

Correspondence

Efforts of a healthcare institution in central India to reduce carbon footprints

A major cause of climate change has been the increase of concentration of CO₂ in the earth's atmosphere. Ancient air bubbles trapped in ice enable us to step back in time and see what earth's atmosphere and climate were like in the distant past. They reveal that levels of CO₂ in the atmosphere are higher than they have been at any time in the past 400 000 years.¹

Carbon footprint is defined as a measure of the total amount of CO₂ emissions that are directly and indirectly caused by an activity or are accumulated over the life stages of a product. This includes various activities of individuals, communities and industries.² Combustion of fossil fuels causes the largest (87% of total) human CO₂ emissions. The energy released by burning these fuels is used to produce heat, electricity or power for transportation.³

We calculated the carbon footprints of the Mahatma Gandhi Institute of Medical Sciences, Sevagram (MGIMS) and examined various measures adopted by the institute to reduce or offset them.

A study of the initiatives

The MGIMS campus is spread over an area of 600 acres in the state of Maharashtra. It includes a hospital, a medical college, two nursing colleges, 15 hostels and 270 residential quarters. The hospital was started as a 15-bed Kasturba Hospital in 1944 by Mahatma Gandhi and the medical college was started in 1969 as India's first rural medical school. Over a period of time, it has progressed into a 980-bed tertiary care hospital. The hospital waste is generated at a rate of 2 kg/bed/day and 15% of it is infectious. Waste is managed as per the Maharashtra Pollution Control Board Guidelines. Akin to other organizations, MGIMS also produces carbon emissions and we calculated the average annual carbon footprints of MGIMS using various assumptions. The tools used were (i) annual reports of MGIMS (downloaded from the website); (ii) a detailed questionnaire-based interview with the in-charge of the engineering section of MGIMS; (iii) meetings with the chief administrative officer of the Kasturba Health Society that runs MGIMS and with the administrative officer of MGIMS; (iv) visits to the Kasturba Hospital and its subsidiaries; (v) an internet-based survey of the teaching staff using Survey-Monkey™; and (vi) a house-to-house survey of non-teaching staff residing in the campus. Efforts were made to collect survey data from at least 30% of households. The population was stratified into two groups of teaching (professors and lecturers) and non-teaching staff and the convenient sampling method was used. CO₂ emissions of MGIMS were calculated using a carbon footprint calculator from Tata Power (available at www.tatapower.com/sustainability/carbon-footprint.aspx). The air travel footprints were calculated @ 250 kg/hour of flying.

The average annual carbon footprints of MGIMS were calculated to be 429 tons of CO₂.

MGIMS has implemented several measures during the past 10 years to offset and reduce carbon footprints. We believe that some of these measures may be applied in other institutes/colleges to cut down their carbon emissions.

Plantation of trees

Residents of Sevagram have a history of tree plantation. The Gandhi Ashram located near MGIMS has trees planted by various leaders such as Mahatma Gandhi, Jawaharlal Nehru and Kasturba. Continuing this tradition, more than 22 000 trees were planted by MGIMS during

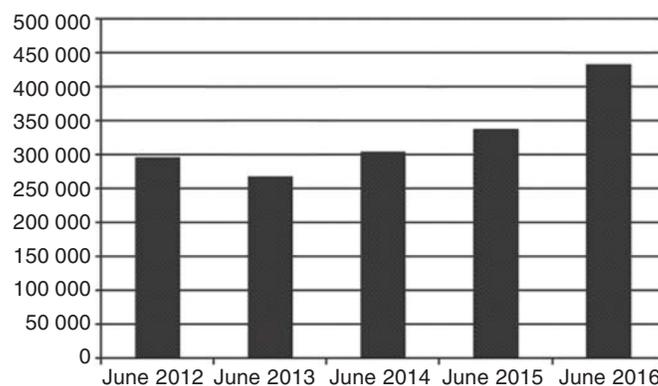


FIG 1. Electricity consumption (in kWh) of the Mahatma Gandhi Institute of Medical Sciences, Sevagram for the month of June from 2012 to 2016

2006–07, both commercial as well as non-commercial in addition to the existing 10 000. Total carbon footprint offset by 32 000 trees calculated at a rate of 22 kg per tree is 704 tons per annum.

Replacement of old electric appliances with new energy-efficient appliances

In a major decision on environment conservation, MGIMS replaced old tubelights, street lights and fans of the hospital, medical college, hostels and offices with new energy-efficient appliances in May 2013. We have plotted the electric consumption of MGIMS in the month of June for five consecutive years. Figure 1 shows that there was a steady rise in consumption of electricity every year except the year in which the new energy-efficient appliances were installed. The reduction in the month of June 2013 was to the tune of 27 770 kilo Watt hours (kWh) or units of electricity, about 9.4% of 296 020 kWh consumed during the previous year (June 2012). During 2015–16, the consumption of electricity increased due to starting the Cardiac Catheterization Laboratory, two new hostels, an operation theatre complex, mortuary freezers and installation of air conditioners for temperature-sensitive equipments.

Paperless hospital

Since 2007, the Kasturba Hospital attached to MGIMS is a partial paperless hospital and all indoor patient records are available online through the hospital information system (HIS). It has a Wi-Fi campus and a majority of consultants and residents have portable devices connected 24 (7 to internet. Since 2010, MGIMS has been recycling its paper and cloth waste to make file covers.

Use of alternative sources of energy

On a pilot basis, MGIMS has started using solar power as an alternative source of electricity. In 2015, an 8 kWh plant was installed to run a containment laboratory on hybrid sources of power and in one year it produced 18 000 kWh of electricity.⁴

Discussion

It was observed that the carbon footprints produced by MGIMS (429 tons) were much lower than offset (704 tons). Hence, MGIMS has not only neutralized its carbon footprints, but has greatly reduced them.

We used carbon footprints as they were easy to calculate and could be understood by administrators and the common man alike. Weidema

et al. also stated that carbon foot printing has a much broader appeal than life cycle assessment (LCA).⁵ The concept has been promoted and used outside the research community. In this approach, things are kept simple, and carbon footprints are also easy to calculate online. Moreover, the calculated value can be easily grasped and placed in context.⁵

Different countries are trying to reduce their carbon footprints by shifting to carbon neutral ways of electricity generation, as has been done in developed countries where they have used solar, wind and nuclear energy. Such measures have also been contemplated by the Government of India, e.g. India has committed that 11 000 MW electricity will be produced by solar energy and 15% of which will be produced in the state of Maharashtra in the next 5 years. However, we are still dependent upon the hydro and thermal power generation. So, the only option is to use energy-efficient appliances.

The limitation of our study is that we used a simple carbon footprint calculator instead of input–output analysis. However, it is also true that most organizations typically report direct emissions and indirect electricity-related emissions while neglecting to report other indirect emissions; largely due to the complexity of both its calculations and the determination of organizational boundaries (personal communication, Tommy Wiedmann).

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Dev Narang
Bhavan's Llyod's Vidya Niketan
Bhugaon

Rahul Narang
Department of Microbiology
Mahatma Gandhi Institute Medical Sciences
Sevagram
Wardha
Maharashtra
rahuldevnarang@gmail.com

Obituaries

Many doctors in India practise medicine in difficult areas under trying circumstances and resist the attraction of better prospects in western countries and in the Middle East. They die without their contributions to our country being acknowledged.

The National Medical Journal of India wishes to recognize the efforts of these doctors. We invite short accounts of the life and work of a recently deceased colleague by a friend, student or relative. The account in about 500 to 1000 words should describe his or her education and training and highlight the achievements as well as disappointments. A photograph should accompany the obituary.

—Editor