MORE CIRCULARITY
LESS CARBON
-25% BY 2025

The Carbon Footprint of Waste

Belfast

ACR+ 25 YEARS INSPIRING CIRCULAR CITIES SINCE 1994

ZERO WASTE SCOTLAND

ACR+ is an international network of cities and regions sharing the aim of promoting sustainable resource management and accelerating the transition towards a circular economy on their territories and beyond.

Circular economy calling for cooperation between all actors, ACR+ is open to other key players in the field of material resource management such as NGOs, academic institutions, consultancy or private organisations.

Find out more at www.acrplus.org

Zero Waste Scotland exists to lead Scotland to use products and resources responsibly, focusing on where we can have the greatest impact on climate change.

Using evidence and insight, our goal is to inform policy, and motivate individuals and businesses to embrace the environmental, economic, and social benefits of a circular economy.

We are a not-for-profit environmental organisation, funded by the Scottish Government and European Regional Development Fund.

Find out more at www.zerowastescotland.org.uk/

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Contents

1 ACR+ ‘More Circularity Less Carbon’ campaign 4

2 Zero Waste Scotland’s Carbon Metric International 4

3 Method & Data source 5

4 About Belfast 6

4.1 Waste collection and separation 8

4.2 Waste treatment 10

5 Results 12

5.1 Key findings 12

5.2 The Top Five Waste Materials: Weight vs. Carbon Impacts 17

5.3 Scenario analysis 17

6 Conclusion 20

7 Appendices 21

Appendix 1 Total amount of waste generated in Belfast (2020). Unit: tonnes 21

Appendix 2 Whole-life carbon impacts of waste generated in Belfast (2020). Unit: tonne CO_2 eq. 22

Appendix 4 Carbon factors for of household waste generated in Belfast (2020). Unit: tonne CO_2 eq. per tonne of waste. 23

ACR+ 'More Circularity Less Carbon' campaign

The ACR+ has partnered with its member Zero Waste Scotland to launch the 'More Circularity Less Carbon' campaign in November 2019, to reduce the carbon impact of municipal waste among its members by 25% by 2025.

Zero Waste Scotland's Carbon Metric International (CMI) tool, developed from Scotland's ground-breaking Carbon Metric, will enable ACR+ members to measure the carbon impact of their municipal waste, take effective actions to reduce it, and track their progress towards the 2025 target.

Belfast is one of the ACR+ members which benefited from this project and received support to use the CMI to quantify the whole-life carbon impacts of its household waste. The results are summarised in this report, which has three main objectives:

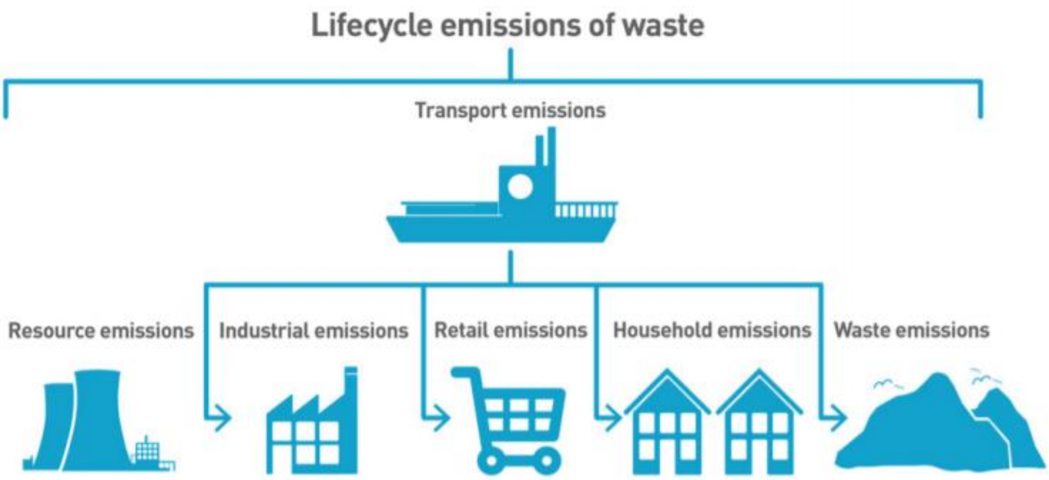
1. Provide a detailed breakdown of waste carbon impacts by materials and management process;
2. Enable Belfast to establish its 2025 waste carbon reduction target;
3. Assess several carbon reduction scenarios that can help Belfast achieve its target.

Zero Waste Scotland's Carbon Metric International

Zero Waste Scotland has developed a ground-breaking tool in the fight against global climate change. The Carbon Metric measures the whole-life carbon impacts of waste, from resource extraction and manufacturing emissions right through to waste management emissions, regardless of where in the world these impacts occur (Figure1).

"The Carbon Metric shows how reducing our waste, and managing what remains in a more sustainable way, is critical to the global fight against climate change."

Figure 1 Schematic diagram presenting the lifecycle emissions of waste.



The Carbon Metric provides policymakers and business leaders with an alternative to weight-based waste measurement, allowing them to identify and focus specifically on those waste materials with the highest carbon impacts and greatest potential carbon savings. Scotland's 33% per capita food waste reduction target is an example of a policy informed by the Carbon Metric[1].

Further details on the Carbon Metric methodology can be found on Zero Waste Scotland's website[2].

The Carbon Metric could be adapted to Belfast's data thanks to the collaborative work between Zero Waste Scotland and ACR+.

3 Method & Data source

The whole-life carbon impacts of **household waste** in Belfast were quantified in this report, based on 2020 data.

Stages covered in the analysis as follows:

- **Waste generated:** all waste generated by households in Belfast during the calendar year (2020). Embodied carbon impacts linked to the production of material (resource extraction, manufacturing and transport emissions) are included in this category. Impacts associated with the product's use (e.g. the impact of electricity consumption of an electronic good, or the impact of food storage and cooking) are excluded.
- **Waste recycled:** all recycled (or reused) materials, including biodegradable materials that have been composted or anaerobically digested. The analysis covers all activities linked to recycling waste, namely waste collection, sorting, recycling, and displacement benefits as recycled content substitutes virgin materials or for reuse.

[1] Scottish Government (2016) Making Things Last
[2] Zero Waste Scotland (2020) Carbon Metric Publications.

- **Waste incinerated:** all incinerated waste. The analysis covers waste collection and treatment (including carbon benefits of energy recovery as well as metal recovery when applicable).
- **Waste landfilled:** all landfilled waste, including incinerator ash and any recycling and composting rejects. The analysis covers the carbon impacts of waste collection and disposal.

4 About Belfast

Belfast is the capital and largest city in Northern Ireland. The population of Belfast in 2020 was 342,600[3]. Total amount of household waste generated in Belfast in 2020 was estimated to be 147,321 tonnes (Table 1), representing around 430 kg/capita. The data only includes waste generated by household, and no "assimilated" commercial waste. The composition of the generated household waste is presented in Table 1.

Table 1 Breakdown of waste generated in Belfast in 2020.

Waste Category	Waste generated (tonnes)
Food waste	38,724
Paper and cardboard wastes	24,688
Plastic wastes	20,165
Glass wastes	14,040
Garden wastes	13,823
Health care and biological wastes	10,429
Wood wastes	6,883
Textile wastes	5,619
Non-ferrous wastes	2,787
Discarded electronic equipment	2,581
Ferrous wastes	2,214
Combustion wastes	2,196
Chemical wastes	1,726
Mixed ferrous and non-ferrous wastes	640
Household and similar wastes	458
Sorting residues	183
Mineral waste from C&D	73
Mixed and undifferentiated materials	55
Rubber wastes	21

[3] https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/MYE20-Factsheets.pdf

Batteries wastes	15
Discarded vehicles	2
Total	147,321

Several waste categories can be further described:

- “Discarded vehicles” refers to discarded bikes.
- “Mixed and undifferentiated materials” designates Tetrapak packaging.
- “Household and similar wastes” includes mattresses waste and carpets waste.

