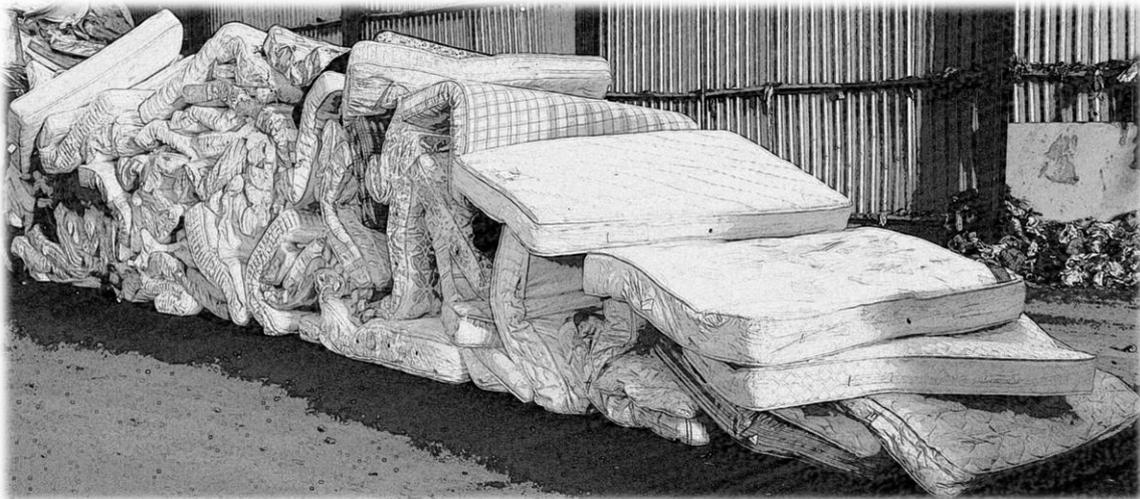


A final report by



for the



Derivation of the UK's mattress recycling rate in 2015

An update to the National Bed Federation's 2016 study into the waste treatment of end of life mattresses in the UK to include the local authority reported treatment of mattresses in 2015.

Derivation of the UK's mattress recycling rate in 2015

An update to the National Bed Federation's 2016 study into the waste treatment of end of life mattresses in the UK

*Value-driven
consulting*

*Science-led
research*

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Contents amendment record

This report has been amended and issued as follows:

Version	Date	Description	Author	Editor
1	12/01/2017	NBF-01 430 Update Draft.docx: Draft of update with 2015 RR for NBF review/comment	NB	DF
2				

1 The UK's mattress recycling rate in 2015

The purpose of this update is to present the derivation of the mattress recycling rate for the UK in 2015. The 2015 recycling rate was not derived in the full report published in the summer of 2016 because the data on waste treatment from Local Authorities (LAs) were incomplete at the time.¹ The data for mattress collection and treatment by LAs for the latter half of 2015 was only made publicly available at the very start of 2017.

The derivation of the 2015 recycling rate followed exactly the same methodology as used to derive that for 2014 in the full report. The mattress recycling rate in 2015 was calculated to be 13%, lower than the 16% calculated for 2014 (Table 1).

Table 1: UK mattress recycling rate 2012-2015

	Old methodology ²		New methodology	
	2012	2013	2014	2015
Number of mattresses recycled	452,000	586,000	924,000*	879,000
Number of replacement mattress sales	4,667,000	4,531,000	5,904,000	6,822,000
Mattress recycling rate	10%	13%	16%	13%

*This figure has decreased 2% from that reported in the full report, 939,000 units, because of a correction in the interpretation of the LA data from Northern Ireland, as described in Appendix III.

Table 1 shows that whilst the number of mattresses recycled in the UK fell by 45,000 units (5%) between 2014 and 2015, the number of replacement mattress sales (equal to the number of End of Life (EoL) mattresses disposed of) increased by 918,000 (16%). We attribute the decrease in the mattress recycling rate between 2014 and 2015 to a decrease in mattress recycling capacity nationwide and an increase in the number of mattresses disposed of in 2015, relative to 2014.

