



MARIAN COLLEGE
KUTTIKKANAM
(AUTONOMOUS)

MAKING COMPLETE

Institutional Distinctiveness 2021



Conscious Efforts in Reduction in Carbon Footprint through Rain Water Harvesting and Green Energy Initiatives

Since its inception in 1995 in a mesmerizing landscape above 3500 ft. sea level reputed as Kuttikkanam Marian College, had exhibited an abiding passion and commitment for environmental sustainability, enveloping a host of environmental concerns, such as water scarcity, energy utilization, waste management, carbon foot print, green protocols and several environmental outreach activities. The college has succeeded in reducing the per capita carbon footprint of the region from the earlier reported value 0.311 TCO₂ to 0.158 TCO₂

WATER CHALLENGE

The first challenge to be met was acute scarcity of water within the campus, where there was neither ground water or underground water due to the high altitude. Water whose quality was questionable, had to be brought in tankers from far distant places. Finding water resources in the campus became the foremost priority. The challenge was successfully met by the then innovative method of **rain harvesting** as the area was blessed with 5000 mm annual rainfall. This enabled the construction of two check dams – first one in 2000 and the second in 2007. Water from major buildings in the campus was effectively channeled to the check dams. Added to this was a recharged wells for drinking water. The emphasis was on availability, usage, purification and recycling of water.

BEST PRACTICES

The best practices for water conservation were adopted: Both productive and wasteful usage of water were identified; detecting and fixing leaks not only saved significant amount of water, but also eliminated the dependence on finding additional water resources to rising demand. All these activities made the campus surplus in water within 10 years of its existence. As the entire region had sufficient ground and underground water sources through the dedicated efforts, dependence on public water system was fully eliminated.

Periodic monitoring of water quality by analyzing factors like pH, TDS,(total dissolved solids), salinity, hardness, chloride nitrates and so on, ensures that the values of physico-chemical parameters of water remains within the permissible limits stipulated by WHO.

Particular attention and care was paid to the multi-faceted **usage of water**. A total of 31,538 and 72,36,196 litres of water is used daily and yearly, respectively. 9,438 litres is consumed for drinking purpose; 16,94,000 litres are utilized by flush tanks per year. Gardening and related activities' annual utilization is calculated as 8,8470 litre; Included also was a '**Vellathotti**' containing 150 litres of water for animals and birds, a highly rated imaginative gesture proclaiming environmental sustainability. The campus has four pumps, two of which have a capacity of 5 HP and the other two 7.5 HP. About 1,64,000 litre water is pumped out daily.

Water self sufficiency achieved by Marian campus is a sustainable water resource model, which can be emulated by others. Aided by efficient rain water systems there are two surface water reservoirs. One has the capacity for about 71 lakhs liters; the other 2 crores liters of water. There is an efficient treatment system for purifying the water stored in the reservoirs.

The water is used for drinking and cooking after UV filtration. More than 30 filter taps are made available for drinking purpose in the campus.

ENERGY MANAGEMENT

In order to promote energy sustainability the institution focused on identifying major energy resources of the campus, creating energy consumption profile, and sustainable energy accesses.

ELECTRICITY

The main energy resource has been electricity supplied by KSEB. Additional energy sources related to LPG and diesel. The annual electricity consumption of the campus was computed as 181184 kWh with a monthly average consumption of 16618 kWh, the maximum utilization for which was for indoor lightning systems (34%), followed by water heaters (19%). Computer systems are also heavy users of electricity. However, interventions through modular UPS systems and efficient computers are slated to reduce electricity consumption (recommendations of Energy Audit), which falls under three different times zones - 6 AM to 6 PM; 6 PM to 10 PM; 10 PM to 6 AM.

RENEWABLE ENERGY

Resorting to renewable energy options, such as **Solar Photovoltaic (SPV) system**, was an admirable innovative step in energy management. The roof top solar system connected to the distribution system of KSEB (in 2019) provides 4 lakh kWh energy per day. The total power requirement being 199 kWh, the SPV arrangement provides nearly 80 KW energy. This is adequate to meet almost 40% of the day time energy needs. The earlier dependence on diesel generators when power failure occurs is now replaced by having recourse to solar back up. The commissioning of its extended capability is expected to boost the energy availability further.

BIOGAS

Taking recourse to the use of biogas from food waste is an imaginative supplement to energy management initiatives. Although presently the biogas plant is functional only in one hostel, it is an harbinger of immense possibilities in green initiative in the entire campus. An example of this is the construction of a storage tank set up for the extraction of leachate from biogas plant and utilizing it as bio fertilizer.

HOLISTIC APPROACH

A critical assessment of these activities leads to the inference that green initiatives adopted on the campus is holistic in nature and approach. To cite a few examples: the quality of air and water has improved considerably from the previous audit; the abundance of water and its judicious utilization has contributed to its multi-faceted usage within the campus; the resultant biodiversity has strengthened the eco system as a whole; flora and fauna have flourished; the green canopy by plants and trees have been enlarged to a much wider area than before; birds and a variety of flies have made the campus home to roost. Perhaps the most significant of them all is the emphasis placed on the awareness of the Greenhouse Gases emissions (CHG) or carbon

foot print by identifying their sources, quantifying and computing them to suggest efficient measures for their reduction.

Despite the progress already achieved, environmental sustainability is an on-going process, implying considerable scope for further excellence in environmental commitment.

The Green initiatives of the college has improved the air and water quality of the region which was depicted in the latest Green audit conducted by the Environment Department of the Parent University, The major achievements are listed in the following table

Quality parameters	WHO Acceptable Limits	Marian Campus Values
Water Quality		
TDS	500 (ppm)	134.7 (ppm)
pH	6.5-8.5	7.64
Salinity	500 (ppm)	93.05 (ppm)
Chloride	250 (mg/L)	13.72 (mg/L)
Hardness	300 (mg/L)	9.65 (mg/L)
Nitrate	45 (mg/L)	4.25 (mg/L)
Air Quality		
CPCB Standard of SO ₂ level	50µg/m ³	2.05 µg/m ³
CPCB Standard of PM 10 level	60µg/m ³	32.4 µg/m ³
CPCB Standard of PM 2.5 level	40 µg/m ³	12.4 µg/m ³
CPCB Standard of CO level is	2 mg/m ³	1.13 µg/m ³