

Client: **Indaver (NI) Ltd**

Northern Ireland Waste Market Review

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FINAL



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CONTENTS

EXECUTIVE SUMMARY 3

1. BACKGROUND AND APPROACH 4

2. SETTING THE 2018 BASELINE 6

3. PROJECTING TONNAGES - ASSUMPTIONS 10

4. COMPETITION AND BALANCE 16

APPENDIX 1 – DETAILED ANALYSIS 18

APPENDIX 2 – 65% HOUSEHOLD WASTE RECYCLING 19

APPENDIX 3 – COMPARISON WITH PREVIOUS STUDIES 21

APPENDIX 4 – SCOPE 22

APPENDIX 5 – REFERENCES 23

APPENDIX 6 – GLOSSARY 23

EXECUTIVE SUMMARY

- ◆ Tolvik Consulting has been engaged by Indaver (NI) Ltd, the lead party in the Becon Consortium, to prepare an assessment of the current and projected tonnages of Residual Waste in Northern Ireland available for thermal treatment at the proposed arc21 EfW facility.
- ◆ It is estimated that in 2018, 642kt of Residual Waste was generated in Northern Ireland. In this context Residual Waste is defined as non-hazardous, solid, combustible mixed waste which remains after recycling activities and which is Household Waste or waste similar in nature to Household Waste and capable of thermal treatment alongside Household Waste.
- ◆ Of this, 457kt was Residual Local Authority Collected Municipal Waste whilst the remainder, 185kt, was Residual C&I Waste collected by the private sector.
- ◆ Projections for Residual Waste in Northern Ireland have been modelled to reflect:
 - The impact of the projected trends in the number of households;
 - The estimated short and longer term impacts of COVID-19 – particularly on the generation of C&I Waste;
 - Projected recycling rates, which have been based, as far as is possible, on historic trends, and indicators of best performance.
- ◆ The projections in this report have been developed on an independent basis using clearly specified assumptions with due regard to the application of appropriate levels of prudence.
- ◆ This report, consistent with recent analysis prepared by WRAP for DAERA, assumes that the overall EU Circular Economy Municipal Waste target of 65% is met through a mix of recycling rates across different waste streams and sources.
- ◆ It is noted that the full arc21 facility will have the ability to make a contribution to recycling targets through extraction of recyclables from Residual Waste in the Mechanical and Biological Treatment plant and through processing the residues from the EfW facility.
- ◆ On the basis that the 2035 65% Municipal Waste recycling target is met, it is estimated that 503kt of Residual Waste will remain in Northern Ireland requiring treatment.
- ◆ Assuming the arc21 EfW facility is constructed with a thermal capacity of 210ktpa, it is projected in 2035 that there will be a Residual Waste “capacity gap” in Northern Ireland of 124ktpa.
- ◆ This would suggest that, together with existing thermal treatment facilities, the arc21 EfW facility will be required if Residual Waste generated in Northern Ireland is to be recovered in Northern Ireland.

1. BACKGROUND AND APPROACH

Background

1. Tolvik Consulting Ltd. (“Tolvik”) is a specialist provider of independent market analysis and commercial advisory services to the waste and bioenergy sectors. Further details of its work can be found at www.tolvik.com.
2. Tolvik has been engaged by Indaver (NI) Ltd, the lead party in the Becon Consortium, to prepare an independent assessment of the current and projected tonnages of Residual Waste in Northern Ireland. The scope of the engagement can be found in Appendix 4.

Definitions

3. In this report, and consistent with Tolvik’s published analysis, **Residual Waste** is defined as non-hazardous, solid, combustible mixed waste which remains after recycling which is Household Waste or waste similar in nature to Household Waste and capable of thermal treatment alongside Household Waste. In this context, recycling includes both recycling at source and the extraction of recyclables from mixed waste streams. This definition is similar to that for Municipal Waste and primarily includes wastes falling within European Waste Catalogue (“EWC”) codes of 19 12 10 (*combustible waste (refuse derived fuel)*), 19 12 12 (*other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11*) and 20 03 01 (*mixed municipal waste*).
4. For avoidance of doubt the definition of Residual Waste includes Refuse Derived Fuel (“RDF”) and Solid Recovered Fuel (“SRF”).
5. Local Authority Collected Municipal Waste (“LACMW”) refers to the tonnages of waste collected or accepted by or on behalf of the 11 Local Authorities in Northern Ireland.
6. Commercial & Industrial (“C&I”) Waste refers in this report only to those elements of Commercial & Industrial Waste which give rise to Residual Waste and primarily comprises of waste derived from commercial sources.

Data Sources and Analysis

7. Data sources are as identified within the text and footnotes to figures.
8. One of the challenges in Northern Ireland is that, unlike the other regions of the UK, the Northern Ireland Environment Agency (“NIEA”) does not publish a full comprehensive set of the tonnages of waste into and out of individual waste management facilities in Northern Ireland. Rather, more selective data is made available in response to Freedom of Information Act requests. This makes data validation less robust than would otherwise be the case.
9. The basis of the analysis in this report has been developed from Tolvik’s more than 10 years of analysing Residual Waste markets in Europe.
10. 2018 is the latest year for which fully comprehensive data is available. Preliminary and partial data for 2019 suggests that there was no material change in the market over the two years.
11. Note that figures in tables may not add up due to rounding.

Methodology

12. The methodology used in this report to analyse the Northern Ireland market is similar to that taken by Tolvik in its “UK Residual Waste: 2030 Market Review” (1) prepared on behalf of the Environmental Services Association in November 2017 (“ESA Report”). This methodology requires that first the Residual Waste market be considered for a baseline year and then projections are developed from this baseline using a range of clearly stated assumptions. These assumptions are informed by a mix of policy direction, published third party projections, historic trends and evidence of best practice.
13. The analysis in this report is based upon calendar years which requires that historic LACMW data be restated to calendar years. This has been through the use, where available, of the relevant quarterly data from 2017/18 and 2018/19 and, where not available, or pro-rating annual data. Any inconsistency from such an approach will not be material to the overall analysis.

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14. Consistent with its standard methodology, and in recognition of the widely different ways in which UK Local Authorities appear to report contamination, the analysis excludes the effect of contamination of the recyclable stream – both on reported recycling rates (where the effect of contamination will be to reduce the recycling rate) but also on Residual Waste tonnages (where the effect of contamination will be to increase the tonnages of Residual Waste available).

2. SETTING THE 2018 BASELINE

LACMW Tonnages

15. NIEA generates (and publishes through DAERA) some of the most comprehensive data on local authority collected waste in the UK (2). The most recent validated annual NIEA data relates to 2018/19. Consistent with NIEA, in this report Tolvik has used the definition of Household Waste rather than the alternative definition of Waste from Households.
16. As shown in Figure 1, it is estimated that 500kt of Residual LACMW was generated in 2018.

kt	Arisings	Recycled	Residual	Recycling Rate
Household Waste	877.1	434.5	442.5	49.5%
Other LACMW	108.1	50.6	57.5	46.8%
Total LACMW	985.1	485.1	500.0	49.2%

Figure 1: Residual LACMW in 2018 Source: NIEA, Tolvik analysis

The NIEA data also provides the destinations of this Residual LACMW as shown in Figure 2.

