The data presented here only includes FNU-owned vehicles and does not account for any transportation in taxis or staff's personal vehicles.

Business-related commutes for staff and students by third-party service providers have been excluded due to the unavailability of data.

The fleet capacity for FNU is presented in the table below.

Class	2018	2019	2020
Bus	18	16	14
Minibus			4
Utility Vehicles (Twin Cabs/Single Cabs)	15	16	12
Vans	9	8	8
Truck	4	3	1
Sedan	23	33	27
Wagon	25	14	4
SUV	25	25	20
Total	119	115	90

The emissions summary is presented below:



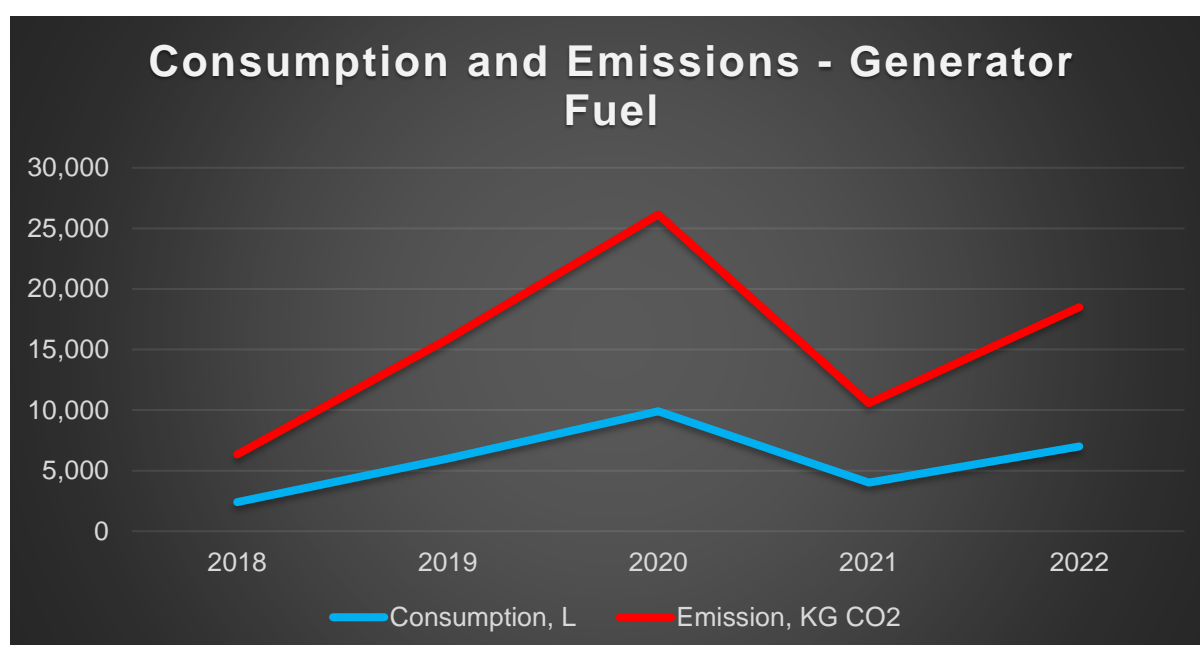
Year	Diesel			ULP			Total CO2 Emission (Kg)
	Diesel Litres	Cost	Diesel CO2 Emission (Kg)	ULP Litres	Cost	ULP CO2 Emission (Kg)	
2018	123,262.35	\$216,372.64	325,412.60	94,640.93	\$194,774.18	226,191.82	551,604.43
2019	91,703.52	\$166,067.72	242,097.29	84,644.60	\$173,585.95	202,300.59	444,397.89
2020	66,919.14	\$107,809.15	176,666.53	59,035.29	\$114,211.57	141,094.34	317,760.87

2021	30,012.23	54,592.24	79,232.29	34,972.63	77,205.19	83,584.59	162,816.87
2022	52,606.43	149,273.37	138,880.98	53,214.63	158,673.52	127,182.97	266,063.94

The reduction of emissions in 2021 is due to lockdowns, Covid 19 restrictions, and work-from-home strategies that were in implementation for most of 2021. By 2022, the operations of the University had been fully normalised, however, lessons learned during Covid 19 lockdown times, such as the use of online platforms for meetings continued to be used which reduced the travel between campuses and maintained emissions to approximately 60% of the baseline year, 2019.

b. Emission from Fuel Combustion – Generator

The data for diesel consumption was obtained and analysed for emissions. The below representations show the results of emissions from 2018 to 2022.



