

Strategic assessment for the future need for energy from waste capacity in the three economic regions of Wales – Methodology

Methodology

Forecast projections for 2024/25 and 2034/35 of the quantities of residual waste produced in Wales suitable for energy recovery have been derived for Wales as a whole and for the three economic regions for two future scenarios. The projections were derived using the latest available data as follows:

- Local Authority collected municipal and household waste – derived from WasteDataFlow and published on Stats Wales¹;
- industrial and commercial (I&C) waste – derived from the 2018 I&C Waste survey commissioned by Natural Resources Wales (NRW)²; and
- construction and demolition (C&D) waste – derived from the 2012 C&D waste survey commissioned by NRW³.

The detail of the scenarios applied are provided in the Strategic Assessment⁴.

The quantities of non-recycled waste suitable for energy recovery were derived for each of the main waste streams. Calculations were made based on the likely recycling rates achievable for each separate waste material to meet overall recycling rates, and the suitability of the non-recycled fraction to go for energy recovery.

The composition of I&C waste is more complex than the waste collected by Local Authorities, necessitating more detailed analysis. Waste types were collated at the Substance Orientation Classification (SOC) sub-sub-group level into categories as listed below. Materials in the data identified as non-wastes were excluded from the data. Categories of I&C waste used in the waste flow model were as follows:

¹ <https://statswales.gov.wales/Catalogue/Environment-and-Countryside/Waste-Management/Local-Authority-Municipal-Waste>

² <https://naturalresources.wales/evidence-and-data/research-and-reports/waste-reports/industrial-commercial-waste-survey/?lang=en>

³ <https://naturalresources.wales/evidence-and-data/research-and-reports/waste-reports/construction-demolition-waste-survey/?lang=en>

⁴ <https://gov.wales/strategic-assessment-future-need-energy-waste-capacity-wales>

Residual
Ferrous Metal
Food Waste
Garden Waste
Glass
Non-Ferrous Metal
Other Reuse/Recycling
Paper and card
Plastic
Textiles
WEEE
Wood
Liquids
Hazardous waste

For clarity and as an example, the SOC sub-sub-group fractions that are ascribed to “Residual” are as follows:

Other Healthcare wastes
Sanitary waste
Acid
Alkaline
Animal Infectious Health Care wastes
Bulky waste
Chemical Reaction Residues
Common Sludges (excluding dredging spoils)
Genetic Engineering wastes
Halogenated Spent Solvents
Human Infectious Health Care wastes
Minor Mixed Chemical wastes
Mixed Construction wastes

Mixed Residual (including Food waste)
Mixed Residual (no Food waste)
Non-Halogenated Spent Solvents
Oils/Water Emulsions Sludges
Other Chemical Deposits and Residues
Other Chemical Preparation wastes
Other Saline
Other Solvents
Paints, Varnish, Inks & Adhesive wastes
Sludges Containing Hydrocarbons
Sludges from Industrial Processes & Effluent Treatment
Sorting Residues
Spent Chemical Catalysts
Spent Filtration and Absorbent Materials
Unused Medicines
Used Motor Oils

The fates of these waste streams are set out according to the waste management operation the waste is sent to and these were grouped in to waste treatment types as follows:

EfW other
AD other
Chemical treatment
Composting
land app
landfill
MRF
Other recycling
RDF
RDF Prep MBT

Reuse

The I&C waste tonnages are collated by categories and processes and by the region in order to allow the tonnage flows through each facility to be calculated. An example of the data is shown below.