Destination	kt
Residual to EfW	146.6
Specialist to EfW (primarily wood)	42.7
Landfill	294.2
Unclassified	16.4
Total Residual	500.0

Figure 2: Destinations of Residual LACMW in 2018 Source: NIEA, Tolvik analysis

17. The 500kt of Residual Waste includes 43kt of specialist wastes, mainly wood, sent to biomass and other incineration facilities. As this is not suitable for treatment in a facility designed for the treatment of Residual Waste, the tonnage has been excluded from the tonnage of "Residual Waste for Treatment".
18. An analysis of Wastedataflow (3) which underlies the NIEA data, suggests that in 2018 less than 500 tonnes of Residual LACMW landfilled was sent to either hazardous or inert waste landfills. This tonnage has been excluded from this assessment and it has been assumed that all other LACMW sent to landfill was Residual Waste.
19. As a result in 2018, it is calculated that the tonnage Residual LACMW in Northern Ireland totalled **457kt**.

Total Residual Waste Generated in Northern Ireland

20. There is no validated source of data with respect to the tonnage of Residual C&I Waste generated in Northern Ireland. The only way in which this tonnage can be estimated is through an assessment of the total tonnage of Residual Waste generated in Northern Ireland, less the tonnage of Residual LACMW.
21. Figure 3 details the estimated tonnage of Residual Waste generated in Northern Ireland in 2018 together with details as to the basis for the estimate and/or source of data.
22. There is one specific adjustment in the analysis which requires clarification (See Paragraph 24). As highlighted in the ESA Report and Table 2.2 in DEFRA's UK Statistics from Waste (4), the reported 545kt of Municipal waste sent to landfill includes 220kt of waste coded under EWC Code 19 12 12 (*other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11*).

23. A review of waste treatment facilities as part of the ESA Report identified that across the UK 19 12 12 was being used for a range of different outputs, some of which were almost certainly inert and would fall within the lower landfill tax band and so does not fall within the definition of Residual Waste. Tolvik's latest estimate is that in 2018 across the UK as a whole 30% of this tonnage should be excluded. Adopting such a methodology can therefore be regarded as conservative.
24. As a result there is a need to adjust the reported data. As Figure 3 shows, the estimated tonnage of Residual Waste accepted at landfills in Northern Ireland in 2018 was 480kt (546kt less the 66kt relating to 19 12 12). Tolvik's own independent assessment using the information provided by NIEA under the Freedom of Information Act is of a figure of 470kt – a relatively immaterial difference.

Destination	kt	Source/Comment
Municipal Waste to Landfill	545.5	UK Statistics on Waste (4)
Less 19 12 12 which is not Residual	(66.0)	30% x 220kt as per comment above
Residual Waste to Landfill	479.5	
Residual Waste sent to mainland UK	14.8	EA Waste Data Interrogator
Thermally Treated in Northern Ireland	13.9	NIEA FoI Request for Cookstown cement kiln and Full Circle Generation facility
Exports from Northern Ireland to EfWs in Europe including RoI	129.5	NIEA Export Data (5)
Mass Loss in processing	4.3	Conservative estimate based on analysis of LACMW data
Total Residual Waste	642.0	

Figure 3: Estimated Residual Waste in Northern Ireland in 2018 Source: Tolvik analysis

25. As per Figure 3 it is estimated that, consistent with the definition in Paragraph 3, there was **642kt** of Residual Waste generated in Northern Ireland in 2018.

C&I Waste Generated in Northern Ireland

26. The tonnage of Residual C&I Waste generated in Northern Ireland in 2018 and collected by private companies is therefore estimated to be the total tonnage of Residual Waste (642kt – Figure 3) less the tonnage of Residual LACMW (457kt – Paragraph 19), i.e. around 185kt.
27. This excludes the c.40kt of Residual C&I Waste collected by local authorities in Northern Ireland – as reported within the LACMW data. Combining the two suggests that 225kt of Residual C&I Waste was generated in Northern Ireland in 2018 of which 18% was collected by Local Authorities.
28. Tolvik has recently undertaken a similar detailed analysis of the Residual Waste markets in Wales and Scotland on behalf of private clients. These reports have been used to benchmark the estimated 225kt of Residual C&I Waste in Northern Ireland.
29. For each of the three devolved regions, the generation of Residual C&I Waste has been considered in the context of level of employment in the services sector - on the basis that almost all Residual C&I Waste originates from this sector.

	Scotland	Wales	N Ireland
Full Time Employees in Services sector (millions)	2.09	1.03	0.72
Estimated Residual C&I Waste – Low (kt)	781	310	225
Estimated Residual C&I Waste – High (kt)	811	394	
Tonnes/employee – Low (tonnes per employee)	0.37	0.31	0.31
Tonnes/employee – High (tonnes per employee)	0.39	0.38	

Figure 4: Comparison of Residual C&I Waste generated across regions 2018 Source: Tolvik analysis

30. Figure 4 compares the findings across the three regions and analyses the number of employees in the service sector taken from 2018 regional employment data generated from Nomis (6).
31. As Figure 4 shows, the estimated tonnage of Residual C&I Waste in Northern Ireland of 225kt (Paragraph 27) is the equivalent to approximately 0.31 tonnes per employee, per year. This is at the lower end but not outside the benchmark range when compared with the equivalent figures for Scotland and Wales (where the overall range, as shown in Figure 4) is 0.31 – 0.39 tonnes per employee. This suggests that the base data used in this report for projecting C&I Waste arisings in Northern Ireland are prudent.
32. Tolvik would observe that the scale of the market means that the analysis for Northern Ireland is sensitive to modest changes in assumptions; the inference however is that whilst Northern Ireland does not appear to generate materially different Residual C&I Waste per employee than other parts of the UK, it is at the lower end of the range. There are two potential reasons for this (a) a differing mix of service sector jobs and (b) greater levels of waste crime in Northern Ireland.
33. There is little reliable recent data from which to draw any conclusions with respect the impact on Residual Waste tonnages of the mix of service sector jobs – save to note that on average public sector jobs would be expected to give rise to less waste per employee than those in the private sector and Northern Ireland has relatively high levels of public sector employment. Waste crime leads to under-reporting of waste tonnages and it is noted that Northern Ireland has had some much publicised examples of significant waste crime.
34. A comprehensive analysis of the C&I Waste market in Northern Ireland was generated by WRAP in 2009 (7). This estimated total Commercial Waste arisings in Northern Ireland of 473kt. Assuming waste arisings grew in line with Gross Value Added (“GVA”) trends in Northern Ireland (8), it is possible to estimate the **tonnage of C&I Waste arisings in Northern Ireland to be 570kt in 2018** – as shown in Figure 5.

	2009 kt	2009 GVA	2018 GVA	GVA Change	2018 kt
Retail & wholesale	207	73.2	104.2	142%	295
Hotels & catering	78	94.1	97.7	104%	81
Public administration & social work	54	112.5	98.5	88%	47
Education	10	113.8	97.9	86%	8
Transport & storage	40	98.6	101.2	103%	41
Other services	84	90.2	103.9	115%	97
Total	473			120%	570

Figure 5: Estimated C&I Waste in Northern Ireland in 2018 Source: Tolvik analysis

35. In this case the effective recycling rate for C&I Waste in 2018 is estimated to have been 60.5%:

Arisings:	570ktpa
Residual:	225ktpa
Recycled:	345ktpa

It is to be noted that this figure is consistent with the ESA Report which calculated a C&I Waste recycling rate of 61% across the UK as a whole – providing further evidence to suggest that the analysis is consistent with estimates elsewhere in the UK.