4.1 Waste collection and separation

The main sources of materials are presented in the graph below:

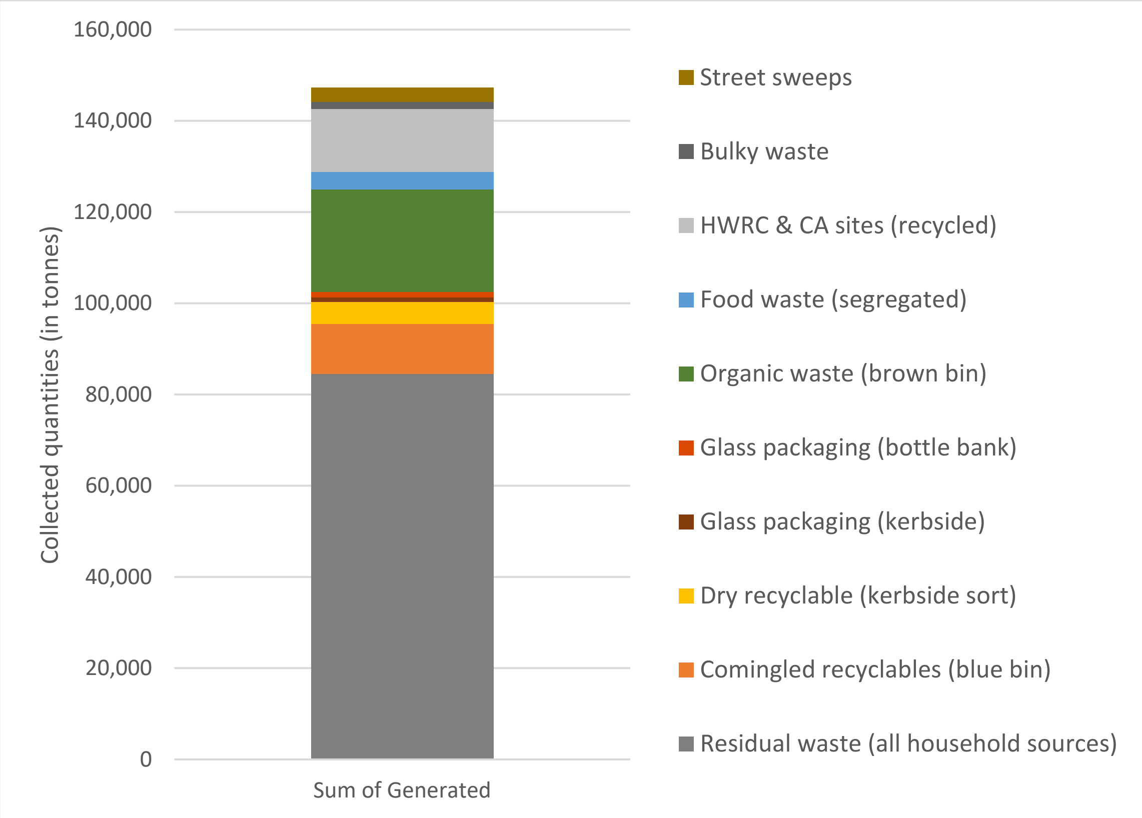


Figure 2 main collected waste streams in 2020 (in t)

Waste collection is organised differently in the city centre and in the outskirts of the city, explaining why there are different collection streams for dry recyclables and organic waste.

The composition of several streams is detailed below:

- The “co-mingled recyclate” collection (blue bin) includes paper and cardboard, metal packaging, Tetrapak, and plastic packaging.
- The “dry recyclables (kerbside sort)” refers to a segregated collection system operated by Bryson Recycling, consisting of four source-separated fractions collected at the kerbside in boxes: paper and cardboard, PMC (plastic, metal, and cartons), glass packaging, and food waste. Textile waste is also collected.
- Glass packaging waste is collected in bottle banks and in a pilot, in-house kerbside collection
- Mixed organic waste, brown bin collection refers to the comingled garden and food kerbside collection serviced by the Council.
- The segregated food waste streams are collected weekly by Bryson Recycling on the same Resource Recovery Vehicle as the segregated dry recyclables
- Bulky waste is collected at the kerbside.
- Household Waste Recycling Centres (HWRCs) and Civic Amenity Sites are operated in-house and capture a range of bulky materials and additional

specialist wastes (paints, oils, mattresses, carpet, batteries, Waste Electrical & Electronic items)
- The data reported by Belfast City Council also includes street sweeps, which was not reported by previous MCLC participants.

Residual waste (kerbside & HWRC) street sweeps and bulky waste accounts for about 60% of the total collected quantities, while organic and recyclable waste collected on the kerbside and in bring banks represents about 30%. The remaining 10% of the total quantity is the recyclables collected at Household Waste Recycling Centres / civic amenity sites.

It is also interesting to see how the main materials are collected. The following graph shows in which waste streams the main materials are collected: kerbside schemes, HWRCs and civic amenity sites, unsorted and collected with residual waste, street sweeps, or bulky waste, or incorrectly placed in the wrong bin (for instance food waste collected with packaging waste, or glass packaging waste collected with paper and PMC i.e. contamination). The graph also shows the capture rate, meaning the share of materials that is separately collected compared to the total quantities generated.