Table 1 Example of data collation North Wales commercial waste 2018

	Tonnage 17/18	AD other	Chemical treatmen t	Compostin g	EfW other	land app	landfill	MRF	Other recyclin g	RDF	RDF Prep MBT	Reuse	Reuse N
Residual	91,527	0.7%	0.0%	-	22.7%	0.4%	43.5%	31.7%	0.2%	0.7%	0.0%	-	0.1%
Ferrous Metal	12,439	-	-	-	-	-	0.0%	12.2%	87.4%	-	-	0.3%	0.0%
Food Waste	15,452	60.6 %	-	4.0%	4.9%	0.1%	16.2%	-	7.2%	0.1%	-	1.8%	5.2%
Garden Waste	6,746	7.4%	-	92.5%	0.1%	-	-	-	-	-	-	-	-
Glass	12,987	-	-	-	-	-	-	6.6%	93.4%	-	-	-	0.0%
Non-Ferrous Metal Other	792	-	-	-	-	-	-	0.0%	100.0%	-	-	-	-
Reuse/Recycling	102,739	-	-	-	3.5%	1.3%	13.7%	40.2%	31.4%	0.0%	-	3.3%	6.6%
Paper and card	87,650	-	-	0.0%	1.6%	0.3%	0.4%	10.1%	82.8%	-	0.0%	0.1%	4.6%
Plastic	22,855	-	-	-	1.7%	-	1.3%	6.8%	89.9%	-	-	0.1%	0.2%
Textiles	158	-	-	-	-	-	-	0.0%	26.7%	-	-	-	73.3%
WEEE	1,717	-	-	-	0.1%	-	17.7%	4.3%	62.6%	-	-	-	15.4%
Wood	3,904	-	-	-	11.2%	-	-	9.7%	53.6%	0.9%	-	0.8%	23.7%
Nonhaz liquids	8,378	0.0%	0.0%	-	0.1%	0.8%	1.0%	11.1%	27.6%	0.3%	58.2%	-	0.8%
Haz waste	18,951	-	6.3%	-	28.9%	0.2%	14.1%	2.8%	32.8%	3.9%	0.8%	0.3%	9.9%

Total	346,884	3.0%	0.3%	2.0%	9.1%	0.4%	15.8%	19.9%	43.2%	0.4%	1.5%	0.8%	3.6%
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To predict the increase in recycling of these waste fractions to match the trajectory of achieving up to 80% recycling, the residual fractions are adjusted so that material from EfW and landfill moves to “other Recycling” reflecting the projected increase in recycling. The amount transferred is calculated as the differential between the recycling rate achieved and the target value (70% in 2024/25 and 80% in 2034/35). This process is conducted for each region (North, South East and Mid & South West) and for the I&C wastes separately.

In addition, in line with progress in moving up the waste hierarchy, the projections account for waste currently destined in the assessment to go to landfill being sent to EfW instead. However, some waste types are not suitable for EfW and the proportion of the waste diverted from landfill was assessed by its suitability for combustion. This was done by allocating the residual waste categories to either combustible or non-combustible as a proxy for its suitability for EfW treatment. The allocation of waste streams is shown below.

SOC sub-sub-group	Suitability for EfW
Other Healthcare wastes	combustible
Sanitary waste	combustible
Acid	non-combustible
Alkaline	non-combustible
Animal Infectious Health Care wastes	combustible
Bulky waste	combustible
Chemical Reaction Residues	non-combustible
Common Sludges (excluding dredging spoils)	non-combustible
Genetic Engineering wastes	combustible
Halogenated Spent Solvents	combustible
Human Infectious Health Care wastes	combustible
Minor Mixed Chemical wastes	non-combustible
Mixed Construction wastes	combustible
Mixed Residual (including Food waste)	combustible

Mixed Residual (no Food waste)	combustible
Non-Halogenated Spent Solvents	combustible
Oils/Water Emulsions Sludges	combustible
Other Chemical Deposits and Residues	non-combustible
Other Chemical Preparation wastes	combustible
Other Saline	non-combustible
Other Solvents	combustible
Paints, Varnish, Inks & Adhesive wastes	combustible
Sludges Containing Hydrocarbons	non-combustible
Sludges from Industrial Processes & Effluent Treatment	non-combustible
Sorting Residues	combustible
Spent Chemical Catalysts	non-combustible
Spent Filtration and Absorbent Materials	combustible
Unused Medicines	combustible
Used Motor Oils	combustible

Quality assurance

Natural Resources Wales assisted in quality assuring the projections. This included agreeing the baseline data and assumptions made in developing the projections and reviewing the approach, methodology and calculations. The methodology uses an approach that has been developed over the last decade and which has been applied on many occasions across the UK.