36. In June 2020, DAERA released a series of documents relating to a consultation on future recycling in Northern Ireland prepared by WRAP (9), This included a paper entitled “*Municipal Recycling Potential in NI 2020*” (“WRAP Report”) which provided the estimates set out in Figure 6 and also “*Future Recycling and Separate Collection of Waste of a Household Nature in Northern Ireland: Public Discussion Document*” (“Future Recycling Discussion Document”).

'000s	Arisings	Recycling Rate	Recycled	Residual
Waste from Households (HH)	838	46.3%	393	445
Non-Household Municipal Waste (NHM)	773	40.0%*	309	464
Total	1,611		702	909

Figure 6: Municipal Waste Arisings and Recycling 2017/18 Source: WRAP Report *WRAP estimate

37. The data in the WRAP Report in Figure 6 suggests that in 2018 there was over 900kt of Residual Waste generated in Northern Ireland. Even if all 19 12 12 waste was included in the analysis in Figure 3, this is still 200kt greater than the estimate in Figure 3.
38. By way of comparison, if instead of using the assumed 40% recycling rate for non-Household Municipal Waste, the 61% UK average from Paragraph 35 is used, and adjustments are made for consistency with the earlier analysis, then the calculated tonnage of Residual Waste would be just 637kt – broadly consistent with the findings in Figure 3 of 642kt.

'000s	Arisings	Recycling Rate	Recycled	Residual
Waste from Households (HH)	838	46.3%	393	445
Non-Household Municipal Waste (NHM)	773	61.0%*	472	301
Total	1,611		865	746
Less: Specialist (eg waste wood) to EfW (Figure 2)				(43)
Less: 30% of 19 12 12 (Figure 3)				(66)
Revised Total				637

Figure 7: Adjusted WRAP Municipal Waste Arisings and Recycling

39. By using a range of data sources and analysis, Tolvik is confident that the tonnage estimates for 2018 used in this report represent the best available data.

3. PROJECTING TONNAGES - ASSUMPTIONS

Household Waste Arisings

40. In Tolvik’s opinion the main driver for Household Waste arisings is the number of households (rather than population) and the effects of “resource efficiency” on the arisings of waste per household. In this context “resource efficiency” of the measure of waste generated per activity level – and historically was described as “waste minimisation”.
41. As Figure 8 shows, there has been no discernible “resource efficiency” effect over the last 6 years – the average tonnage of Household Waste generated per household in Northern Ireland has remained constant.

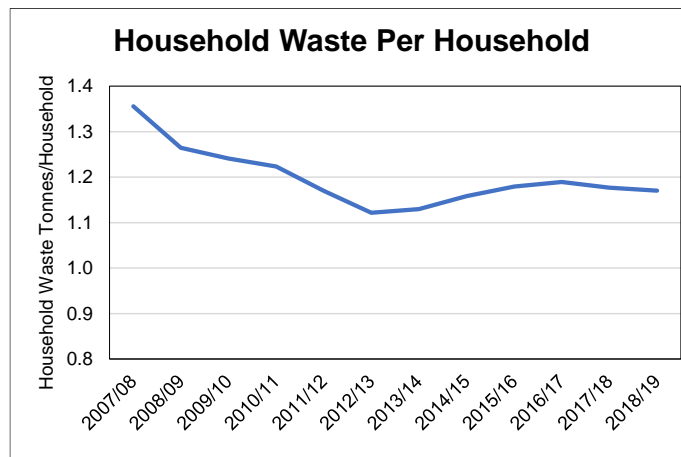


Figure 8: Household Waste arisings per Household in Northern Ireland Source: NIEA

42. From a waste management policy perspective, “*Delivering Resource Efficiency*” - the Northern Ireland Waste Management Strategy - had an unquantified objective of a decline in tonnages per capita. The EU Circular Economy package, now transposed into UK law has a number of aspirations with respect to resource efficiency but, other than for food waste, has no “hard” waste minimisation targets.
43. As shown in Appendix 1, the modelling in this report therefore uses the projected number of households in Northern Ireland (10). These are projected to increase on average by 0.52%pa in the period 2018-2035. The report also conservatively assumes a 0.5%pa resource efficiency impact. As a result Household Waste arisings are projected to be held at a relatively constant level over the period to 2035.
44. The modelling also assumes that COVID-19 does not have a long term impact on the tonnages of Residual Household Waste in Northern Ireland. There is the potential that sustained increases in the number of people working from home could increase Household Waste arisings in the long term, but the effect is expected to be modest and arguable would be offset by a fall in the tonnages of Residual C&I Waste which would (almost inevitably) result.

Household Waste Recycling

45. Figure 9 shows the development of Household Waste recycling in Northern Ireland. Unlike the “curve” seen in most European countries, the recycling rate has risen steadily for a number of years – and more particularly in the last 4 years. Most of the improvements in this period have come from organic wastes composting – which have contributed an additional 6.1% to the recycling rate. The more “mature” dry recycling element has contributed an additional 1.9% over the same period.

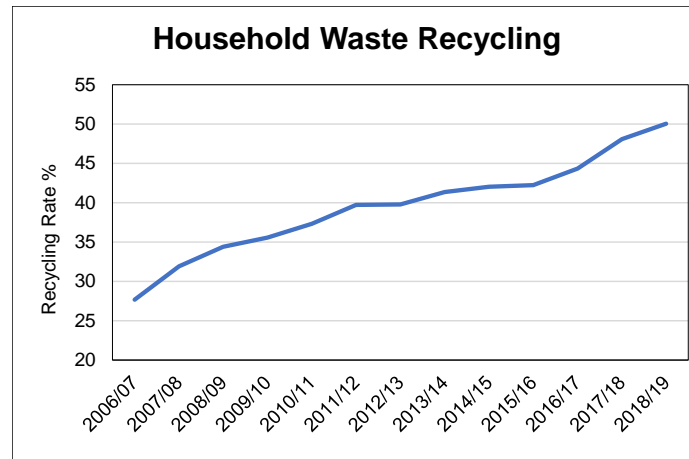


Figure 9: Household Waste Recycling in Northern Ireland Source: NIEA

46. Evidence from across Europe suggests that, with the passage of time, and certainly once a 50% recycling rate has been achieved (as in Northern Ireland), maintaining the rate of increase in recycling becomes progressively more challenging. This is because increases in recycling are then a result of progressive improvements in capture rates of individual material streams rather than from increasing the range of materials captured for recycling. This has been demonstrated by the recent growth in composting in Northern Ireland which has largely come following the expansion of the kerbside collection of mixed garden and food waste.
47. The progressive improvement in Household Waste recycling at a local authority level assumed in the projections have been informed by Tolvik's estimates of best practice in Northern Ireland. In this it has been assumed that best practice is a circa 27% contribution to the recycling rate for dry recyclables and 31% for organic waste.
48. The net impact from this modelling is a Household Waste recycling rate in Northern Ireland which rises to 57.6% by 2030.
49. This assumption is consistent with the WRAP Report described in Paragraph 36 which states: *"With these changes, the natural limits for household recycling appear to be around 58% by combining kerbside and HWRC contributions"*
50. It is noted that the full arc21 facility will have the ability to make a contribution to recycling through extraction of recyclables from Residual Waste in the Mechanical and Biological Treatment plant and through processing the residues from the EfW facility. It is to be also noted that the assumed recycling rates exclude any recycling achieved from the processing of residues from the EfW facility.
51. The EU Circular Economy package has set Municipal Waste recycling targets of 55% by 2025, 60% by 2030 and 65% by 2035. There are no specific targets for Household Waste recycling.
52. Tolvik notes both the WRAP Report and Future Recycling Discussion Document (9) discuss the potential steps necessary to achieve these Municipal Waste recycling targets and these documents are based on the potential for a 58% Household Waste recycling target. Nevertheless it is acknowledged that there is the potential that some policy makers may wish to set targets for Household Waste recycling based on these Municipal Waste targets and a separate analysis of such a policy on the projected tonnages of Residual Waste in Northern Ireland is contained in Appendix 2.

