

Avoiding Emissions Through Waste Diversion

This guide provides a step-by-step approach to calculating the greenhouse gas emissions avoided by diverting waste from landfills through reverse logistics and recycling.

1 - Characterize Type & Quantity of Waste to Be Returned and Recycled

Start by collecting, segregating, and characterising the waste and measure their quantities. This is essential because different materials have different environmental impacts. Common materials include:

- Paper and cardboard
- Wood (e.g. broken pallets)
- Plastics (e.g., plastic wraps, broken pallets, multilayer sachets)
- E-waste
- Fleet waste (e.g., batteries, tires).

[Consult the WREC Waste or Material Characterization Exercise Guidance](#)

2 - Identify the right Emission Factors

Apply standardized emission factors associated with landfilling. Common emission factors are:

Paper and cardboard:
825 kgCO₂e/tons ¹

Plastic:
33 kgCO₂e/tons ¹

E-waste:
20 kgCO₂e/tons ²

NOTE: Using the right unit of measure is essential for accurate emission calculations. It ensures consistency, avoids errors, and allows reliable comparisons across projects and sectors.

Metal waste:
20 kgCO₂e/tons ²

Food waste:
558 kgCO₂e/tons ¹

Household waste:
1158 kgCO₂e/tons ¹

¹Source: [Humanitarian Carbon Calculator](#)

²Source: [Climatiq](#)

3 - Calculate Avoided Emissions

Apply relevant emission factors to estimate the amount of CO₂ emissions (CO₂e) avoided by diverting waste from landfilling to more sustainable alternatives such as reuse and recycling.

Avoided emissions by Diverting Waste from Landfilling = Weight of the materials x Emission factor associated with landfilling

4 - Adjust for Transport Emissions

When adopting Reverse Logistics, include emissions from transporting waste.

Transport Emissions = Mass of Waste × Distance × Emission Factor

Truck:
0.10-0.37 kgCO₂e/tonKm ¹

Container ship:
0.01-0.70 kgCO₂e/tonKm ¹

Train:
0.02-0.04 kgCO₂e/Km ¹

5 - Calculate Net Avoided Emissions by Diverting Waste from Landfills

♻️ Combine the benefits of reusing or recycling with the impact of transportation to determine the overall emissions avoided. This final step gives you a realistic picture of the environmental impact of your initiative.

Net Avoided Emissions by Diverting Waste from Landfilling = Avoided emissions - Transport Emissions

Scenario

A humanitarian organisation diverts 5 tons of cardboard from landfill through reverse logistics and recycling. Measuring the environmental benefits of this initiative helps demonstrate tangible results and builds support from management, donors, and other humanitarian actors. How? Following the step-by-step approach!

Emissions avoided by diverting waste from landfilling:

5 tons × 825 kg/ton = **4,125 kg of CO₂**

Emissions from transport of waste:

5 tons × 100 km × 0.1 kg/ton/km = **50 kg of CO₂**

Net avoided emission: 4,125 – 50 = **4,075 kg avoided of CO₂**

→ That's equivalent to the amount of emissions generated by transporting 40 metric tons of food over 10,000 kilometers by sea!



Why these numbers matter

Here's how you can turn these numbers into real impact.

- **Advocate with Management:** Demonstrate how environmental sustainability efforts result in measurable impact, reinforcing the case for continued investment
- **Attract Partner Interest:** Share achievements to position your organization as a leader in green humanitarian practices.
- **Engage Donors:** Present measurable environmental results to build trust and reinforce accountability toward shared sustainability goals.