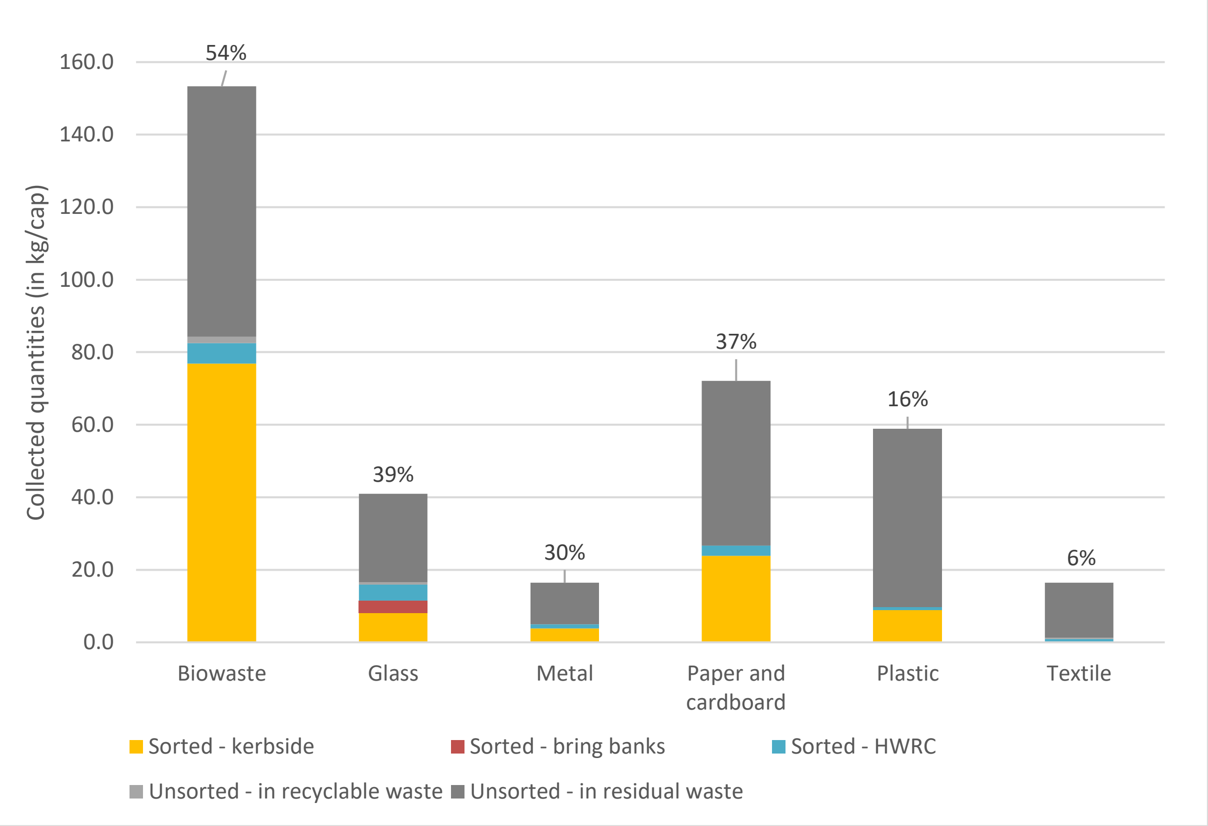


Figure 3 collected quantities in kg/cap for several waste fraction, by collection streams, and sorting rates in % (calculated as the quantities selectively collected and sent to recycling compared to the total arising).

Capture rates are relatively high for biowaste (including both food and garden waste), average for paper and cardboard, metal, and glass, and low for plastic and textile waste. Large quantities of recyclable waste remain within the residual waste stream.

4.2 Waste treatment

A breakdown of waste treatment and disposal route is shown in Figure 4. 43% of household waste is sent to recycling/composting, while the rest is sent to incineration and landfilling. The “other” category mostly refers to moisture loss during the solid recovered fuels processing of waste prior to incineration.

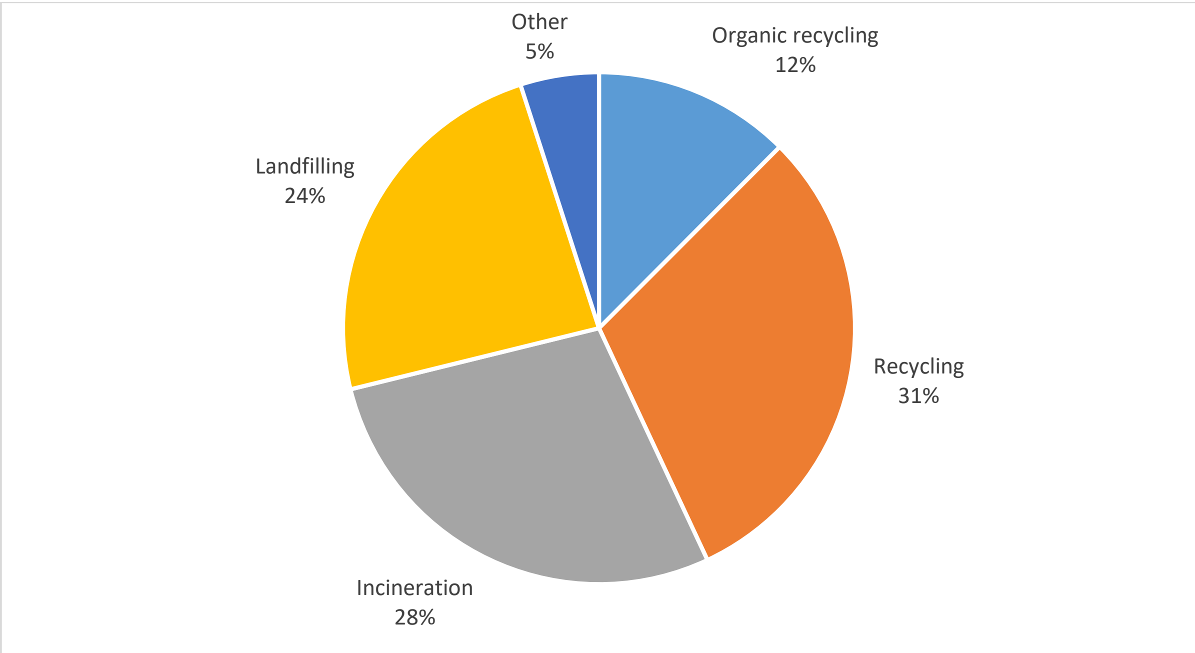


Figure 4 Final destination of household waste in 2020.

The distribution of each waste stream presented above according to its treatment destination is presented in the graph below:

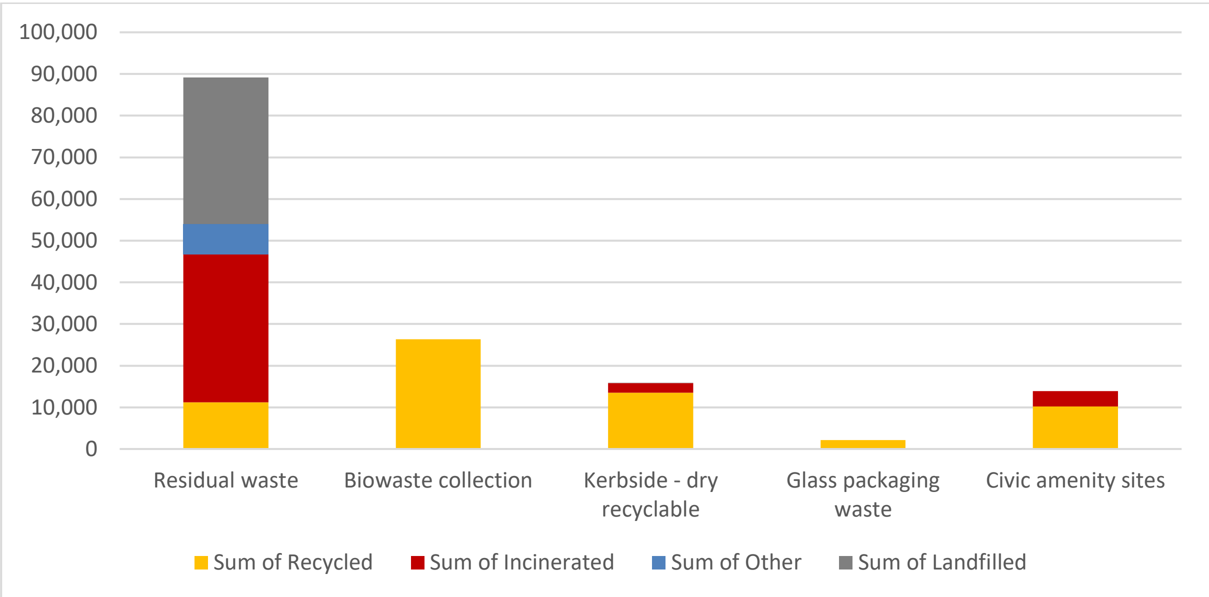


Figure 5 treatment destination for each of the reported waste stream (in t)

Approximately 65% of residual waste is sent to a sorting facility (“dirty Materials Recovery Facility”) that extracts recyclable materials to send for recycling, while the rest is either recovered as (RDF)/Solid Recovery Fuel (SRF) or sent to landfill. For the sorted fraction, contamination is not included (except for the contamination of the comingled dry recyclables collected in the” blue bin”).