Year	Consumption (L)	Emission (KG CO2)
2018	2,400	6,336
2019	6,000	15,840
2020	9,900	26,136
2021	4,000	10,560
2022	7,000	18,480

Consumption dropped substantially in 2021 due to restrictions in place presented to Covid-19. The trend indicates an increase in 2022 in the range of the baseline year of 2019.

The stock of generators at various University Campuses is noted below:

Year	No. of Generators
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2019	8
2021	12
2022	13

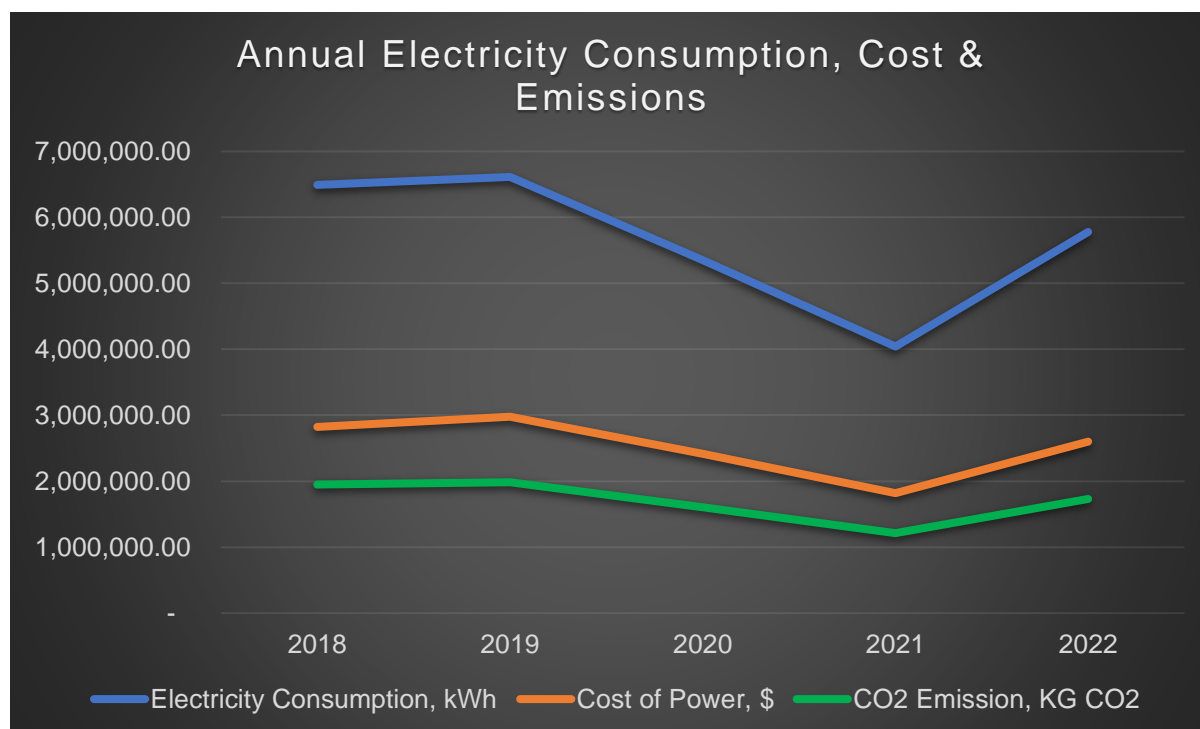
3.2. Scope 2: Indirect Emissions

This category accounts for emissions from electricity supplied by Energy Fiji Limited (EFL).

