SANTHIGIRI COLLEGE, THODUPUZHA

Vazhithala PO, 685 583, Idukki, Kerala

Carbon Footprint Analysis and Evaluation for 2021-'22

The actual per capita carbon footprint for Santhigiri College, Vazhithala, Thodupuzha, Kerala is 107 kg (0.107 Ton) of CO_2 equivalent [162.3 Ton/(1506 + 14 visitors] during the current COVID year. With an offset of 80.9 TCO_2 obtained through remedial actions, the net carbon footprint during 2021-'22 is thus [162.3 – 80.9 = 81.4 T CO_2 eq.].

The effective CF is 81.4/1520 or 0.054 T or 54 kg CO_2 per capita [2021-22]

According to the Economic Survey of Govt. of India, the per capita emission for an Indian is 1.84 Ton $CO_{2\ eq.}$ per annum in 2021. It is projected to increase by 1% in 2022. India's effort for greening is gaining ground with visible low carbon footprints.

For the year 2021-'22, for Santhigiri College, Thodupuzha, Kerala, the Carbon Footprint per capita at 0.054 T CO_2 equivalent, is very modest. This is achieved due to the minimal use of resource, maximal recycling, and moderate dependence on remedial measures like the use of solar energy.

The campus is a 'very low carbon footprint' institution, with potential for attaining Net Zero or Net Negative with minimal efforts during the next two years.

The remediation gap between the assessed footprint and the available remediation is 81.4 Ton CO_2 eq. On a closer look, the major contributors are:

1. Transportation (91.9 T of CO_2)
2. Use of Purchased Electricity (24.4 T of CO_2), and
3. Wastes (16.7 T of CO_2)

The College may seriously consider more remediation options, in spite of its very low CF status. Being a college with moderate use of personal vehicles like the use of scooters/bikes, and cars, the present 57% share of carbon footprint of Transportation is largely due to large number of students daily commuting by bus, as it is situated distant from Thodupuzha.

The College maintains greenery through its bird park, herbal gardens, fruits and vegetable gardens, as well as tree plantations with commendable biodiversity within the hilly terrain of the campus in the outskirts of Thodupuzha town. CF due to electricity use is more than fully offset by the Solar PV (30 gained against 24.4). It is planning to expand the solar PV power station of 25 kW to 50 kW. Waste recycling and use as energy and manure is near total. Electronic wastes are stored properly and disposed of responsibly. For water, there is no dependence on any outside sources.

Extensive arrangements for Divyangjans' mobility, toilets, accessibility, accommodation, cooking, games and sports, and employment (software, printing press and bindery) are in place as inclusive and adjunct facilities.

Carbon Footprint Calculation
for Santhigiri College, Thodupuzha, 685 583 Kerala, for 2021– '22

Sl. No:	Source	Rate	Quantity x Days/year	Total Quantity	Annual Eqvt. CO_2
1.a	Electricity use	0.82 $kgCO_2$/kWh (India 2018)	2,480 kWh/month	29,761 kWh	24.4 T CO_2
1.b	Fossil fuel use	2.68 $kgCO_2eq$/kg 2.30 $kgCO_2eq$/L	- LPG (66x19+6x14)	- 1,338 kg	 3.1 T CO_2
1.c	Firewood	1.65-1.8$kgCO_2eq$/kg	100 kgx12	1,200 kg	2.2 T CO_2
2.a	Food waste	1.9 $kgCO_2eq$/kg	18 kgx300d	5,400 kg	10.3 T CO_2
2.b	Paper waste	1.725$kgCO_2eq$/kg	6 kgx250d	1,500 kg	2.6 T CO_2
2.c	Water waste	0.298$kgCO_2eq$/kL	15 Lx365L	5,520 L	1.6 T CO_2
2.d	Plastic/Other	6.0$kgCO_2eq$/kg	1.45x250	362.5 kg	2.2 T CO_2
3.a	Bus – students	2.68 $kgCO_2eq$/L	(360/4) x 250	22,500 L	60.3 T CO_2
3.b	Staff, Stu/week	2.68 $kgCO_2eq$/L	100x230x4/50x4	460 L	1.2 T CO_2
3.c	Cars, Taxis, and College Car	2.30 $kgCO_2eq$/L	80x250/10	2,000 L	4.6 T CO_2
3.d	Auto rickshaws	2.68 $kgCO_2eq$/L	15x20x250/15L	5,000 L	13.4 T CO_2
3.e	Two wheelers	2.30 $kgCO_2eq$/L	24x45x250/50 L	5,400 L	12.4 T CO_2
4	Events, Festivals	LS			24.0 T CO_2
5	Construction	Lump Sum	--		--
	Total				**162.3 T CO_2**

**No. of activity days in 2021-22 reckoned as: 250 days*

Table 4.1: Calculation of Carbon Footprint Source-wise

Remediation for Carbon Footprint
of Santhigiri College, Thodupuzha, 685 583 Kerala, for 2021–'22

	Source	Rate	Quantity x Days/year	Total Quantity	Annual Eqvt. CO_2
1	1.a. Solar PV electricity 1.b. Solar Hot Water 1.c. Wind energy 1.d. Biogas 1.e. Micro Hydro Power, other	0.82 $kgCO_2$/kWh -- 1.34/kg --	25 kWx4x365 - - 3.5cum/day	36,500 kWh - 1277.5 kg	30.0 T CO_2 -- -- 14.7 T CO_2 -
2	2.a. Replacing old tube lights 2.b. Replacing bulbs & CFLs 2.c. Replacing Fans, Motors 2.d. UPS Upgradation 2.e. Reduce Phantom load	0.82	300 LED Tubes x 40 W x 6h x 250	18,000 kWh	14.8 T CO_2
3	3.a. Waste Reduction 3.b. Recycling 3.c. Waste to Energy	0.26 $kgCO_2$/kL	15 kL/day	4,500 kL	1.2 T CO_2
4	4.a. Sharing of vehicles 4.b. Low footprint options 4.c. Electric/Solar vehicles		8 Bikes	LS	0.5 T CO_2
5	5.a. Greenery forest retained 5.b. Tree planting, Biodiversity 5.c. Gardens, Lawns etc.	Nil 22kg/yr. 2200 kg	LS		10.0 T CO_2
6	6. Walking & bicycle use	2.68 kg/L	135x250x2/50x4	637.5 L	1.7 T CO_2
7	7. Outreach activities	22 kg/yr	LS		8.0 T CO_2
	Total				**80.9 T CO_2**

Table 4.2: Remediation for Carbon Footprints: available/created.

The International Organization for Standardization (ISO) also provides some general standards for

- *Greenhouse gas emissions at Organization level (ISO 14064 - 1) and*
- *Greenhouse gas emissions at project level (ISO 14064 – 2)*
- *Specifications to validate and verify relevant accountings are documented in (ISO 14064 - 3)*

[Full Report of Green Audit is issued separately]