

Carbon accounting: concepts, calculations, and considerations

In recent years I have been interested in issues surrounding climate change, but felt that I lacked depth of understanding. So, earlier this year, I enrolled in a Carbon Accounting course. It was enlightening and sobering: enlightening because I was introduced to 'the carbon cycle', and taught how to determine carbon sources and calculate carbon emissions, sobering because I gained a much clearer understanding of our dwindling resources, and the impact of higher carbon levels in our atmosphere.

Part of the course assessment was undertaking a carbon audit and report for an organisation. What better place to start than my own workplace, Swinburne University of Technology, Hawthorn campus library in Melbourne?

I want to share a few of the concepts, calculations, and considerations I came across in the Carbon Accounting course.

First, what does it mean to go carbon neutral? For an organisation, it simply means reducing the overall climate impact to zero. This usually involves a three part process:

1. measuring carbon emissions,
2. reducing emissions, and
3. offsetting the remaining emissions.

So what are the main sources of library carbon emissions?

Emission sources from any library include: lighting, heating, and cooling; computers and other equipment; transportation - commuting to work, carpooling, air travel, intercampus delivery of books; paper and other stationery; waste; and refrigerant leakage from fridges and air conditioning.

Swinburne Hawthorn library is large, very busy, and open 24 hours. Our door count is over 1.6 million people per year, and over 90% of our carbon emissions is electricity usage.

Electricity usage is measured in kilowatt hours (kwh) and, in 2009, our library used 2 021 113 kwh of electricity producing

2465.76 tonnes of CO₂-e (carbon dioxide equivalents). CO₂ is used as an equivalence benchmark because it is the most prevalent emission and allows us to calculate as accurately as possible the Global Warming Potential (GWP) of all emissions on our atmosphere. Thus, CO₂ has a GWP of 1, methane is 21, and the gas in many refrigerators has a GWP of 1300 CO₂-e!

So, having determined and calculated its carbon emissions, what steps could a library take to become carbon neutral?

The Carbon Management Principles of Victoria's Environmental Protection Agency (EPA) are considered best practice and provide a framework from which future actions can be prioritised. The key strategies around these principles are: Avoid, Reduce, Switch, Sequester, Assess, and Offset.

Avoid and Reduce

There are many ways a library can avoid and reduce emissions.

Smart building design or retrofitting can ensure lighting, heating, and cooling is reduced, as can purchasing new equipment with high efficiency ratings and minimising wastage of every resource used. Sensors to cut energy when rooms or buildings are not in use and meeting via tele- or videoconference are some real alternatives.

Switching

Onsite installation or purchase of renewable forms of energy such as solar, wind, hydro, and biomass reduces dependence on fossil fuels and can significantly reduce greenhouse gas (GHG) emissions.

This is perhaps the most significant way a library can reduce its GHG emissions. In the quest to be carbon-neutral, switching to more efficient energy sources would have a significant effect. It is interesting to note that if our library was situated in Tasmania, its carbon emissions from electricity usage would be reduced to approximately one fifth of their current size, because Tasmania uses hydroelectricity, and Victoria's electricity is generated from brown coal.

Sequestration

Planting trees effectively sequesters carbon emissions in the ground. For a library, this could even mean partially allocating income streams to tree planting.

Assessing

Once any institution has gone through the process of reducing on-site emissions, it needs to look back and re-assess its original reduction objectives. If the objectives are not being met, then consideration should be given to reduction strategies that might have been missed or under-used.

Offsets

A carbon offset is any project that indirectly reduces GHG offsets at one source. The purchase of carbon offsets are last in the order of carbon management strategies because of the importance of first considering 'at-source' options for reducing energy use.

In recent times, libraries have responded well to change and have kept pace in a rapidly evolving technological environment. Now, when we are all being asked to adjust our thinking even further and dramatically reduce our carbon emissions for the sake of future generations, the challenge of sustainable, carbon-neutral libraries presents as both an inspiring and achievable goal.

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