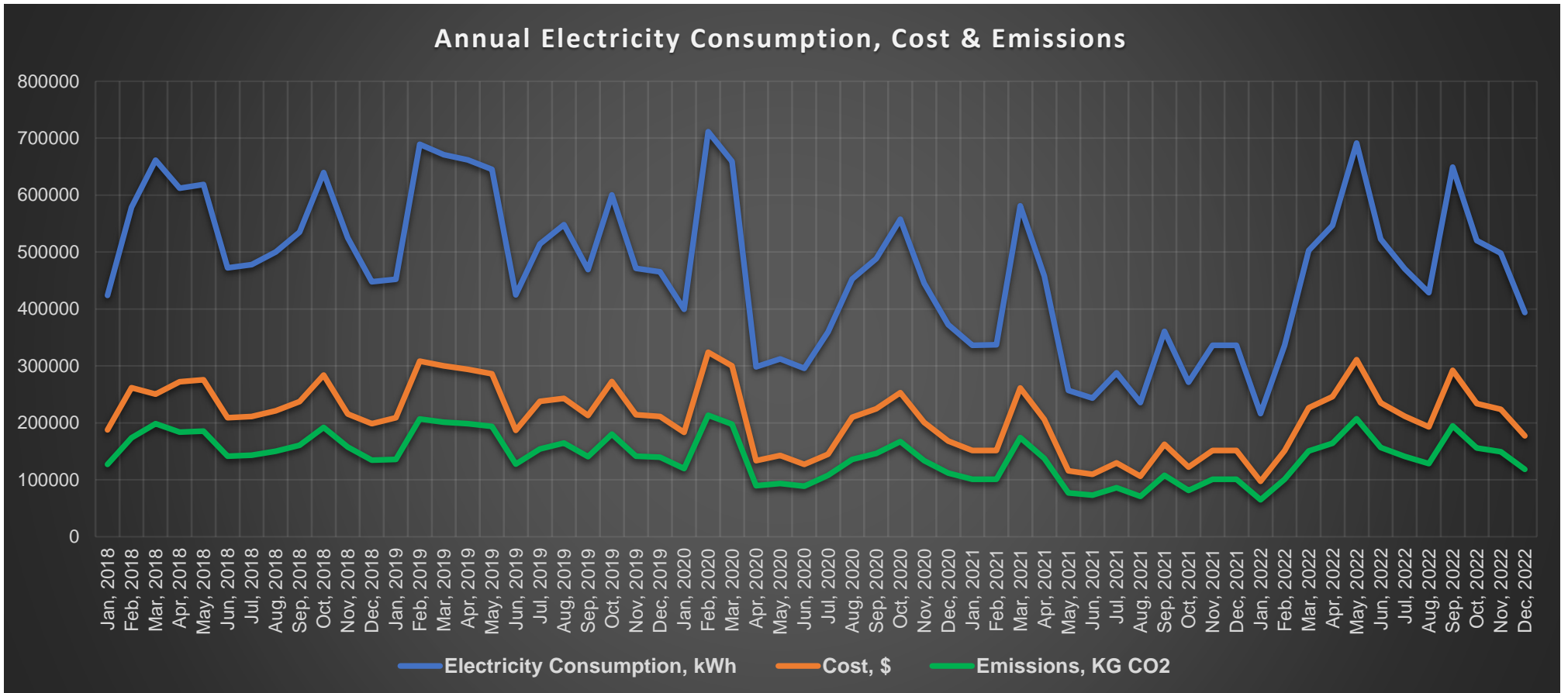
This report includes combined data for all FNU Campuses & Centres as well as properties rented by FNU.

The conversion factor was calculated based on information from the EFL 2019 annual report. The report presents data that renewable energy production has a ratio of 57.59% and calculated from the data is the rate of emission from diesel generation, which is 68%. This gives a factor of 0.288. Allowing for minor losses in the distribution system, a figure of 0.3 is used for the calculation of Carbon Emissions per kWh.

The monthly consumption data recorded from the bills and provided for analysis was incomplete for 2021 whereby shortfalls were noted in expenditure vs actual payments made. For 2022, data was not recorded. Therefore, for this analysis, the actual payments were prorated to obtain consumption based on the ratio between cost and payments for the years 2018 to 2020 based on the analysis from the previous carbon footprint report. While this method provides an approximate consumption, it is prone to errors and can only be considered as estimate values.