More details on the treatment routes for the key waste streams are presented in the table below:

Waste stream	Treatment route
Residual waste	65% of residual waste is sent to a Materials Recovery Facility where a portion of the input is extracted for recycling (paper and cardboard, plastic, metal, glass, aggregate…) The remainder is either; processed as RDF/SRF and sold to Energy from Waste (EfW) operators or cement kilns. with residues disposed of at a landfill site. The other 35% of residual waste collected is directly sent to landfill. 77% of the incinerated waste is processed in a unit producing electricity, and 23% in a unit recovering heat only.
Food waste	44% of food waste is selectively collected, with 75% of the selectively collected food waste being collected together with garden waste at the kerbside. The remaining food waste stream is collected by means of a segregated, weekly collection. The rest is mostly collected together with residual waste. All separately collected organic waste including food is sent to in-vessel composting facilities.
Paper and packaging waste	Most paper and packaging waste is collected at the kerbside, either co-mingled or by means of segregated collection with paper/cardboard. Co-mingled streams recorded a contamination rate of approximately 14% in 2020.
Glass	Only about 40% of glass waste is selectively collected, mostly through kerbside collection, the HWRCs, and a network of bring banks. About 88% is sent to closed-loop recycling (e.g. bottle to bottle), while the rest recovered from the residual waste stream is sent to open-loop recycling as aggregate substitute.
Re-use	Re-used quantities are reported for three fractions: about 30 tonnes of large WEEE are re-used, as well as about 1 tonne of furniture and 3.3 tonnes of bikes.

Results

5.1 Key findings

The carbon impacts of household waste in Belfast in 2020 were approximately 360,000 tonnes of carbon dioxide equivalent (tCO_2eq.), or 1.05 tCO_2eq./capita. Figure 6 shows that carbon saved through recycling was slightly more than the carbon impacts of landfilling and incineration, meaning Belfast's waste management operation is net carbon negative. However, the embodied carbon impacts of waste material (i.e. the emissions generated by the extraction of resources, production, manufacturing, etc. of the corresponding products, labelled as "Generated" in Figure 6) are always the highest contributor to the net carbon impacts of waste , which is **why waste prevention, in accordance with the waste hierarchy, always offers the greatest carbon savings**. Accounting for the full lifecycle impacts, Belfast's waste carbon intensity is 2.4 tCO_2eq./tonne of waste collected.

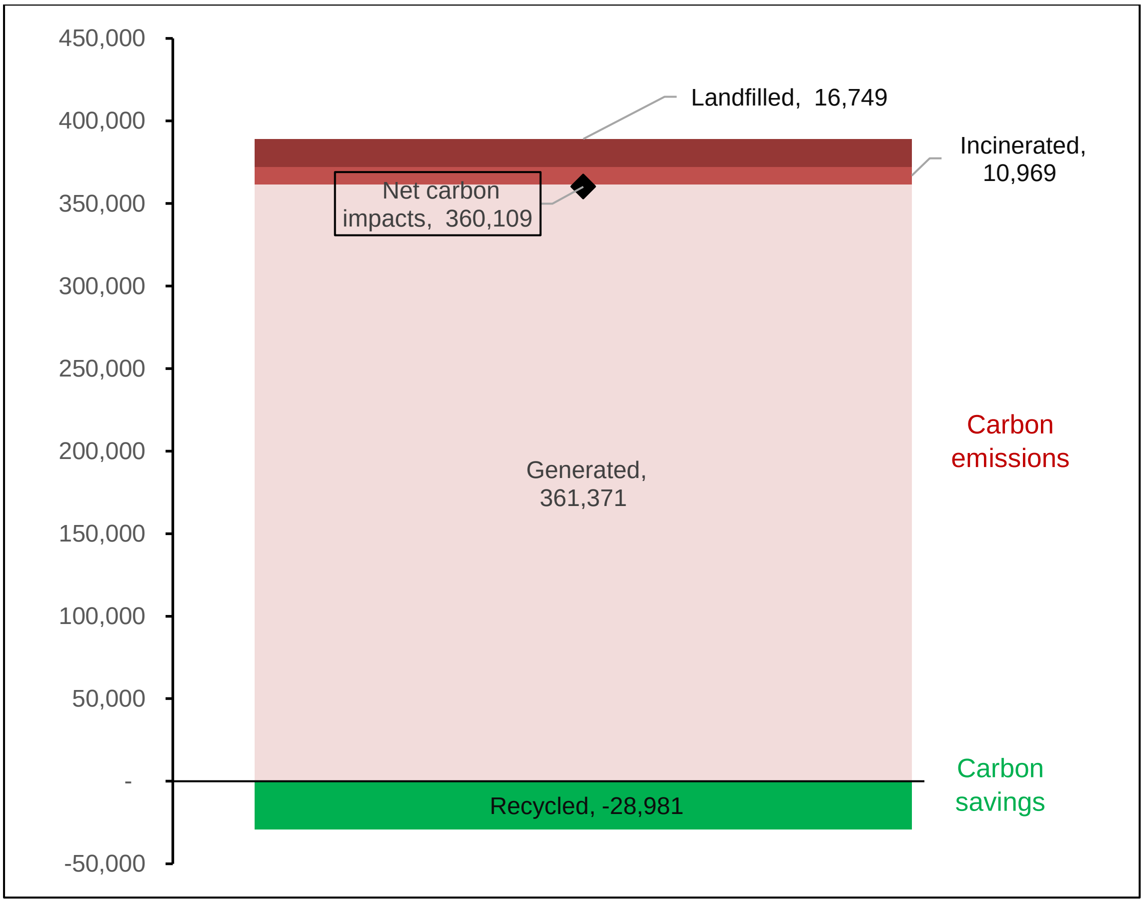


Figure 6 Breakdown of whole-life carbon impacts of waste by stage (tCO2eq).

Figure 7 shows that the amount of waste generated by each waste category[4] and their associated carbon impacts. Textile waste, plastic waste, and food waste are the most

[4] Each category does not refer to waste tonnages in a single stream (e.g. "garden waste collected in civic amenity sites"), but rather to the total waste fraction that encompassed in multiple waste streams (e.g. garden waste collected in civic amenity sites, garden waste collected door-to-door, and garden waste improperly discarded in residual waste

carbon-intensive fractions. It is interesting to highlight the importance of textile waste when it comes to carbon emissions, when the associated tonnages are relatively low.