Recycling capacity was impacted by the low commodity price environment and, to a lesser extent, the cost of insurance and other regulatory pressures. In the full report we identified four recycling companies that either closed or stopped accepting mattresses in 2014 and 2015.³

The increase in UK mattress sales in 2015, relative to 2014, also drove down the mattress recycling rate for 2015. Though higher than the preceding three years, the figure of 7.3 million mattresses sold in the UK in 2015 is similar to that recorded for the period 2009 to 2011, see Appendix II.

The 5% decrease in the overall number of mattresses recycled in 2015, relative to 2014, is driven by the 11% decrease in mattress recycling reported by LAs. Contributing factors may

¹ 'Full report' refers to the 'End of Life Mattress Report 2016' available on the NBF's recycling website: www.nbfrecycle.org.uk

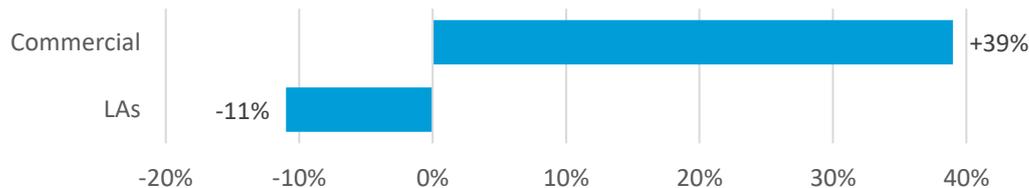
² As used in the NBF End of Life Mattress Report 2014, published May 2015 and available at www.nbfrecycle.org.uk

³ See Appendix VI of full report

include financial pressures on local councils and difficulties in assuring that recyclers comply with all necessary regulations.

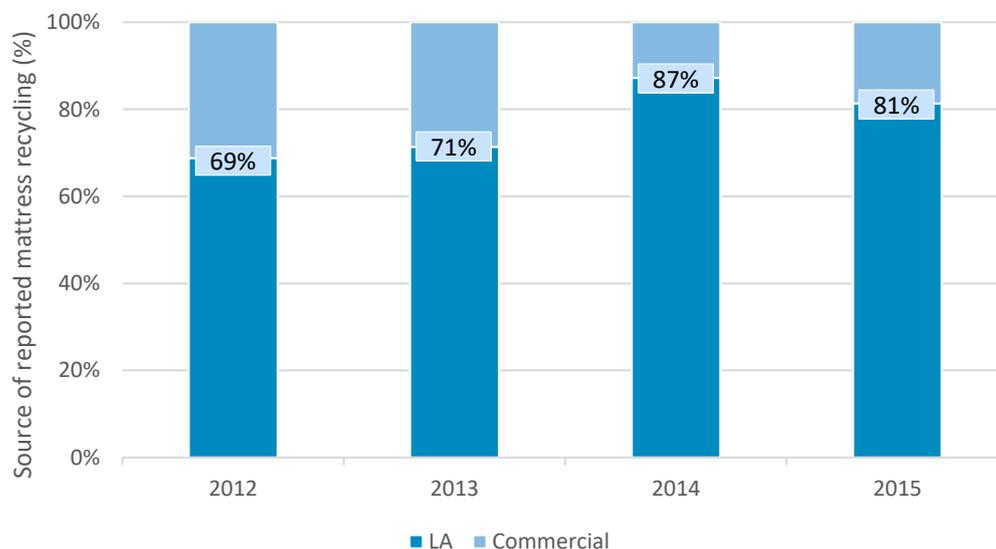
Conversely, mattress recycling in the commercial sector, as reported by manufacturers, retailers and prisons, grew between 2014 and 2015 (Figure 1) from 118,000 units to 164,000 units. Retailers, who were responsible for 70% of this growth in mattress recycling, are increasingly offering EoL mattress take-back with the sale of a new mattress as a value-added service offering to their customers.

Figure 1: Annual change in mattress recycling reported by commercial enterprises (manufacturers, retailers and prisons) and LAs between 2014 and 2015



The volume of mattresses recycled by commercial stakeholders and LAs was also reported on in the 2014 report covering 2012-13 data. Though the methodology used in this earlier report differed substantially to that applied to processing the 2014-15 data, they are presented alongside each other in Figure 2. This figure shows that despite the decrease in mattress recycling by LAs in 2015, LAs are still consistently the largest source of mattresses being recycled in the UK.