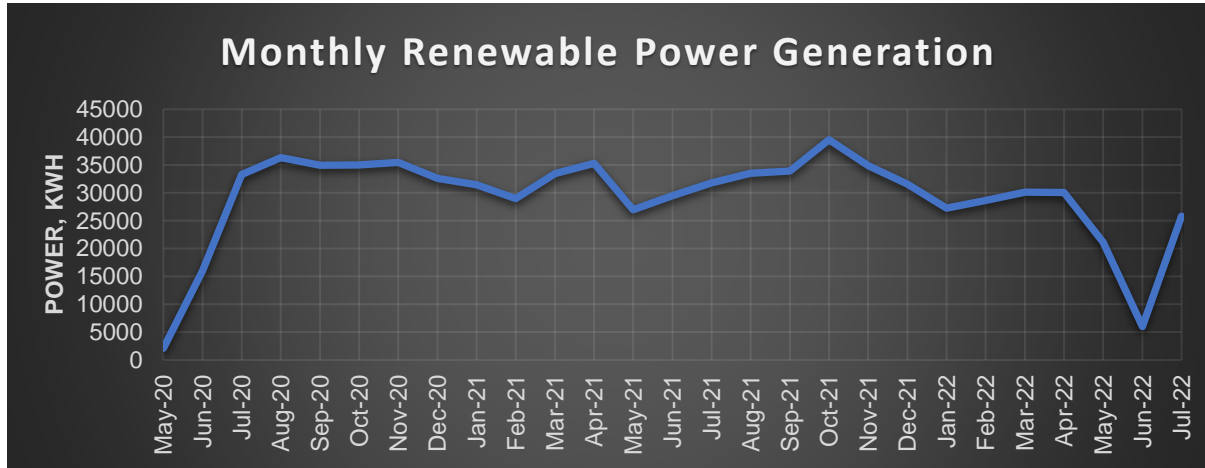


Year	Electricity Consumption, kWh	Cost of Power, \$	Emissions, KG CO2
2018	6,492,272.00	\$2,825,089.79	1,947,681.60
2019	6,612,963.00	\$2,977,207.55	1,983,888.90
2020	5,352,088.00	\$2,412,595.72	1,605,626.40
2021	4,040,888.27	\$1,818,399.72	1,212,266.48
2022	5,776,834.80	\$2,599,575.66	1,733,050.44



a. Renewable Power Generation

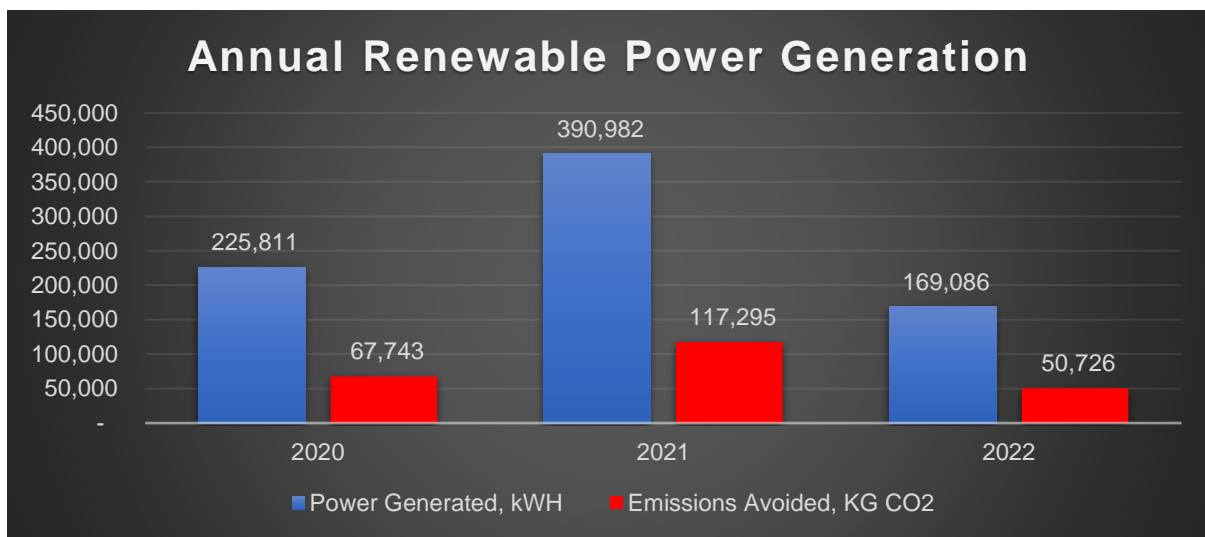
The University commissioned a 250kW Photovoltaic Power Generation System in May 2020 at FNU Nadi Campus. The monthly generation from the system is presented in the graph below.



The power generated averages 29,100 kWh per month.

The generation has halted since August 2022 due to faults in the system.

The below graph identifies the annual renewable power generation with emissions avoided.

