

Carbon Footprinting

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Background

With increasing concern for global climate change and greenhouse gas (GHG) emissions as a causal factor, many companies and organizations are pursuing ‘carbon footprint’ projects to estimate their contributions to global climate change. Protocol definitions from carbon registries help organizations analyze their footprints. The scope of these protocols vary, but generally suggest estimating only direct emissions and emissions from purchased energy, with less focus on supply-chain emissions. In contrast, approaches based upon comprehensive environmental life-cycle assessment methods are available to track total emissions across the entire supply-chain, and experience suggests that following narrowly-defined estimation protocols will generally lead to large underestimates of carbon emissions for providing products and services.

Approach

Most protocols, including The Climate Registry and WRI/WBCSD, define carbon footprint inventories in increasingly bigger scopes or “tiers”. The “Tier 1” definition consists of the direct emissions of the organization itself (e.g., the CO₂ emissions coming out of a firm’s factories and vehicles). “Tier 2” expands the boundary to include the carbon emissions of energy inputs used by the organization, given that the energy sector is a leading source of GHG emissions. An optional final tier expands the boundary to include “other indirect activities”, which is vaguely defined in general but presumably suggests adding in other known sources of GHG emissions for an industry.

Results

To estimate GHG emissions across tiers, we leverage, EIO-LCA which was developed by our Green Design Institute. This method tracks all activities across the supply-chain for a specific industry. We combine this existing information with industry specific

data to obtain estimates of both direct and indirect carbon emissions. We find that direct (Tier 1) emissions of industries are on average only 14% of total supply chain GHG emissions. The Tier 1+2 emissions are on average only 26% of the total. The vast majority of sectors would have less than 25% of their total GHG footprint represented by Tier 1 and 2 estimates.

Next Steps

Dealing with boundary definitions and estimation uncertainty are major concerns in our work.

We are developing this carbon footprinting approach with several corporate partners. Our primary concern is that estimating smaller footprints by using limited boundaries will cause firms to make short-sighted decisions about cost-effective GHG mitigation strategies.

References

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