Introduction to Carbon Footprints

Today, just about every human activity contributes to the increasing issue of climate change and global warming. All human activities to some extent, have direct and indirect impacts on the environment, through the emission of greenhouse gases. The term “carbon footprint”, is a metaphor used to describe the environmental impact of an entity or activity by estimating its total carbon emissions caused. “Carbon”, does not only refer to carbon dioxide, and includes other greenhouses gases such as methane and nitrous oxide. In the process of measuring a carbon footprint, it is import to include as many factors as possible, otherwise, the proportion of the footprint will turn out inaccurate. A carbon footprint does not only consist of direct emissions, but also indirect emissions. Direct emissions would refer to the combined emissions of activities that constitute the footprint. On the other hand, indirect emissions are the emissions caused by activities that lead up to the activities that constitute the footprint. For example, the direct emissions of creating a plastic box would include the emissions of all activities at the factory where construction of the box took place. Indirect emissions would include the emissions of the refinery process required to make the oil that supplied energy to the machines that created the box, and so on. In the end, being completely accurate in measuring a carbon footprint is near impossible due to the vast number of factors involved.

The CO2e is the standard unit used in measuring carbon footprints. The underlying concept behind the carbon dioxide equivalent is to express the impact of greenhouse gases in the form of carbon dioxide required to create the same environmental impact (usually the increase in temperature). By using CO2e, the size of a carbon footprint could be measured with a standard unity and various greenhouse gases can be grouped together and compared within a single number. Greenhouse gases are converted into equivalent amounts of CO2 using standard ratios based on the global warming potential (GWP) of each gas. The GWP illustrates each gas’s total warming impact compared to carbon dioxide over a span of time, measuring the amount of energy (sunlight trapped) one ton of the specified gas would absorb over a fixed time compared to a ton of CO2. The larger the GWP, the more amount of energy the given gas has the potential of absorbing over time. For example, CO2 has a GWP of 1 compared to CH4 (methane), which has a GWP of 28-36, over the course of 100 years. However, the GWP of various greenhouse gases differ across time, for instance, methane has a momentarily significant impact, but in the long term, it has less of an impact compared to other gases. This discrepancy further adds to the inaccuracy of measuring carbon footprints.

The process behind measuring a carbon footprint proves challenging due to the near limitless number factors involved. In addition, the standard ratios that convert different greenhouse gases to carbon dioxide equivalents may not be accurate depending on the selected timeframe. An efficient and precise method of measuring carbon footprints would have to overcome these problems by finding ways to circumvent the challenge of measuring all carbon pathways while arriving at accurate and representative measurements.