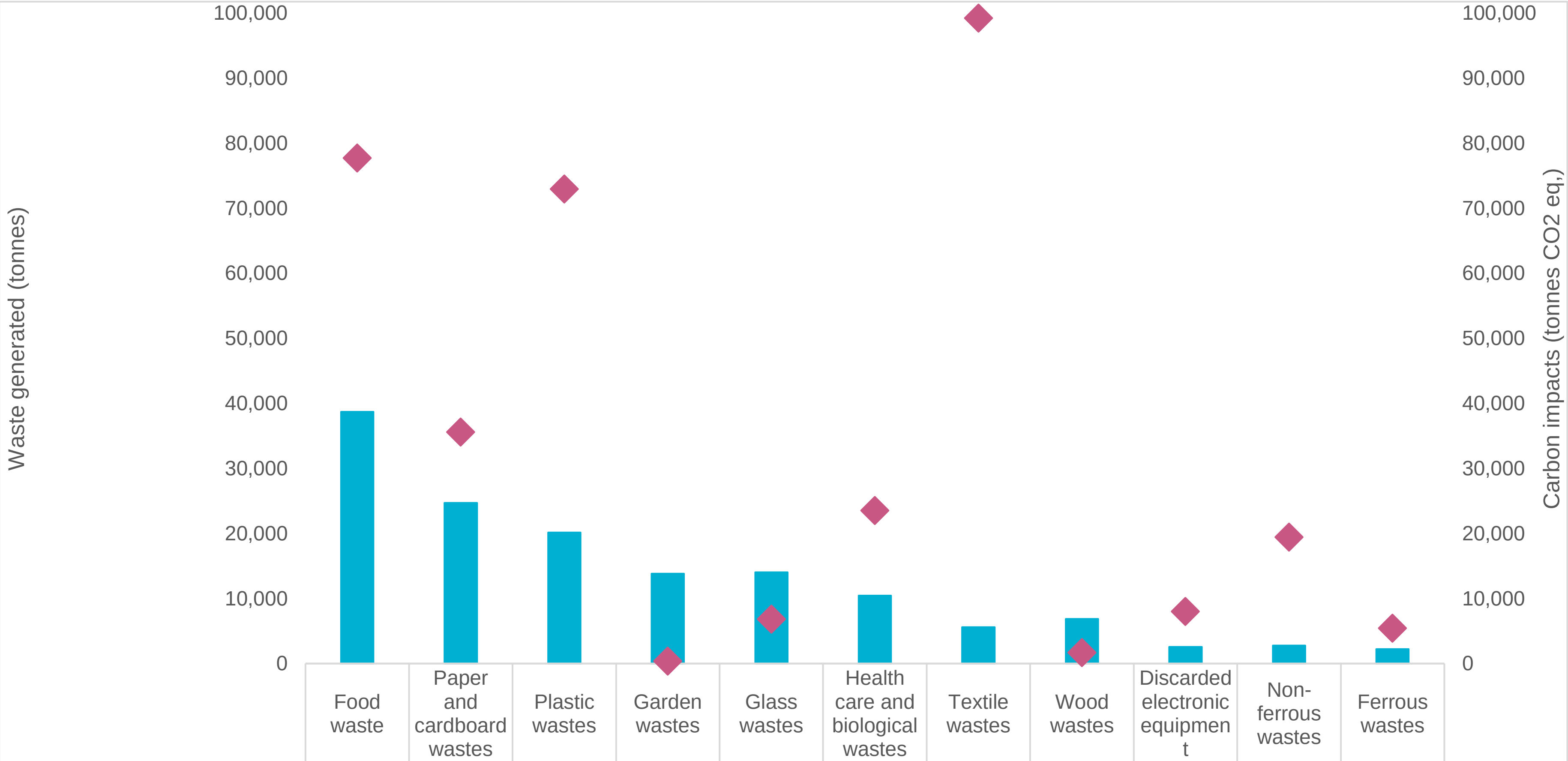
Further carbon savings can be achieved by capturing more materials for recycling instead of waste to energy (incineration) and landfilling (Figure 8). Overall, the vast majority of carbon impacts is attributed to the production of materials (i.e., “Generated”) as shown in Figure 9.

Overall, emissions linked to landfill account for around 5% of the total emissions. The impact of landfilling is most noticeable for paper/cardboard and food waste, accounting for approximately 18% and 7% of the waste streams’ total emissions, respectively.

The impact of waste to energy (incineration) is varied: the incineration of plastic waste accounts for 19% of the waste stream’s total net emissions, while energy recovery from the incineration of paper and cardboard waste offsets around 6% of the embodied emissions.

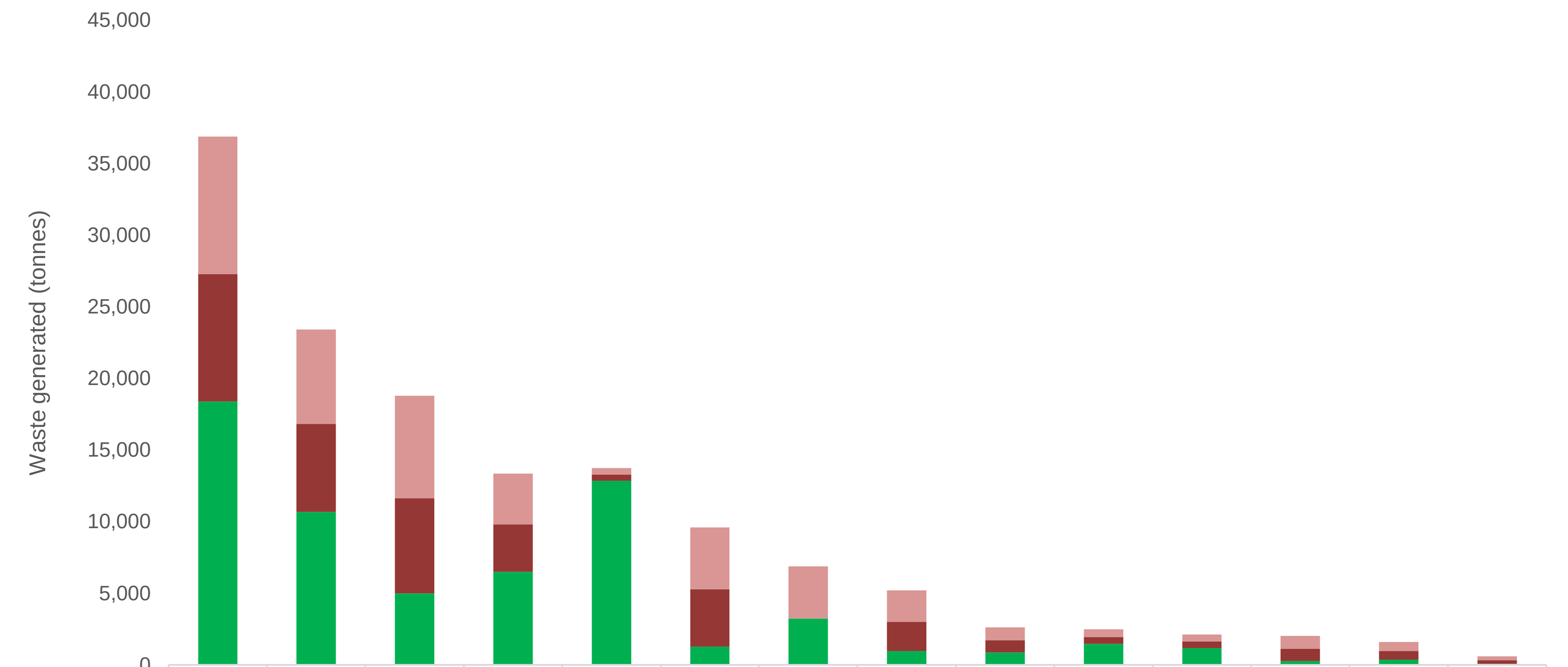
Recycling contributes to emissions reduction. The emissions saved by recycling amounts to approximately 8% of the embodied emissions of household waste. For glass and ferrous waste streams, recycling offsets 48% and 42% of the embodied emissions respectively. Recycling is also the most effective waste treatment option for textiles, plastics and non-ferrous metals compared to landfilling or incineration. The recycling impacts for textile waste include the impact of re-use, and in terms of carbon benefits (i.e., a reduction in carbon), re-use impacts dominate compared to recycling activities.

A detailed breakdown of waste tonnages and their impacts is available in Appendix 1 and 2 and can be used to identify areas for improvements in terms of both recycling rates and waste reduction.