Residual Household Waste

53. Figure 10 shows the projected tonnage of Residual Household Waste in Northern Ireland with the modelling assumptions resulting in a decline of 70ktpa when compared with the 2018 baseline.

kt	2018	2025	2030	2035
Arising	877.1	890.6	892.5	887.8
Recycling Rate	49.5%	56.6%	57.6%	57.8%
Residual	442.5	386.9	378.4	374.4

Figure 10: Projected Residual Household Waste in Northern Ireland

Other LACMW

54. In Northern Ireland between 11-12% of total LACMW arisings (108kt in 2018) comprises non-Household Waste. Residual C&I Waste collected by Local Authorities accounts for just under 41kt, and the remainder comprises construction and demolition wastes, grounds maintenance waste etc.
55. Projections in Figure 11 assume that, for simplicity, the recycling rate for the Other LACMW stream rises in proportion to the projected growth in the recycling rate for Household Waste. Further detail is shown in Appendix 1.

kt	2018	2025	2030	2035
Arising	108.1	101.2	98.5	95.6
Residual	57.5	47.1	44.9	43.4

Figure 11: Projected Residual Other LACMW in Northern Ireland

Residual LACMW for Treatment

56. Combining Figures 10 and 11 provides a projection for the total tonnage of Residual LACMW. After adjusting for specialist waste streams to EfW, Residual LACMW for treatment is projected to fall from 457kt in the 2018 baseline year to 374kt in 2035.

kt	2018	2025	2030	2035
Residual Household	442.5	386.9	378.4	374.4
Residual Other LACMW	57.5	47.1	44.9	43.4
Residual LACMW	500.0	434.0	423.3	417.7
Less Specialist to EfW	-42.7	-43.4	-43.5	-43.3
Residual for Treatment	457.3	390.6	379.8	374.5

Figure 12: Projected Residual LACMW available for treatment in Northern Ireland

(Private Collected) C&I Waste

57. At the time of writing this report, there is significant uncertainty with respect to the long term future impact of COVID-19 on the Residual Waste market, and in particular the impact on tonnages of Residual C&I Waste, which at the peak of the lockdown across the UK as a whole were circa 50% below the levels seen in 2019.
58. Tolvik has produced a series of papers and notes which look to assess the impact of COVID-19 on the Residual Waste market – the most recent of which was released on 15 September 2020 (11).
59. This shows that for the Quarter 2 2020 (when lockdown measures were at their greatest), consistent with Tolvik's prior projections, the total tonnage of Residual Waste across the UK is estimated to have been down by 15.6%. During this period, on a like-for-like basis, EfW inputs were up by 1.4% on the previous 5 quarters. The experience of EfW operators in the UK was similar to that seen across Europe as reported by CEWEP (12).
60. Tolvik's published analysis of the impact of COVID-19 identifies various short-term (2020/21) scenarios for future tonnages of C&I Waste and then sets out some long term projection

profiles for Residual C&I Waste in the UK. In the absence of alternative data, this report uses the central projection profile in the report (the “Bumpy GDP” scenario) for projecting C&I Waste arisings in Northern Ireland (as shown in Figure 13).

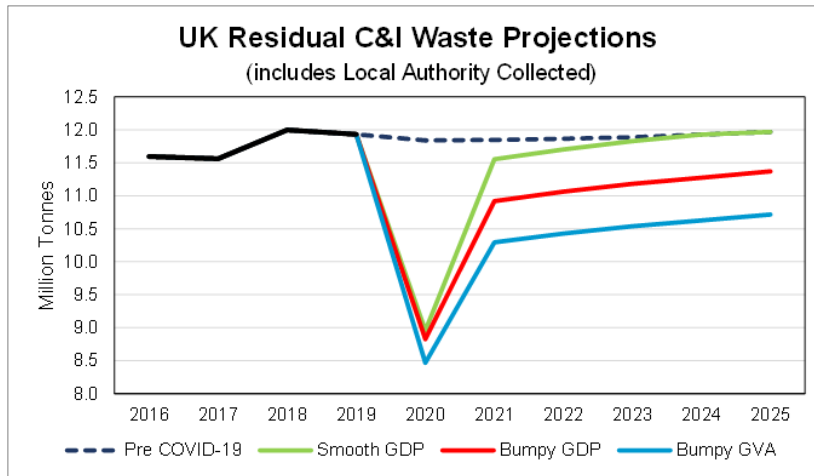


Figure 13: Projected Residual C&I Waste in Northern Ireland Source: Tolvik COVID-19 report

- 61. This central projection profile assumes that by the end of 2021, C&I Waste arisings will be 8.3% lower than they were on in 2019.
- 62. In September 2020 Biffa, the UK’s largest collector of C&I Waste, reported that by mid August 2020 their volumes of collected C&I Waste had returned to 92% of their prior year levels (13). Assuming a broadly like-for-like comparison, the modelling in this report is effectively consistent with an assumption that there will be no further recovery in C&I Waste tonnages in the period from August 2020 to December 2021.
- 63. Brexit is also another potential factor with the potential to impact on the economy of Northern Ireland and hence the generation of C&I Waste. But with no certainty with respect to the practical outcomes of the ongoing discussions between the UK and the EU, it is almost impossible to make any projections as to the impact of Brexit. Instead, the matter is considered in Paragraph 78.
- 64. The projections also assume that in the future recycling rates for C&I Waste will rise to 73% as set out in the WRAP Report. The effect is to reduce the tonnages of Residual C&I Waste from 226ktpa in 2018 to 156ktpa in 2035, as shown in Figure 14.