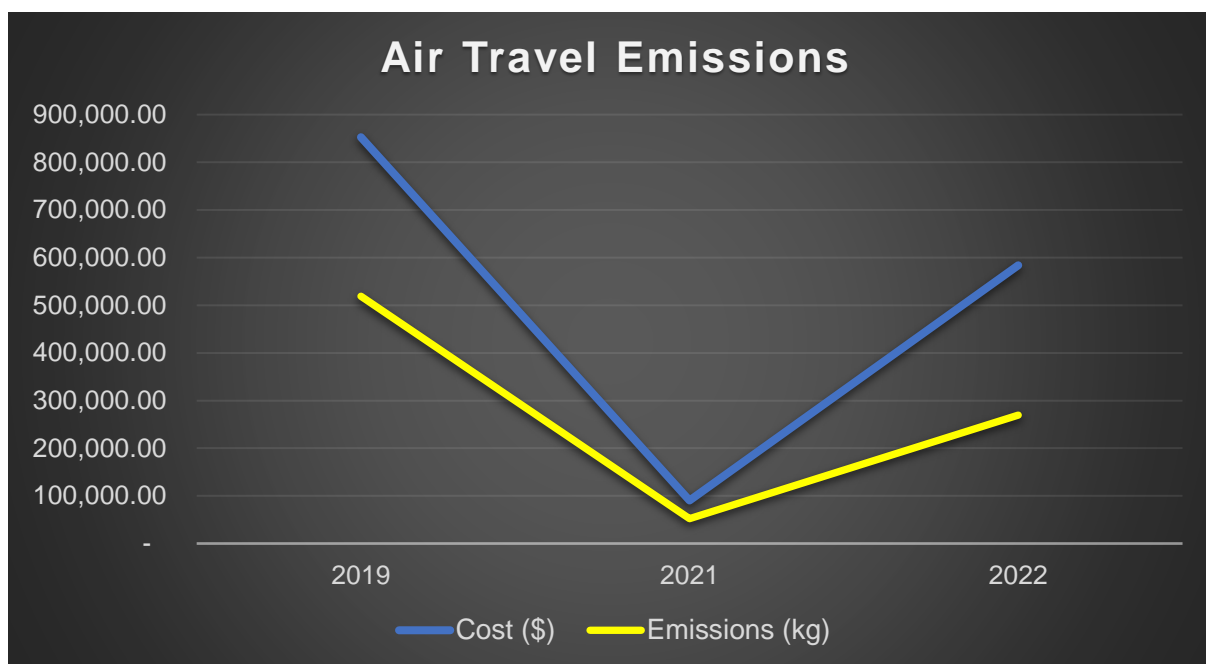


b. Air Travels

In the previous Carbon Footprint Report presenting the emissions from the year 2018 to 2020, the data for business travel was only available for 2019 which was assessed for emissions.

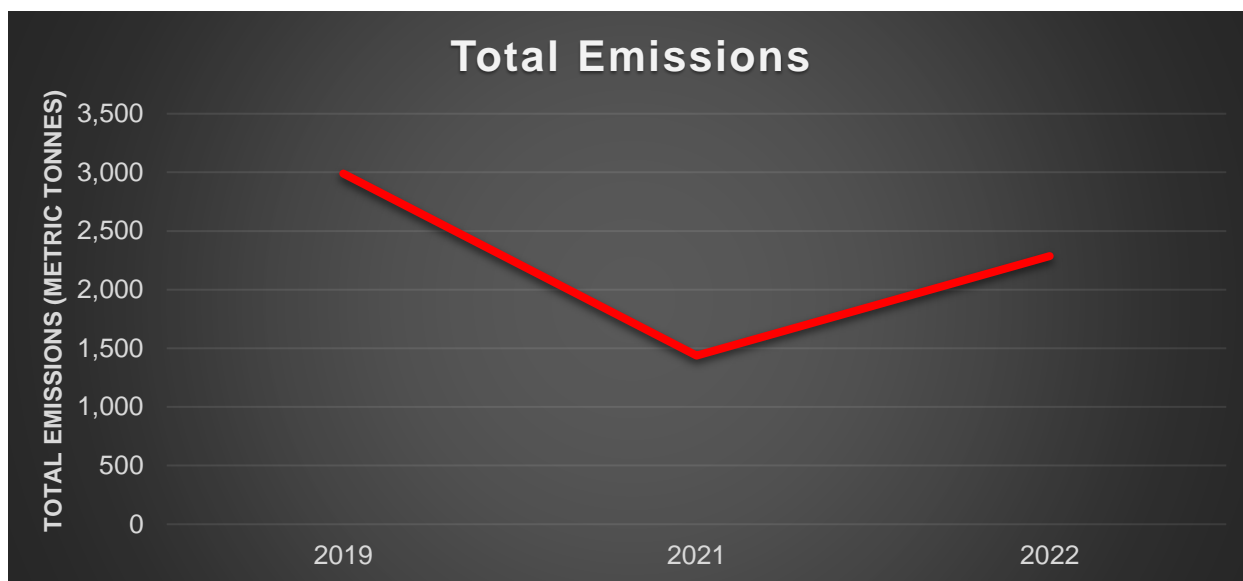
The data available did not provide all travel origins and destinations for 2019. Hence, the carbon emission was calculated for those for the origin and destination information was available through the online calculator available on the website https://co2.myclimate.org/en/flight_calculators/new and then prorated against cost.