	Food waste	Paper and cardboard wastes	Plastic wastes	Garden wastes	Glass wastes	Health care and biological wastes	Textile wastes	Wood wastes	Discarded electronic equipmen t	Non-ferrous wastes	Ferrous wastes
Waste generated (tonnes)	38,724	24,688	20,165	13,823	14,040	10,429	5,619	6,883	2,581	2,787	2,214
Carbon impacts (tCO2eq.)	77,709	35,595	72,952	356	6,835	23,517	99,208	1,687	7,985	19,419	5,448

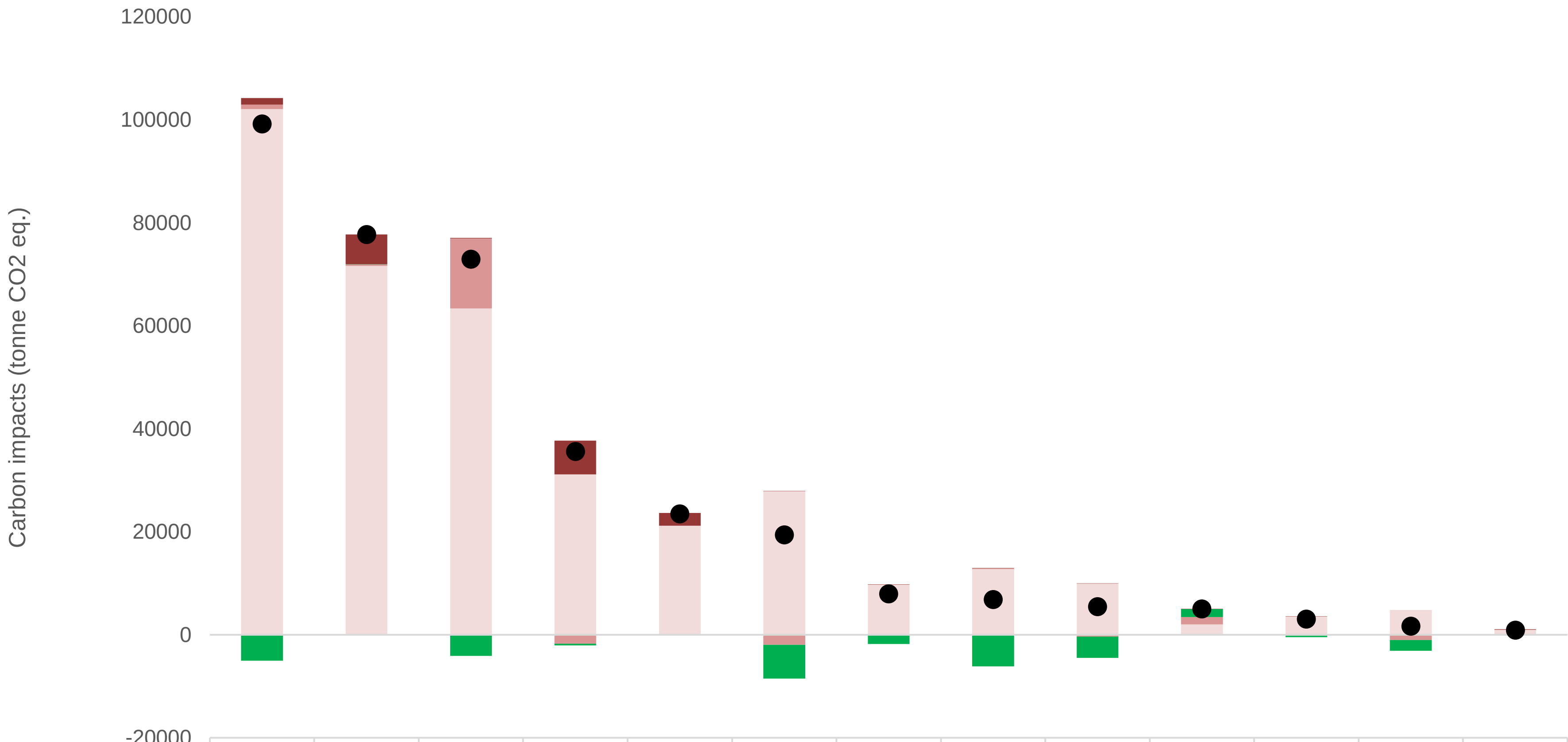
Figure 7 Weight vs carbon impacts of key wate categories in Belfast.



	Food waste	Paper and cardboard wastes	Plastic wastes	Glass wastes	Garden wastes	Health care and biological wastes	Wood wastes	Textile wastes	Non-ferrous wastes	Discarded electronic equipment	Ferrous wastes	Combustion wastes	Chemical wastes	Mixed ferrous and non-ferrous wastes
Incineration	9,578	6,593	7,141	3,552	453	4,307	3,645	2,192	907	529	491	907	642	264
Landfilled	8,915	6,137	6,647	3,306	422	4,009	-	2,040	844	492	457	844	598	246
Recycled	18,375	10,680	4,993	6,494	12,860	1,278	3,238	963	861	1,457	1,171	269	361	78
Generated	38,724	24,688	20,165	14,040	13,823	10,429	6,883	5,619	2,787	2,581	2,214	2,196	1,726	640

Waste category

Figure 8 Total tonnages of waste (key categories) in Belfast in 2020 by management route.

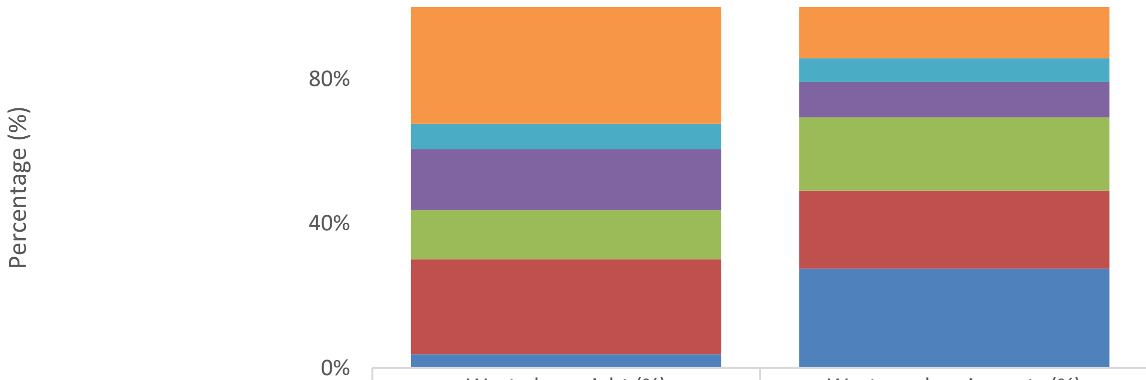


	Textile wastes	Food waste	Plastic wastes	Paper and cardboard wastes	Health care and biological wastes	Non-ferrous wastes	Discarded electronic equipment	Glass wastes	Ferrous wastes	Chemical wastes	Mixed ferrous and non-ferrous wastes	Wood wastes	Household and similar wastes
■ Landfilled (tCO2e)	1292	5747	96	6540	2504	17	20	52	9	69	5	0	90
■ Recycled (tCO2e)	-5026	64	-4101	-354	0	-6579	-1779	-6139	-4137	1518	-296	-2082	-136
■ Incineration (tCO2e)	850	253	13608	-1729	-143	-1934	30	169	-357	1445	-192	-1035	-11
■ Generated (tCO2e)	102092	71645	63349	31138	21157	27914	9715	12753	9932	2002	3541	4804	993
● Total (tCO2e)	99208	77709	72952	35595	23517	19419	7985	6835	5448	5035	3059	1687	936

Figure 9 Whole-life carbon impacts of key waste categories by management route.