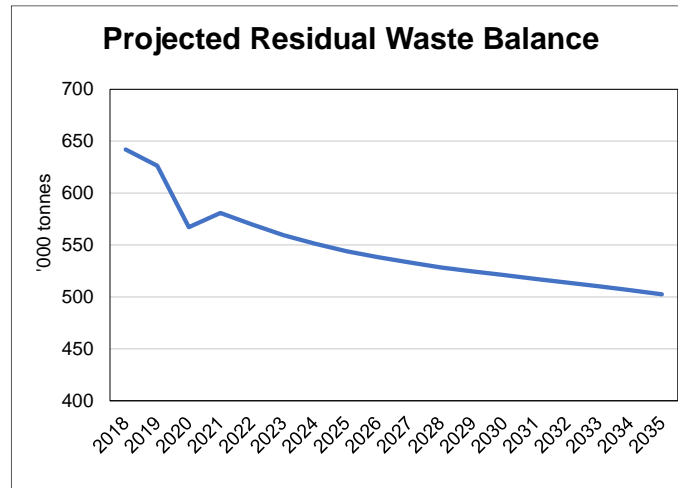
Kt	2018	2025	2030	2035
Arisings	570.0	544.4	561.5	579.1
Recycling Rate	60.4%	65.6%	69.3%	73.0%
Residual Total	225.5	175.1	176.2	156.4
Less Local Authority Collected	-40.7	-33.9	-31.2	-28.3
Residual for Treatment	184.7	153.3	141.2	128.1

Figure 14: Projected Residual C&I Waste available for treatment in Northern Ireland

- 65. However this headline figure includes tonnages of Residual C&I Waste collected by Local Authorities. This tonnage (which in 2018 was 18% of the total Residual C&I Waste - see Paragraph 27) has already been included in the Residual LACMW stream, and to prevent double counting must be deducted to get the tonnage of private collected Residual C&I Waste. In the projections it has been assumed that the Local Authority share of the market remains at 2018 levels.

Total Residual Waste for Treatment

66. The total projected tonnage of Residual Waste available for treatment in Northern Ireland can be obtained by combining Figure 12 and Figure 14. The analysis suggests a steady decline in Residual Waste tonnages to 2035 but with the tonnage remaining above 500ktpa at all times.



kt	2018	2025	2030	2035
Residual LACMW for Treatment	457.3	390.6	379.8	374.5
Residual C&I Waste for Treatment	184.7	153.3	141.2	128.1
Residual Waste for Treatment	642.0	543.9	521.0	502.6

Figure 15: Projected Residual Waste available for Treatment in Northern Ireland

67. The analysis can also be used to assess the overall recycling rate in Northern Ireland. Because of the way in which this report has defined Residual Waste, the tonnages described in this report are a reasonable proxy to municipal waste which is subject to specific recycling targets under the EU Circular Economy package.
68. As Figure 16 shows, if the specialist waste (largely wood) sent to EfW were to be diverted to recycling e.g. to panelboard, then the projections and analysis in this report are such as to suggest that Northern Ireland would be able to demonstrate that it would meet these EU Circular Economy targets.

kt	2018	2025	2030	2035
Total Municipal Waste Arisings	1,514	1,502	1,521	1,534
Recycled (inc specialist waste)	872	958	1,000	1,032
Municipal Waste Recycling Rate	57.6%	63.8%	65.8%	67.2%

Figure 16: Projected Municipal Waste Recycling Rate in Northern Ireland

Comparison with the WRAP Report

69. The WRAP Report and Future Recycling Discussion Document does not consider the impact of future changes in Municipal Waste arisings, rather focusses on the way in which the 65% Circular Economy recycling rate could be achieved by 2035 and as referred to earlier concludes:

“As an indication the average scenarios would suggest a balance of approximately 58% recycling from Local Authority collections and 73% from non-household sources as an optimum means of meeting the overall rate of 65%”.

'000s	Baseline Arisings	Recycling Rate	Recycled	Residual
Waste from Households (HH)	838	58%	486	352
Non-Household Municipal Waste (NHM)	773	73%	564	209
Total	1,611		1,050	561

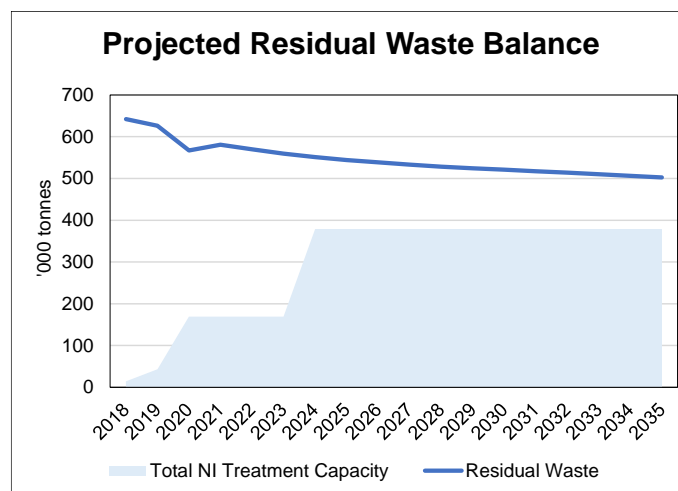
Figure 17: Projected Residual Waste in Northern Ireland in 2035 Source: WRAP Report

70. If, for simplicity, it is assumed that waste arisings remain flat (not unreasonable given that in Tolvik's modelling the projected total change in arisings for the period 2018-2035 is less than 2% for both Household Waste and C&I Waste), then, as Figure 17 shows, the projected tonnage of Residual Waste for Treatment in 2035 using the WRAP approach would be 561ktpa – above Tolvik's estimate in Figure 15.

4. COMPETITION AND BALANCE

Residual Waste Capacity in the Market

- 71. In accordance with the waste hierarchy, the treatment of Residual Waste by way of energy recovery in Northern Ireland is assumed to be a preferable option than landfill.
- 72. Within Northern Ireland, other than facilities thermally treating specialist waste streams, e.g. wood, there are currently two facilities permitted to combust (treated) Residual Waste:
 - a. Full Circle Generation Limited, Belfast, BT3 9ED. This has a permitted capacity of 180ktpa.
 - b. Lafarge Cement UK Limited, Cookstown, BT80 9AR. The permit for this facility does not explicitly refer to tonnages as it is permitted to accept a range of waste and biomass derived alternative fuels to coal, including Residual Waste in the form of SRF. Over the last three years it has accepted around 30,000MWh of SRF each year – which is conservatively estimated to be no more than 9ktpa.
- 73. The permitted capacity for Full Circle Generation is the maximum tonnage it can process thermally, and typically such facilities do not operate to this maximum. It is noted that their website makes reference to 160ktpa capacity – and this seems a reasonable assumption on the basis of an underlying average availability of just under 90%. The Full Circle Generation facility is restricted to only accepting an RDF-type feedstock (EWC code 19 12 10 (*combustible waste (refuse derived fuel)*)) as conditioned in the facility’s planning permit); the definition of Residual Waste used in this report means that this does not change the effective capacity of the facility.
- 74. The assumed thermal capacity of the arc21 EfW facility is 210ktpa.
- 75. Figure 18 shows the Residual Waste balance in Northern Ireland, with the “gap” between the projected tonnage of Residual Waste and the 379ktpa of capacity in Northern Ireland to treat it falling to 124ktpa by 2035. This would suggest that, based on the assumptions set out in this report, assuming all RDF export contracts are relatively short term in nature, there will be sufficient Residual Waste in Northern Ireland to ensure that the arc21 EfW facility will be able to operate at its proposed 210ktpa capacity.



kt	2025	2030	2035
Residual Waste for Treatment – <i>Figure 15</i>	543.9	521.0	502.6
Treatment Capacity	379.0	379.0	379.0
Residual Waste “Capacity Gap”	164.9	142.0	123.6

Figure 18: Residual Waste Capacity Gap in Northern Ireland

- 76. It seems reasonable to assume, based on the current legislative context, that the balance will either be landfilled or exported.

