MORE CIRCULARITY
LESS CARBON
-25% BY 2025

THE CARBON FOOTPRINT OF WASTE

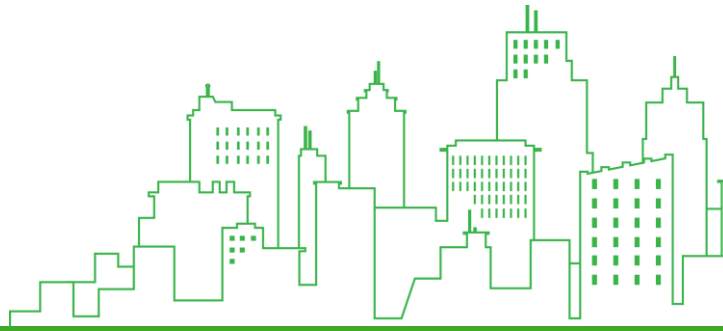
CROSS ANALYSIS OF THE SECOND COHORT

EXECUTIVE SUMMARY

ODENSE ■ IRELAND ■ REGION OF NAVARRA

ACR+

ZERO WASTE SCOTLAND



EXECUTIVE SUMMARY

The 'More Circularity, Less Carbon' (MCLC) campaign was launched by ACR+ in November 2019 to help its member in addressing the carbon footprint of their waste. ACR+ has partnered with its member Zero Waste Scotland to assess how individual territories can reduce the carbon impact of municipal waste by 25 per cent by 2025.

To do so, Zero Waste Scotland adapted its own carbon assessment tool to develop the Carbon Metric International. It allows the assessment of the carbon footprint linked with material resources by using local waste data: generation, composition, and treatment. The tool assesses the impact linked with waste management, but also the impacts linked with the production and the consumption of the product that became waste. To summarise, the CMI allows the assessment of both direct and indirect emissions of the consumption of material resources and products at local level thanks to local waste data.

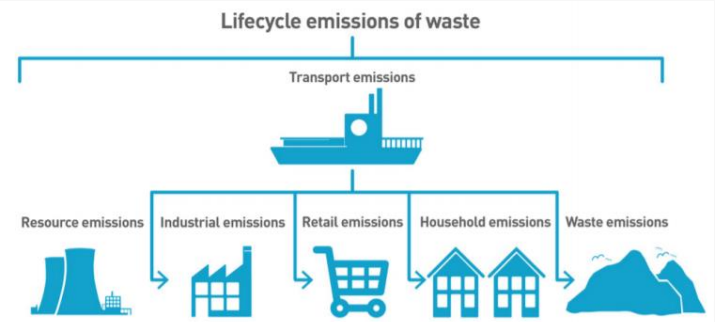


Figure 1: Schematic diagram presenting the lifecycle emissions of waste.

The MCLC campaign consists in different "cohorts", in which three territories collect data and assess their carbon footprint with the assistance of Zero Waste Scotland and ACR+. A first cohort was launched in early 2020, and a second one was launched in 2021. This second cohort includes three territories: the city of Odense in Denmark, the region of Navarra in Spain, and Ireland.

THE IMPACT OF LOCAL SPECIFICITIES ON WASTE DATA AND CARBON FACTORS

These three territories present quite different data when it comes to waste generation, composition, and treatment. These differences are linked with local specificities, but also the fact that the scope of municipal waste data is slightly different: in Ireland, only household waste is included, when a share of commercial waste is reported in the other two territories. Odense manages quite significant construction and demolition waste, that are for the most part excluded from municipal waste in the other two territories. Finally, beverage packaging waste is partly collected in a deposit-refund system in Denmark, and the associated quantities are not included in the reported data.

There are also important differences regarding waste management. While all three territories present recycling rates around 50%, Ireland and Odense resort mostly to incineration for residual waste whereas Navarra uses landfilling. There are also significant differences regarding the treatment of individual waste fractions.

Participants of cohort 2 could share local data on the composition and recycling routes of key waste fractions, as well as on the waste treatment units in use. This enabled the assessment of local carbon factors, with noticeable discrepancies among the territories. As an illustration, the carbon factor associated with food waste generation is lower in Odense due to a lower presence of protein waste, and the savings enabled by recycling of textile waste are considerably lower in Navarra due to a lower re-use rate.

DIFFERENT CARBON FOOTPRINTS YET SIMILAR MOST CARBON-INTENSIVE FRACTIONS

These discrepancies lead to different carbon footprints. A lower footprint per capita is observed in Odense due to a larger share of waste fractions with a low carbon intensity (such as construction and demolition waste), smaller arising of textile waste (associated with very high carbon intensity), and more significant savings thanks to energy recovery with incineration. In Navarra, the use of landfilling also increases the overall carbon footprint. Yet for the three participants, the emissions linked with the extraction of resources and manufacturing of products that then became municipal waste are significantly higher than the emissions linked with products' end-of-life.