For the years 2021 & 2022, full data was available for origins & travels. Each travel CO2 emission was calculated from the above website to obtain yearly totals.



Year	Cost (\$)	Emissions (kg)
2019	\$852,621.62	518,907.13
2021	\$90,287.59	52,167.50
2022	\$584,032.54	269,730.50

4. Total Emissions

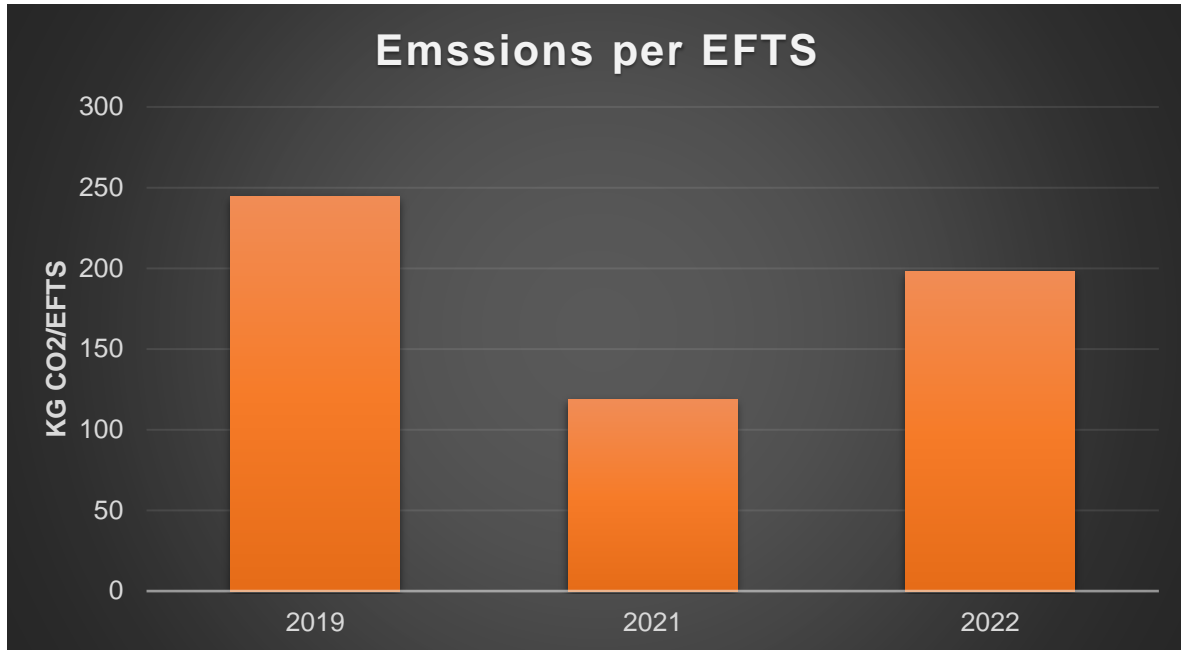


Item	2019	2021	2022
Scope 1 - Vehicular Emissions	465,559	162,816.87	266,063.94
Scope 1 - Generator Emissions	17,424	10,560	18,480
Scope 2 - Electricity Consumption	1,987,690	1,212,266.48	1,733,050.44
Scope 3 - Flight Travels 2019	518,907	52,167.50	269,730.50
Total Emissions (KG)	2,989,580	1,437,811	2,287,325
Total Emissions (Metric Tonnes)	2,990	1,438	2,287

The total emissions for the year 2021 were substantially lower which is a result of limited operations at all University Campuses during the Covid-19 pandemic restrictions and work-from-home strategies. The operations normalized in 2022 which is indicated as per the trend presented in the graph. The total emissions in 2022 were approximately 76% of the baseline, i.e., the University achieved a reduction of 24%.