77. It is noted that one of the suggestions in the Committee on Climate Change *“Reducing emissions in Northern Ireland”* (14) (February 2019) and *“Net Zero, The UK’s contribution to stopping global warming”* (15) (May 2019) reports is the introduction of a landfill ban on most biodegradable material no later than 2025 – which would include Residual Waste – similar to that planned in Scotland in 2025 and implemented in a number of European countries. Clearly such a ban would require alternative solutions for the treatment of Residual Waste to be available.
78. If, as reported (16), a no-deal Brexit resulted in a 9% decline in GDP in Northern Ireland, and assuming this flowed through to a 9% reduction in Residual C&I Waste in Northern Ireland, then the capacity “gap” in Figure 18 could fall by 15ktpa or 20ktpa. Given that, at a minimum, the gap is projected to be 124ktpa in 2035, it therefore seems reasonable to assume Brexit will not materially impact on the potential need for the arc21 EfW facility.
79. Overall the analysis would suggest that, together with existing thermal treatment facilities, the arc21 EfW facility will be required if Residual Waste generated in Northern Ireland is to be recovered in Northern Ireland.

APPENDIX 1 – DETAILED ANALYSIS

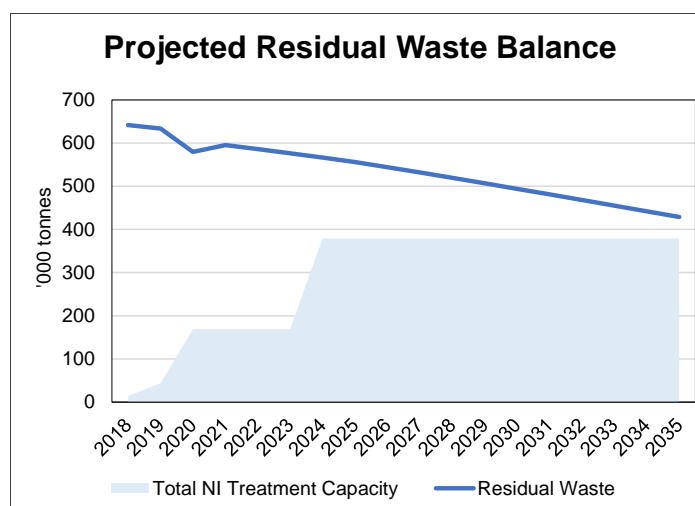
	Change	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Household Waste																			
No. of Households	per ONS	733	736	741	745	749	754	759	764	768	773	777	781	785	788	791	794	797	800
Waste per Household	0.5%	1.197	1.194	1.194	1.189	1.183	1.177	1.171	1.166	1.160	1.154	1.149	1.143	1.137	1.132	1.126	1.121	1.115	1.110
Recycling Rates																			
Household Waste - Dry		23.9%	24.4%	24.8%	25.2%	25.6%	25.9%	26.1%	26.3%	26.4%	26.6%	26.7%	26.8%	26.8%	26.9%	27.0%	27.0%	27.0%	27.1%
Household Waste - Organic		25.6%	26.7%	27.7%	28.3%	28.9%	29.5%	29.9%	30.3%	30.5%	30.6%	30.7%	30.8%	30.8%	30.8%	30.8%	30.8%	30.8%	30.8%
Household Waste - Total		49.5%	51.1%	52.4%	53.5%	54.5%	55.4%	56.0%	56.6%	56.9%	57.2%	57.4%	57.5%	57.6%	57.7%	57.7%	57.8%	57.8%	57.8%
Household Waste Arisings '000s tonnes		877.1	879.2	884.4	885.2	886.2	887.6	889.3	890.6	891.4	892.2	892.8	892.9	892.5	891.8	891.3	890.3	889.2	887.8
Household Waste Recycled '000s tonnes		434.5	449.3	463.7	473.6	482.9	491.6	498.2	503.7	507.2	510.1	512.6	513.7	514.1	514.3	514.4	514.2	513.9	513.5
Residual Household Waste '000s tonnes		442.5	429.9	420.7	411.6	403.3	396.0	391.0	386.9	384.3	382.1	380.2	379.2	378.4	377.5	376.8	376.1	375.3	374.4
Other LACMW																			
Recycling Rate		46.8%	48.3%	49.6%	50.6%	51.5%	52.3%	53.0%	53.5%	53.8%	54.0%	54.3%	54.4%	54.4%	54.5%	54.5%	54.6%	54.6%	54.7%
LA Collected C&I Waste '000s tonnes		40.7	40.5	30.9	35.7	35.3	34.9	34.4	33.9	33.3	32.8	32.3	31.7	31.2	30.6	30.0	29.5	28.9	28.3
Other Non Household Arisings '000s tonnes		67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3
Total Other LACW Arisings '000s tonnes		108.1	107.9	98.3	103.0	102.6	102.2	101.7	101.2	100.7	100.1	99.6	99.1	98.5	97.9	97.4	96.8	96.2	95.6
Other LACMW Recycled '000s tonnes		50.6	52.1	48.7	52.1	52.9	53.5	53.9	54.1	54.1	54.1	54.0	53.9	53.6	53.4	53.1	52.8	52.6	52.3
Other LACMW Residual '000s tonnes		57.5	55.8	49.6	50.9	49.8	48.7	47.9	47.1	46.5	46.0	45.6	45.2	44.9	44.6	44.3	44.0	43.7	43.4
LACMW																			
Recycling Rate		49.2%	50.8%	52.1%	53.2%	54.2%	55.1%	55.7%	56.2%	56.6%	56.9%	57.1%	57.2%	57.3%	57.4%	57.4%	57.4%	57.5%	57.5%
LACMW Arisings '000s tonnes		985.1	987.0	982.7	988.1	988.9	989.8	991.0	991.7	992.1	992.4	992.4	992.0	991.0	989.8	988.6	987.1	985.4	983.5
LACMW Recycled '000s tonnes		485.1	501.4	512.4	525.6	535.7	545.2	552.1	557.8	561.3	564.2	566.7	567.5	567.7	567.7	567.0	566.5	565.7	
Residual LACMW '000s tonnes		500.0	485.7	470.3	462.5	453.1	444.7	438.9	434.0	430.8	428.1	425.8	424.4	423.3	422.1	421.1	420.0	419.0	417.7
Specialist to EfW '000s tonnes		-42.7	-42.8	-43.1	-43.1	-43.2	-43.2	-43.3	-43.4	-43.4	-43.5	-43.5	-43.5	-43.5	-43.5	-43.4	-43.4	-43.3	-43.3
Residual for Treatment '000s tonnes		457.3	442.8	427.2	419.4	409.9	401.4	395.6	390.6	387.4	384.7	382.3	380.9	379.8	378.6	377.7	376.7	375.6	374.5
Commercial & Industrial Waste																			
Projection Profile for UK C&I Waste			101.2%	77.8%	117.6%	101.0%	100.8%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%
Recycling Rate		60.4%	61.2%	61.9%	62.7%	63.4%	64.1%	64.9%	65.6%	66.4%	67.1%	67.8%	68.6%	69.3%	70.0%	70.8%	71.5%	72.3%	73.0%
C&I Waste Arisings '000s tonnes		570.0	577.0	448.9	527.8	533.3	537.7	541.0	544.4	547.7	551.1	554.6	558.0	561.5	565.0	568.5	572.0	575.6	579.1
C&I Waste Recycled '000s tonnes		344.5	353.0	277.9	330.7	338.1	344.8	351.0	357.2	363.4	369.8	376.1	382.6	389.1	395.7	402.4	409.1	415.9	422.8
Residual C&I Waste '000s tonnes		225.5	224.0	170.9	197.1	195.2	192.8	190.0	187.2	184.3	181.4	178.4	175.4	172.3	169.2	166.1	162.9	159.7	156.4
Less Local Authority Collected '000s tonnes		-40.7	-40.5	-30.9	-35.7	-35.3	-34.9	-34.4	-33.9	-33.3	-32.8	-32.3	-31.7	-31.2	-30.6	-30.0	-29.5	-28.9	-28.3
Residual for Treatment '000s tonnes		184.7	183.5	140.0	161.5	159.9	158.0	155.7	153.3	151.0	148.6	146.1	143.7	141.2	138.6	136.0	133.4	130.8	128.1
RESIDUAL WASTE FOR TREATMENT ('000s tonnes)		642.0	626.3	567.2	580.8	569.8	559.4	551.2	543.9	538.3	533.2	528.4	524.6	521.0	517.2	513.7	510.1	506.4	502.6