5.2 The Top Five Waste Materials: Weight vs. Carbon Impacts

Many of the high tonnage materials in Belfast's waste stream have relatively low carbon impacts (e.g. glass waste accounts for 10% of total waste generated by weight, but just 2% of total carbon impacts). The top five waste materials by carbon emissions in 2020, accounted for 86% of all carbon emissions, and 68% of the total weight. The largest contributor, textiles, accounts for only 4% by weight, but 28% of the carbon emissions.



	Waste by weight (%)	Waste carbon impacts (%)
All Other	32%	14%
Health care and biological wastes	7%	7%
Paper and cardboard wastes	17%	10%
Plastic wastes	14%	20%
Food waste	26%	22%
Textile wastes	4%	28%

Figure 10: Top five waste materials by carbon impacts and the associated weight

5.3 Scenario analysis

Belfast must reduce its waste carbon impacts by 90,025 tCO_2eq, to a total of 275,075 tCO_2eq by 2025, in order to achieve the 25% ACR+ target. A scenario analysis was carried out to investigate scenarios that Belfast might use to accomplish this.

As part of this project, we investigated waste-reduction scenarios that could help Belfast achieve the target. To achieve the 2025 carbon savings target, focus should be placed on the largest contributors to carbon emissions; the scenarios considered therefore focus on:

1. Textile waste
2. Food waste
3. Plastic waste
4. Paper and cardboard wastes
5. Health care and biological wastes

Table 2 lists scenarios considered in this analysis and their results, also presented in Figure 11.

Table 2 Summary of the scenario analysis results.

Scenario number	Description	Total carbon impacts (Tonnes CO_2eq.)	Reduction rate (%)
Scenario 0	Business as usual (BAU)	360,100	-
Scenario 1	Targeted materials - 20% reduction (all)	298,300	-17%
Scenario 2	Textile (50%), Food (20%), remaining targeted materials (20%)	268,600	-25%
Scenario 3	Textile (30%), Food (50%), remaining targeted materials (20%)	265,100	-26%
Scenario 4	All materials (25%)	270,081	-25%

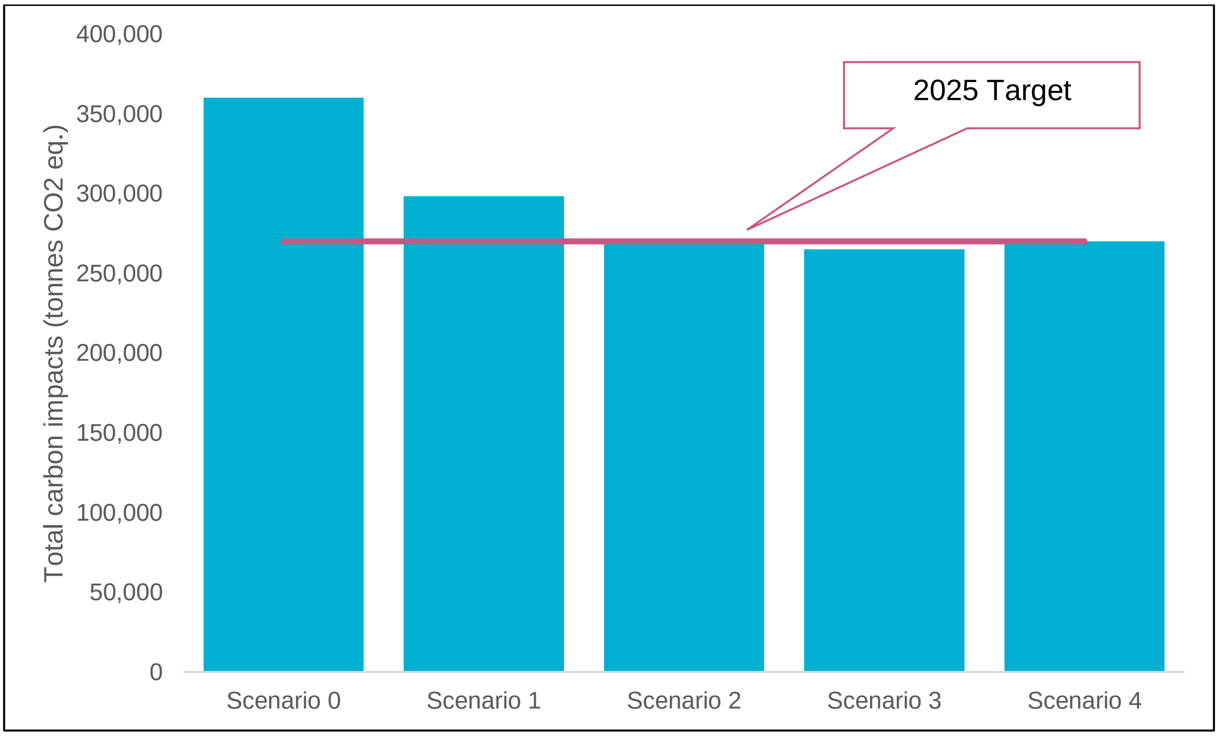


Figure 11 Results of the scenario analysis.

Results, presented in Figure 11, suggest Belfast can meet the 2025 carbon reduction target by adopting one of the following strategies:

1. Reduce the amount of textile waste by 50%, food waste by at least 20%, and other targeted waste materials (i.e., plastic, paper and cardboard, and health care and biological waste) by 20%; or

2. Reduce textile waste by 30%, food waste by 50%, and other targeted materials by 20%.
3. Introduce a waste reduction target of 25% for **all** materials.

In addition to waste reduction strategies, we also considered increasing recycling rates of plastics, glass, and food to 90%. The recycling processes themselves remain unchanged (i.e., the carbon factors for recycling in each waste stream are not changed). Table 3 shows the results. Increasing the recycling rate of plastics has the largest impact in terms of emissions reduction relative to business as usual. Increasing the recycling rates of paper, glass, and food can also help to reduce carbon emissions, but compared to the waste reduction scenario analysis, it is not as effective.

Table 3: Summary of recycling scenario analysis.

Material	New recycling rate (Old recycling rate)	Reduction (t CO2eq)	Reduction (%)
Plastics	90% (25%)	23,899	6.6%
Glass	90% (46%)	6,004	1.7%
Food	90% (47%)	5265	1.5%
Total		**35,169**	**9.8%**

Note that these results are indicative only, they do not reflect what may be feasible. While other European cities could reach a 90% recycling rate for glass, there are no or few examples of territories that could recycle 90% of food waste, or 90% of plastic waste. For plastic waste, such performance might be achieved through the use of deposit-return schemes applied to beverage packaging.

Further benefits could be achieved depending on the recycling routes used for the different materials. For instance, bottle-to-bottle recycling yields more benefits than open-loop recycling for glass packaging (although, given Belfast's high closed-loop recycling rate, improving this further may be unfeasible). The impact of food waste recycling also depends on whether energy is produced, and on the bio-based products generated (soil conditioner, bio fertilisers, etc.). Therefore, in addition to increasing capture rate, exploring other treatment routes may bring further benefits.

Due to the limited availability of data necessary to develop Belfast-specific carbon factors, the Zero Waste Scotland's analysis team used insights provided by partners in Belfast alongside default datasets based on the Scottish Carbon Metric[5] to estimate the carbon impacts of waste generated in Belfast. Default datasets used include substitution rate (amount of virgin material offset by recycling), and the composition of

[5] Zero Waste Scotland (2020) The Carbon Footprint of Scotland's Waste Technical Report [Online]. Available at: www.zerowastescotland.org.uk/

a number of waste categories (e.g. textile, food). In addition, generic UK or European wide processes have been used to estimate life-cycle impacts. Identifying Belfast specific data for these parameters and processes might provide more accurate assessment and have an impact of the recommendations, e.g. regarding the potential reduction or recycling of specific waste fractions. As an example, it could be relevant to analyse the current re-use rate for textile waste and possibilities to increase the re-used quantities.