Figure 2: Proportion of reported mattress recycling attributed to LAs and commercial stakeholders (retailers, manufacturers and prisons)



A plateauing in the volumes of mattresses recycled in 2015 was predicted in the full report, based on the insight gathered from stakeholders and particularly the mattress recyclers themselves. Economic factors may have contributed to the resilience seen in the recycling of mattresses from commercial sources, compared to those collected by LAs: retailers and manufacturers generally pass the cost of recycling onto their customers by charging for the take-back schemes, while many LAs are obliged to take the lowest-cost option of disposing of mattresses, be it to landfill or energy from waste treatment.

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Appendix I: Recycling rate calculation

The recycling rate was calculated using the equation:

$$\text{Recycling rate (RR)} = \frac{V_{LA} + N_C}{X \times N_S}$$

where:

	Input	Source	2015 Value
V_{LA}	Volume of mattress recycling reported by LAs for 2015	New analysis of waste data flow database and LA survey presented in Appendix III (using methodology in full report, Appendix III)	17,887 tonnes
N_C	Volume of recycling reported by retailers, manufacturers and prisons for 2015	2016 NBF member survey (as reported in full report, Appendices IV and V) and summarised in Appendix IV below	163,900 units
N_S	UK mattress sales in 2015 (production + exports - imports)	New analysis of PRODCOM and COMEXT databases presented in Appendix II (using methodology in full report, Appendix II)	7,296,073 units
X	Mattress replacement rate	Appendix II	93.5 %
W	Average mattress weight	Full report, Appendix VII	0.025 tonnes

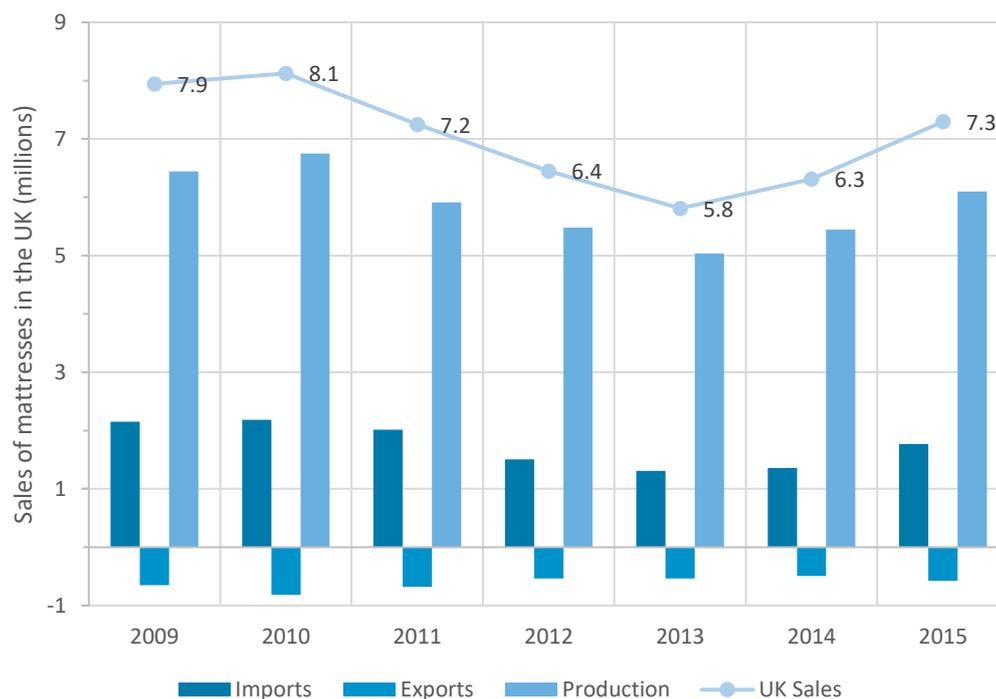
Note: 'Full report' refers to the 'End of Life Mattress Report 2016' available on the NBF's recycling website: www.nbfrecycle.org.uk

Appendix II: Market data analysis

UK mattress sales in 2015

For the derivation of the 2015 recycling rate it is necessary to determine the number of new mattresses sold in the UK market in 2015. Using the same methodology as in the full report, and the data in the PRODCOM and COMEXT databases, the total volume of new mattresses sales in the UK was estimated to be 7.3 million units (production + imports - exports); see Figure 3.