APPENDIX 2 – 65% HOUSEHOLD WASTE RECYCLING

- A2.1 This section of the report considers the effect in the event that policy makers set local targets for Household Waste recycling based on the EU Circular Economy Municipal Waste targets as identified in Paragraph 51. Details are shown in Figure A3.
- A2.2 The recycling rate for C&I Waste, modelled in the main body of the report to be above the EU Municipal Waste recycling targets has been assumed to be unchanged.
- A2.3 The consequence of this analysis is that by 2035, when the overall Municipal Waste recycling rate in Northern Ireland is modelled to be 72% it is projected that there would be 429kt of Residual Waste in Northern Ireland. This is 50ktpa above the 379ktpa of capacity described in Paragraph 72 and shown in Figure 18.

	kt	2018	2025	2030	2035
Household Waste	Arisings – see Figure 10	877.1	890.6	892.5	887.8
	Recycling Rate	49.5%	55.0%	60.0%	65.0%
	Residual	442.5	400.7	357.0	310.7
Other LACMW	Arisings – see Figure 11	108.1	101.2	98.5	95.6
	Recycling Rate	46.8%	55.0%	60.0%	65.0%
	Residual	57.5	45.5	39.4	33.5
LACMW	Total Residual	500.0	446.3	396.4	333.9
	Less Specialist to EfW – Figure 12	-42.7	-43.4	-43.5	-43.3
	Residual Waste for Treatment	457.3	402.9	352.9	301.0
C&I Waste	Residual Waste for Treatment – Figure 14	184.7	153.3	141.2	128.1
Total	Residual Waste for Treatment	642.0	556.2	494.1	429.0

Figure A1: Residual Waste Projection with assumed 65% Household Waste recycling in 2035



kt	2025	2030	2035
Residual Waste for Treatment	556.2	494.1	429.0
Treatment Capacity	379.0	379.0	379.0
Residual Waste "Capacity Gap"	177.2	115.1	50.0

Figure A2: Alternative Residual Waste Capacity Gap in Northern Ireland

DETAILED ANALYSIS – 65% HOUSEHOLD WASTE RECYCLING

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	
Household Waste																			
Recycling Rate	49.5%	50.3%	51.1%	51.9%	52.7%	53.4%	54.2%	55.0%	56.0%	57.0%	58.0%	59.0%	60.0%	61.0%	62.0%	63.0%	64.0%	65.0%	
Household Waste Arisings '000s tonnes	877.1	879.2	884.4	885.2	886.2	887.6	889.3	890.6	891.4	892.2	892.8	892.9	892.5	891.8	891.3	890.3	889.2	887.8	
Household Waste Recycled '000s tonnes	434.5	442.4	452.0	459.2	466.7	474.4	482.2	489.8	499.2	508.6	517.8	526.8	535.5	544.0	552.6	560.9	569.1	577.1	
Residual Household Waste '000s tonnes	442.5	436.7	432.5	425.9	419.5	413.3	407.1	400.7	392.2	383.7	375.0	366.1	357.0	347.8	338.7	329.4	320.1	310.7	
Other LACMW																			
Recycling Rate	46.8%	48.0%	49.2%	50.3%	51.5%	52.7%	53.8%	55.0%	56.0%	57.0%	58.0%	59.0%	60.0%	61.0%	62.0%	63.0%	64.0%	65.0%	
Total Other LACW Arisings '000s tonnes	108.1	107.9	98.3	103.0	102.6	102.2	101.7	101.2	100.7	100.1	99.6	99.1	98.5	97.9	97.4	96.8	96.2	95.6	
Other LACMW Recycled '000s tonnes	50.6	51.8	48.3	51.8	52.9	53.8	54.8	55.7	56.4	57.1	57.8	58.4	59.1	59.7	60.4	61.0	61.6	62.1	
Other LACMW Residual '000s tonnes	57.5	56.1	50.0	51.2	49.8	48.4	47.0	45.5	44.3	43.1	41.8	40.6	39.4	38.2	37.0	35.8	34.6	33.5	
LACMW																			
Recycling Rate	49.2%	50.1%	50.9%	51.7%	52.5%	53.4%	54.2%	55.0%	56.0%	57.0%	58.0%	59.0%	60.0%	61.0%	62.0%	63.0%	64.0%	65.0%	
LACMW Arisings '000s tonnes	985.1	987.0	982.7	988.1	988.9	989.8	991.0	991.7	992.1	992.4	992.4	992.0	991.0	989.8	988.6	987.1	985.4	983.5	
LACMW Recycled '000s tonnes	485.1	494.2	500.3	511.1	519.6	528.2	536.9	545.5	555.6	565.6	575.6	585.3	594.6	603.8	613.0	621.9	630.7	639.3	
Residual LACMW '000s tonnes	500.0	492.8	482.4	477.1	469.3	461.7	454.1	446.3	436.5	426.7	416.8	406.7	396.4	386.0	375.7	365.2	354.8	344.2	
Specialist to EfW '000s tonnes	-42.7	-42.8	-43.1	-43.1	-43.2	-43.2	-43.3	-43.4	-43.4	-43.5	-43.5	-43.5	-43.5	-43.5	-43.4	-43.4	-43.3	-43.3	
Residual for Treatment '000s tonnes	457.3	450.0	439.3	433.9	426.1	418.4	410.7	402.9	393.1	383.2	373.3	363.2	352.9	342.6	332.3	321.8	311.4	301.0	
Commercial & Industrial Waste																			
Projection Profile for UK C&I Waste		101.2%	77.8%	117.6%	101.0%	100.8%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	100.6%	
Recycling Rate	60.4%	61.2%	61.9%	62.7%	63.4%	64.1%	64.9%	65.6%	66.4%	67.1%	67.8%	68.6%	69.3%	70.0%	70.8%	71.5%	72.3%	73.0%	
C&I Waste Arisings '000s tonnes	570.0	577.0	448.9	527.8	533.3	537.7	541.0	544.4	547.7	551.1	554.6	558.0	561.5	565.0	568.5	572.0	575.6	579.1	
C&I Waste Recycled '000s tonnes	344.5	353.0	277.9	330.7	338.1	344.8	351.0	357.2	363.4	369.8	376.1	382.6	389.1	395.7	402.4	409.1	415.9	422.8	
Residual C&I Waste '000s tonnes	225.5	224.0	170.9	197.1	195.2	192.8	190.0	187.2	184.3	181.4	178.4	175.4	172.3	169.2	166.1	162.9	159.7	156.4	
Less Local Authority Collected '000s tonnes	-40.7	-40.5	-30.9	-35.7	-35.3	-34.9	-34.4	-33.9	-33.3	-32.8	-32.3	-31.7	-31.2	-30.6	-30.0	-29.5	-28.9	-28.3	
Residual for Treatment '000s tonnes	184.7	183.5	140.0	161.5	159.9	158.0	155.7	153.3	151.0	148.6	146.1	143.7	141.2	138.6	136.0	133.4	130.8	128.1	
RESIDUAL WASTE FOR TREATMENT ('000s tonnes)	642.0	633.5	579.3	595.4	586.0	576.4	566.4	556.2	544.1	531.8	519.5	506.9	494.1	481.2	468.3	455.3	442.2	429.0	