5. Emissions per Effective Full-Time Students (EFTS)

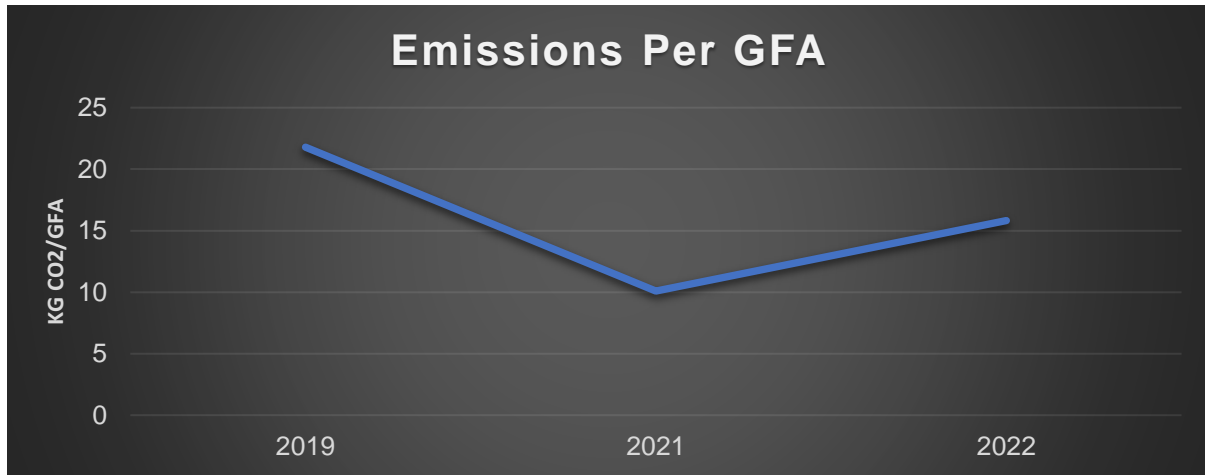
The total number of Effective Full-Time Students (EFTS) in 2019 with a slight reduction in 2021 through to 2022. While the EFTS was maintained, there was a reduction in emissions in 2021 which normalized in 2022.



	2019	2021	2022
Total Emissions (KG CO2)	2,989,580	1,437,811	2,287,325
EFTS	12,226	12,128	11,567
Emissions per EFTS, KGCO2/EFTS	245	119	198

6. Emission per Gross Floor Area (GFA)

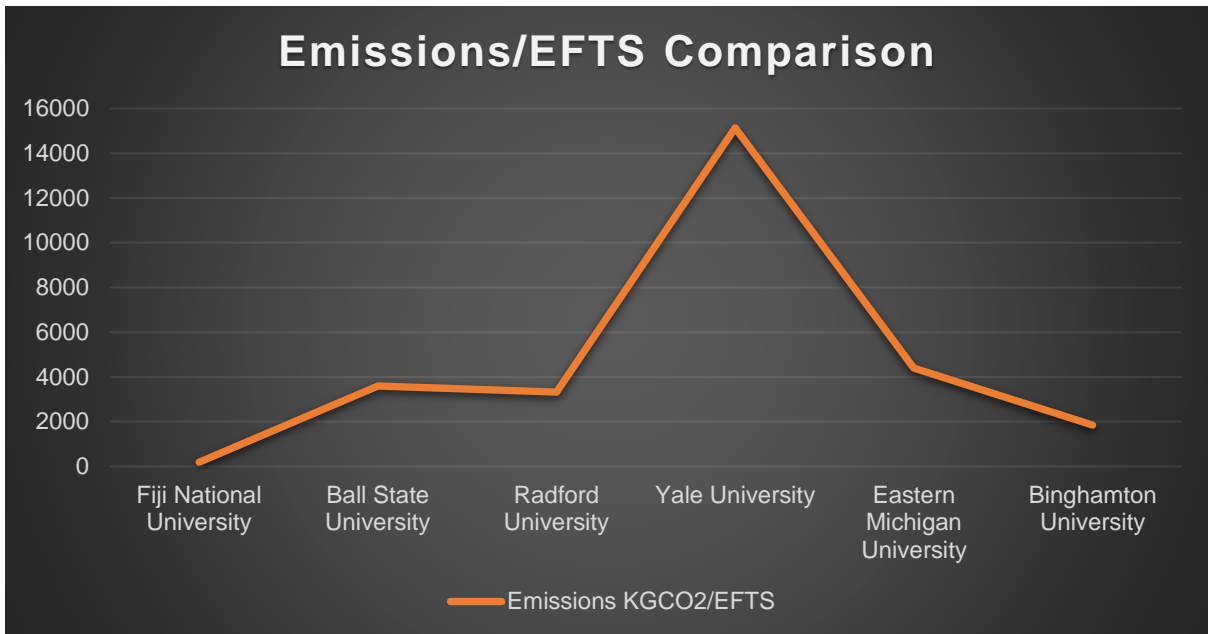
The total gross floor area of the university increased substantially in 2021 with the completion of projects in late 2020 and 2021. The result of this analysis is presented below.



