A4 Transportation Calculation

Last updated: January 24, 2024

EC3 calculates the impact of transport from manufacturing plant to project site for each material. This result is then shown as A4 transportation impact. This calculation takes into account:

1. product weight
2. transportation mode(s)
3. transportation distance(s)

Product weight is the mass per declared unit when available; otherwise EC3 calculates it from the default density for the product category. You can manually enter a more accurate product weight, for example to include packaging (if known).

Transportation mode defines the carbon footprint per ton of product transported over a km or mi distance, i.e., kgCO2e per t*km or ton*mi. Our list of transportation modes and the associated impact factors come from regional LCA datasets, such as USLCI in the United States [1]. Associated impacts are well-to-wheel, i.e., they include both fuel production and combustion emissions, unless noted otherwise in the transportation mode table.

Transportation distance can be custom calculated, but EC3 provides a default initial estimate.

If the user has selected a facility-specific product EPD, EC3 uses the straight-line distance from the manufacturing facility to the project site, plus a 40% routing factor to account for the actual road, rail, and waterway routes [2].

If no product EPD is selected yet, EC3 uses a default distance and mode for the general product category that was selected. These default values represent the typical distance based on national or regional data (e.g., U.S. Census Bureau's Commodity Flow Survey in the United States [3]).

You can also enter specific info about multiple transportation modes and distances manually, where you have more complete information. We recommend Ecotransit as a resource.

To calculate the **A4 transportation impact,** we multiply:
GWP_a4_leg1 = product_weight * transport_mode_gwp_intensity * leg_distance

For multiple legs, each leg is calculated as above and results of all legs are summed:
GWP_a4_total = GWP_a4_leg1 + GWP _a4_leg2 + GWP_a4_leg3 + …

As usual, EC3 handles the unit conversions.

References

[1]   National Renewable Energy Laboratory, USLCI Database, National Renewable Energy Laboratory Golden, CO, 2021.
[2]   F.P. Boscoe, K.A. Henry, M.S. Zdeb, A nationwide comparison of driving distance versus straight-line distance to hospitals, Prof. Geogr. 64 (2012) 188–196.
[3]   U.S. Department of Transportation, U.S. Department of Commerce, U.S. Census Bureau, 2017

Commodity Flow Survey, Washington, DC, 2020. www.census.gov /content/dam/Census/library /publications/2017/econ /ec17tcf-us.pdf.