Figure A3: Detailed Calculation of Alternative Residual Waste Capacity Gap in Northern Ireland

APPENDIX 3 – COMPARISON WITH PREVIOUS STUDIES

- A3.1 In April 2018 Eunomia produced an “Assessment of Residual Waste Treatment in Northern Ireland.” (17).
- A3.2 This report projected the tonnages of Residual Waste requiring treatment in Northern Ireland on the basis of a long term assumed 50% recycling rate for Household Waste and 70% recycling rate for C&I Waste - i.e. below the assumptions in this report. Whilst the report did not provide a full data set, Figure 2.4 provided the projected tonnages of Residual Waste in Northern Ireland with an estimate of 534ktpa in 2020/21 rising to 555ktpa in 2035/36.
- A3.3 It is possible from the assumptions and results to “back solve” to an estimate of the waste arisings in Northern Ireland, and from this generate revised Residual Waste projections based on the recycling assumption in this report.

kt		2020	2030	2035
Residual Waste – Original Report	Original Total	534	545	555
	Household Waste (est)	450	468	476
	C&I Waste (est)	84	77	79
Estimated Arisings	Household	900	935	953
	C&I Waste	252	222	229
Recycling Rate from report	Household	52.4%	57.6%	57.8%
	C&I Waste	61.9%	69.3%	73.0%
Residual Waste - Revised	Household	428	396	402
	C&I Waste	96	68	61
	Revised Total	524	464	463

Figure A4: Updated Residual Waste Projections from Eunomia report

- A3.4 Figure A5 shows the effect of these updated recycling projections on the Eunomia report. Whilst the revised Residual Waste projections are lower than those in this report, they do not change the fundamental analysis in Figure 18 – i.e. that even after allowing for arc21 EfW facility there will still be a “gap” between Residual Waste generated and the capacity in Northern Ireland to treat it.

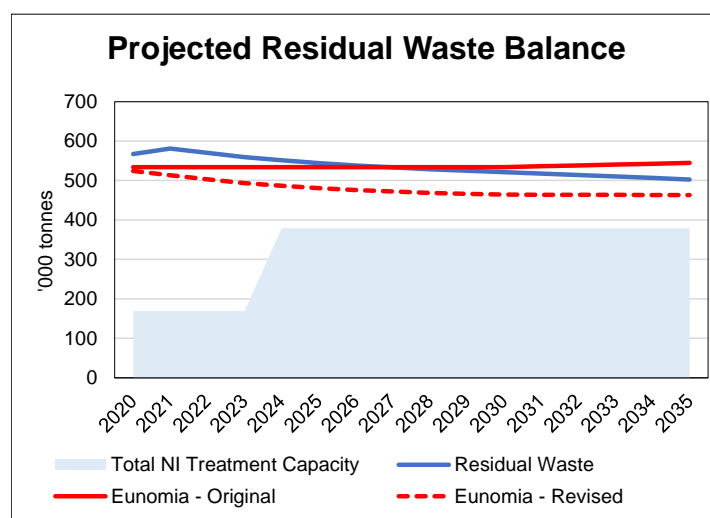


Figure A5: Residual Waste Capacity Gap in Northern Ireland

APPENDIX 4 – SCOPE

The preparation of an independent assessment of the Northern Ireland Residual Waste market based on the following approach:

Baseline

- ◆ An assessment of the baseline Residual Waste tonnage for 2018 and 2019 through consideration of the tonnages of Residual Waste (using Tolvik’s industry-standard definition) being sent to:
 - Landfill in Northern Ireland
 - Cookstown cement kiln and Full Circle Generation site
 - Export – either to RoI or mainland Europe
- ◆ Consider the veracity of the tonnage of municipal waste sent to landfill as reported by the UK to the EU as part of waste data statistics.
- ◆ An assessment of the baseline Residual LACMW in Northern Ireland from NIEA – with particular emphasis on the mix between waste sources – Household, C&I Waste and other.
- ◆ Estimate of the tonnage of Residual C&I Waste collected by private contractors by reference to the total tonnage of Residual Waste and the tonnage of Residual LACMW. From this using various UK and other metrics estimate the total tonnage of relevant C&I Waste arisings.
- ◆ Consider the potential impact of waste crime on the analysis.

Projections

- ◆ Develop, using clearly defined assumptions (not just policy aspirations), projections for Residual Waste in Northern Ireland for the next 25 years – splitting out projections for Household Waste, C&I Waste and other sources of Residual Waste.
- ◆ The general approach to be to use Tolvik’s Policy Intervention scenario, but also reflecting the contribution Arc 21 project can make to the overall recycling rates so as to prevent double counting. Policy interventions include 2035 CEP targets, 2030 stricter observance to the waste hierarchy and consideration of the potential impact of the CCC policy proposal of 2025 ban on biodegradable waste to landfill.
- ◆ Clearly identify the projected impact of COVID-19 in these projections and the impact of Brexit.

Competition

- ◆ Consider the competition/available capacity for the treatment of Residual Waste in Northern Ireland – not just EfW also consider the available landfill capacity.
- ◆ Consider the potential threats/opportunities posed by international movements of Residual Waste.

Balance

- ◆ Draw conclusions as to the potential future availability of Residual Waste in Northern Ireland.

Comparison with other Studies

- ◆ Compare with analysis with other published studies on the Northern Ireland Residual Waste market.

APPENDIX 5 – REFERENCES

- (1) http://www.esauk.org/download_file/view/183/224
- (2) <https://www.daera-ni.gov.uk/articles/northern-ireland-local-authority-collected-municipal-waste-management-statistics>
- (3) <https://www.wastedataflow.org/>
- (4) <https://www.gov.uk/government/statistical-data-sets/env23-uk-waste-data-and-management>
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APPENDIX 6 – GLOSSARY

CEWEP	Confederation of European Waste to Energy Plants
C&I Waste	Commercial & Industrial Waste
EfW	Energy from Waste facility
GDP	Gross Domestic Product
GVA	Gross Value Added
ktpa	'000s of tonnes per annum
MBT	Mechanical Biological Treatment
Mtpa	Million tonnes per annum
LACMW	Local Authority Collected Municipal Waste
NIEA	Northern Ireland Environment Agency
RDF	Refuse Derived Fuel
SRF	Solid Recovered Fuel