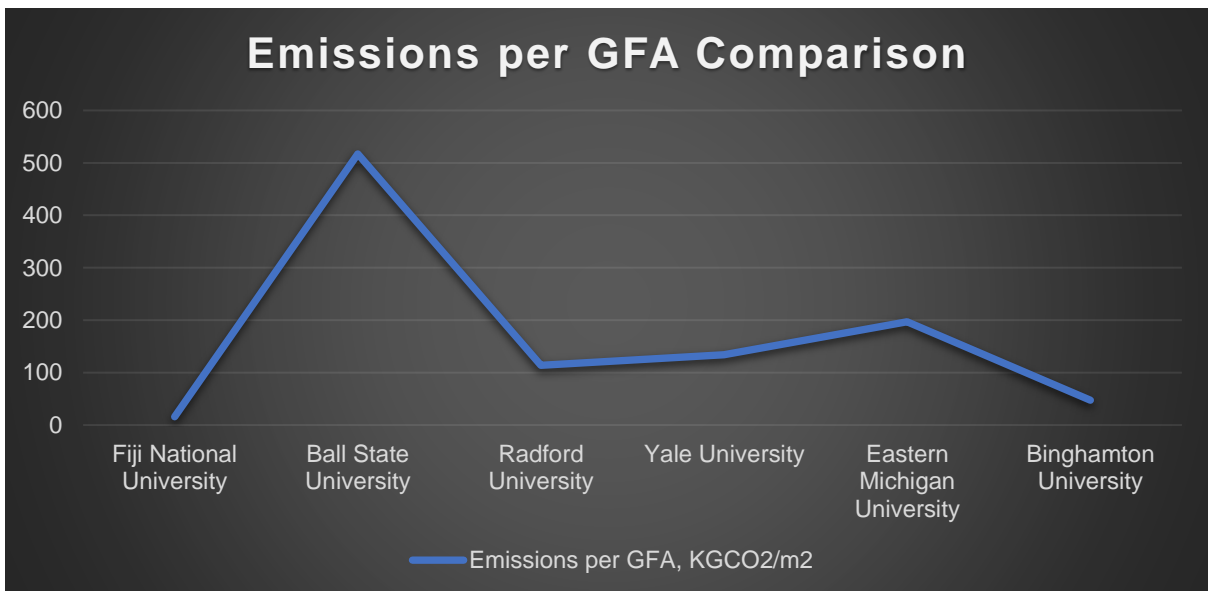
	2019	2021	2022
Total Emissions (KG)	2,989,580	1,437,811	2,287,325
Gross Floor Area	137,225	146,043	146,343
Emissions Per GFA, CO2 KG/M. Sq	22	10	16

7. Comparison of Similar Universities

7.1. Comparison by EFTS



7.2. Comparison by Gross Floor Area



University	EFTS	Emissions, Tonnes CO2	Emissions per EFTS, KGCO2/EFTS	Gross Floor Area, m2	Emissions per GFA, KGCO2/m2
Fiji National University	11,567	2,287	198	144,693	16
Ball State University	22,000	78,913	3587	152,618	517
Radford University	9401	31,289	3328	273,887	114
Yale University	14,567	220,416	15131	1,642,768	134
Eastern Michigan University	21,105	92,661	4390	469,883	197
Binghamton University	16,896	31,168	1845	658,436	47

It can be deduced that the carbon emission of the Fiji National University is extremely low when compared with other Universities of similar size in terms of EFTS as well as gross floor area. This may be due to the higher renewable methods of production of power in Fiji, limited air-conditioned spaces in our facilities, and limited categories under scope 3 that are being considered for the Carbon Footprint analysis.

8. Conclusion

To conclude, the GHG Scope 3 Protocols are a relevant and helpful instrument for measuring emissions. The data that was made accessible in the relevant categories allowed for the creation of a carbon footprint report. Based on the information and analysis drawn it is noted that the carbon emission as per the current report is more favorable compared to the previous report.

The overall emissions reduction is by 24% compared to 2019 which was a baseline. The contributing factors which led to a reduction are the following.

- ✓ 13% reduction in emissions due to electricity consumption reduction
- ✓ Renewable Power Generation Annual – 6.8% of consumption (Consider solar generation of 2021 and consumption of 2022)
- ✓ Percentage avoidance of emissions based on above years – 5%

Nevertheless, the reporting of the university's carbon footprint allows for the monitoring of its performance and the identification of additional actions that could be taken to improve the emissions and support the ecosystem.