It should also be noted that the data may have been impacted by the covid pandemic and its influence on waste management operations during this period. In general this seemed to depress recycling figures across the board.

Conclusion

The 2020 carbon impacts of municipal waste in Belfast are assessed by the Carbon Metric at **360 thousand** tonnes of carbon dioxide equivalent (t CO_2eq.), or **1.05 tonnes CO_2eq./capita**.

To achieve a 25% reduction by 2025 as part of the ACR+ 'More Circularity Less Carbon' campaign, Belfast must reduce its waste carbon impacts by approximately 90 thousand tCO2eq, to a total of 270 thousand tCO_2eq.

A number of scenarios, that focus on waste prevention measures, have been investigated in this report to explore pathways for Belfast to achieve the 2025 target. Prevention and re-use encompass the main potential for reduction, but significant reductions could also be achieved by increasing the recycling of plastic, meaning increasing the capture rate and quality of sorted plastic. However, the benefits associated with recycling are generally lower than those associated with prevention and re-use.

Follow-up activities might include further investigation on the actual composition of carbon intensive materials as discussed previously, as well as the identification of actions and policies that could contribute to reach the aforementioned reduction targets. Comparing these figures with the other participants to the MCLC campaign will also help to put these figures in perspective.

Appendices

Appendix 1 Total amount of waste generated in Belfast (2020). Unit: tonnes

Waste category	Generated	Recycled	Incinerated	Landfilled	Other diversion
Acid, alkaline or saline wastes	-	-	-	-	-
Animal faeces, urine and manure	-	-	-	-	-
Batteries wastes	15	15	-	-	-
Chemical wastes	1,726	361	642	598	124
Combustion wastes	2,196	269	907	844	176
Common sludges	-	-	-	-	-
Discarded electronic equipment	2,581	1,457	529	492	102
Discarded vehicles	2	2	-	-	-
Dredging spoils	-	-	-	-	-
Ferrous wastes	2,214	1,171	491	457	95
Food waste	38,724	18,375	9,578	8,915	1,855
Garden wastes	13,823	12,860	453	422	88
Glass wastes	14,040	6,494	3,552	3,306	688
Health care and biological wastes	10,429	1,278	4,307	4,009	834
Household and similar wastes	458	137	151	141	29
Industrial effluent sludges	-	-	-	-	-
Mineral waste from C&D	73	73	-	-	-
Mineral wastes from waste treatment and stabilised wastes	-	-	-	-	-
Mixed and undifferentiated materials	55	55	-	-	-
Mixed ferrous and non-ferrous wastes	640	78	264	246	51
Non-ferrous wastes	2,787	861	907	844	176
Other mineral wastes	-	-	-	-	-
Paper and cardboard wastes	24,688	10,680	6,593	6,137	1,277
Plastic wastes	20,165	4,993	7,141	6,647	1,383
Rubber wastes	21	21	-	-	-
Sludges and liquid wastes from waste treatment	-	-	-	-	-
Soils	-	-	-	-	-
Sorting residues	183	22	76	70	15
Spent solvents	-	-	-	-	-
Textile wastes	5,619	963	2,192	2,040	424
Used oils	-	-	-	-	-
Waste containing PCB	-	-	-	-	-
Wood wastes	6,883	3,238	3,645	-	-
Grand Total	**147,321**	**63,405**	**41,429**	**35,169**	**7,317**

Appendix 2 Whole-life carbon impacts of waste generated in Belfast (2020). Unit: tonne CO_2 eq.

Waste category	Generated	Recycled	Incinerated (energy from waste)	Landfilled
Acid, alkaline or saline wastes	-	-	-	-
Animal faeces, urine and manure	-	-	-	-
Batteries wastes	85	-14	-	-
Chemical wastes	2,002	1,518	1,445	69
Combustion wastes	-	-	-	9
Common sludges	-	-	-	-
Discarded electronic equipment	9,715	-1,779	30	20
Discarded vehicles	18	-13	-	-
Dredging spoils	-	-	-	-
Ferrous wastes	9,932	-4,137	-357	9
Food waste	71,645	64	253	5,747
Garden wastes	-	105	-9	260
Glass wastes	12,753	-6,139	169	52
Health care and biological wastes	21,157	-	-143	2,504
Household and similar wastes	993	-136	-11	90
Industrial effluent sludges	-	-	-	-
Mineral waste from C&D	27	0	-	-
Mineral wastes from waste treatment and stabilised wastes	-	-	-	-
Mixed and undifferentiated materials	147	15	-	-
Mixed ferrous and non-ferrous wastes	3,541	-296	-192	5
Non-ferrous wastes	27,914	-6,579	-1,934	17
Other mineral wastes	-	-	-	-
Paper and cardboard wastes	31,138	-354	-1,729	6,540
Plastic wastes	63,349	-4,101	13,608	96
Rubber wastes	58	-27	-	-
Sludges and liquid wastes from waste treatment	-	-	-	-
Soils	-	-	-	-
Sorting residues	-	-	23	40
Spent solvents	-	-	-	-
Textile wastes	102,092	-5,026	850	1,292
Used oils	-	-	-	-
Waste containing PCB	-	-	-	-
Wood wastes	4,804	-2,082	-1,035	-
Grand Total	**361,371**	**-28,981**	**10,969**	**16,749**

Appendix 3 Carbon factors for household waste generated in Belfast (2020). Unit: tonne CO_2 eq. per tonne of waste.

Model Waste Category	Generated	Recycled	Incinerated (Energy from waste)	Landfilled
Acid, alkaline or saline wastes	2.01	-	2.24	-
Animal faeces, urine and manure	-	-	-	-
Batteries wastes	5.69	-0.92	0.41	0.10
Chemical wastes	1.16	4.20	2.25	0.12
Combustion wastes	-	-	-	0.01
Common sludges	-	-	-	-
Discarded electronic equipment	3.76	-1.22	0.06	0.04
Discarded vehicles	8.00	-5.91	-	-
Dredging spoils	-	-	-	-
Ferrous wastes	4.49	-3.53	-0.73	0.02
Food waste	1.85	0.00	0.03	0.64
Garden wastes	-	0.01	-0.02	0.62
Glass wastes	0.91	-0.95	0.05	0.02
Health care and biological wastes	2.03	-	-0.03	0.62
Household and similar wastes	2.17	-0.99	-0.07	0.64
Industrial effluent sludges	-	-	-	-
Mineral waste from C&D	0.37	0.00	0.05	0.01
Mineral wastes from waste treatment and stabilised wastes	-	-	-	-
Mixed and undifferentiated materials	2.69	0.27	0.17	0.67
Mixed ferrous and non-ferrous wastes	5.53	-3.77	-0.73	0.02
Non-ferrous wastes	10.01	-7.64	-2.13	0.02
Other mineral wastes	-	-	-	-
Paper and cardboard wastes	1.26	-0.03	-0.26	1.07
Plastic wastes	3.14	-0.82	1.91	0.01
Rubber wastes	2.76	-1.28	1.29	0.02
Sludges and liquid wastes from waste treatment	-	-	-	-
Soils	0.01	0.00	-	0.02
Sorting residues	-	-	0.31	0.56
Spent solvents	0.97	-	1.97	-
Textile wastes	18.17	-5.22	0.39	0.63
Used oils	1.22	-0.70	1.96	-
Waste containing PCB	-	-	-	-
Wood wastes	0.70	-0.64	-0.28	0.83

-25%
BY 2025

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