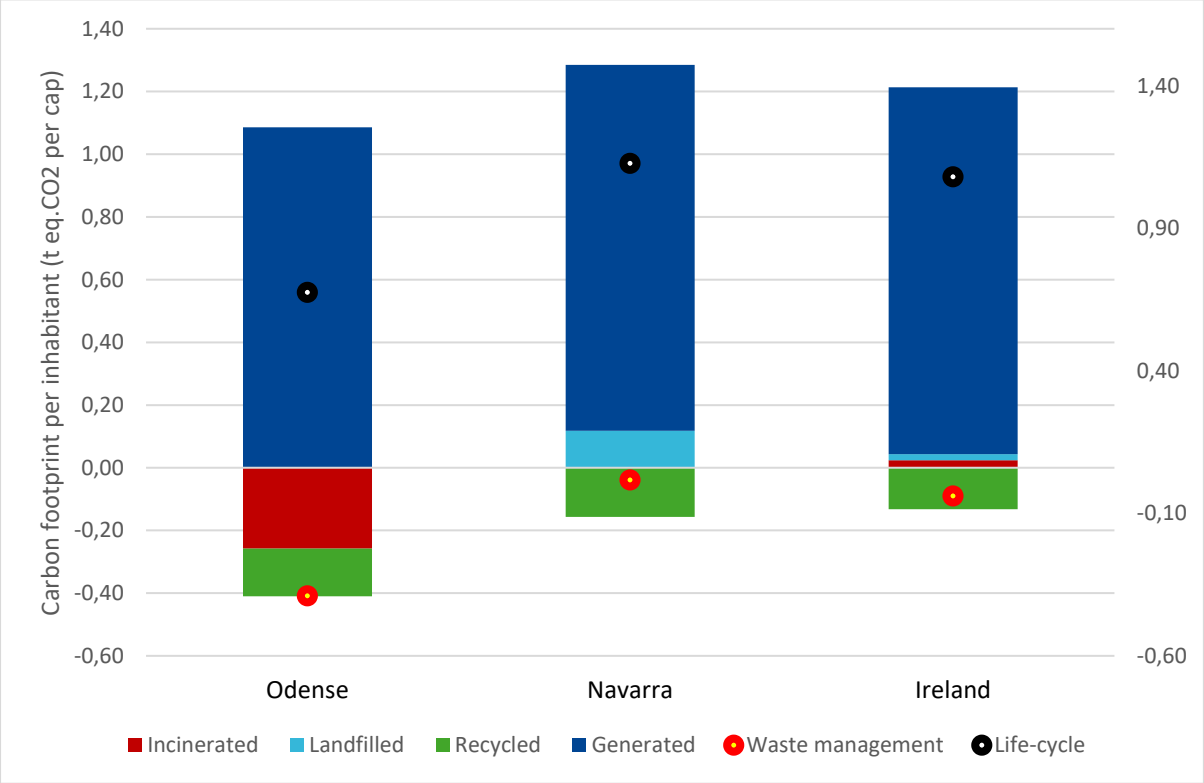


Figure 2: carbon footprint of municipal waste per capita (in t.eqCO2/cap).

Other observations can be made for the three territories:

- The three territories share the same most carbon-intensive fractions: textile, food, and plastic. These were also the key fractions identified for cohort 1. If recycling has a potential to improve their carbon footprint, especially for plastic, prevention represents a much more important potential. This is also true for re-use, especially when applied to textile and WEEE.

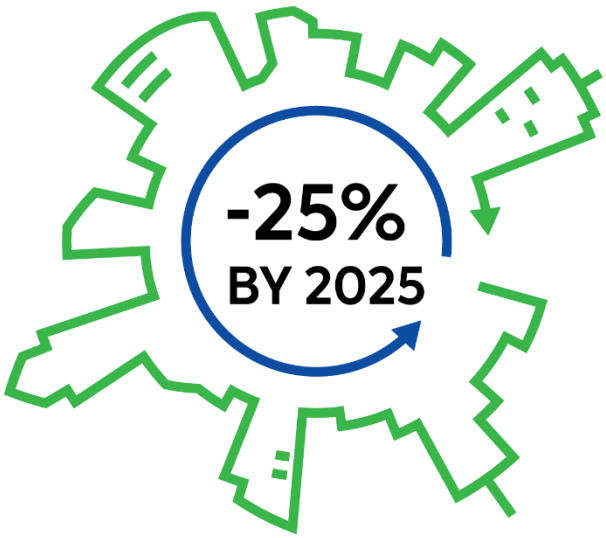
- The efficiency of waste treatment plants and their outputs can greatly impact the potential savings: the energy efficiency of incineration and anaerobic digestion plants, the production of heat, or the production of biofertilizer were found to have a strong impact on saved emissions. For energy recovery, it is important to note that the savings also depend on the carbon intensity of the national energy grid.
- The composition of the key waste fractions is a relevant information to identify priorities. For instance, the higher presence of protein waste in Navarra's food waste strongly impacts its carbon footprint and makes it relevant to focus on this specific sub-fraction.

HOW COULD THE THREE TERRITORIES REACH THE TARGET?

Considerable efforts should be put in place to reach the -25% target, which would be only a first step toward carbon neutrality. For all three territories, the model shows that this would require reducing two key target fractions by 30 to 40%, which calls for much more ambitious prevention targets and strategies.

There is little correlation between the tonnages of waste and their carbon footprint, as the most carbon-intensive fractions generally represent a small percentage of municipal waste in weight. This calls for an on-going monitoring of the carbon footprint of waste, a better understanding of waste generation and composition, and more efforts put on prevention and re-use monitoring.

Discover the individual reports and the detailed cross-analysis of the second cohort of the More Circularity, Less Carbon campaign on www.acrplus.org/morecircularitylesscarbon-cohort2



MORE CIRCULARITY LESS CARBON

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