Figure 3: The sales of mattresses in the UK between 2009 and 2014



Replacement rate

For this update we used the same replacement rate as derived in the full report, i.e. that 93.5% of the mattresses sold in the UK are bought to replace EoL mattresses.

Appendix III: Local Authority data analysis

National overview of the Local Authority data analysis

Table 2 summarises the analysis of the waste data flow (WDF) database and the responses from the LA survey carried out as part of the full study.⁴ The conversion between tonnes and units of mattresses is dependent on a conversion factor: that a mattress weighs an average of 25 kg.⁵

Table 2: Summary of mattress recycling reported by Local Authorities

	2010	2011	2012	2013	2014	2015
No. of LAs covered (WDF and survey)	47	74	91	94	104	109
Population represented	19,630,670	22,687,490	26,362,910	28,980,930	33,997,930	33,731,356
% UK population represented	31	35	41	45	53	53
Total mattresses recycled (tonnes)	3,626	8,418	12,459	16,556	20,157	17,887
Total mattresses recycled (units)*	145,040	336,720	498,360	662,240	806,291	715,464
No. of mattresses recycled per 100 population	0.23	0.53	0.78	1.0	1.3	1.1

*Assuming 1 mattress = 25kg

Note: The recycling reported herein includes a small proportion of reuse; less than 0.5% of the total.

The data presented in Table 2, and the rest of this update, have been changed to reflect the correct Northern Ireland figures.⁶

Between 2014 and 2015 the mattress recycling reported by LAs decreased by 11% in spite of the number of LAs reporting EoL mattress treatment in WDF increasing by 5% and the population represented by reporting LAs being unchanged. Nevertheless, the mattress recycling reported by LAs in 2015 is still approximately four times greater than in 2010 (Figure 4). As in the full report, we assumed that there was no recycling activity carried out

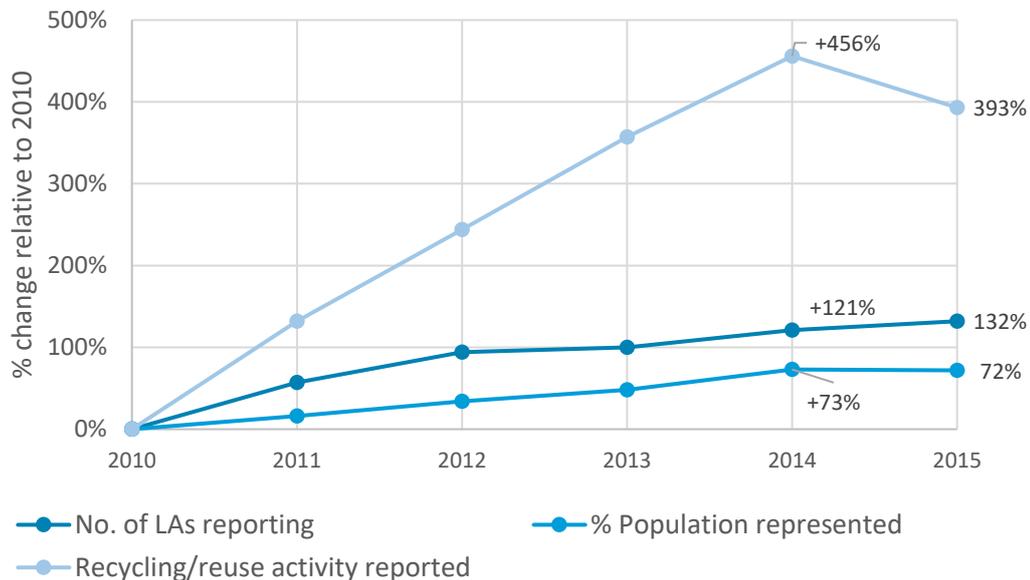
⁴ WDF database found at www.wastedataflow.org. The jump in number of LAs reporting covered between 2013 and 2014 is partially a result of the period covered by the survey

⁵ In the 2015 report, 30kg/mattress was assumed.

⁶ In preparing this update we realised that the Northern Ireland figures had accidentally been doubled in the 2016 report. Mattress recycling in Northern Ireland is recorded under two questions, (Q.s 16 and 16c) as opposed to just one (Q.16) for the rest of the UK.

by LAs that was not reported in the WDF database. This assumption is supported by the fact that none of the LAs contacted for the survey reported recycling unless they had already done so in WDF.

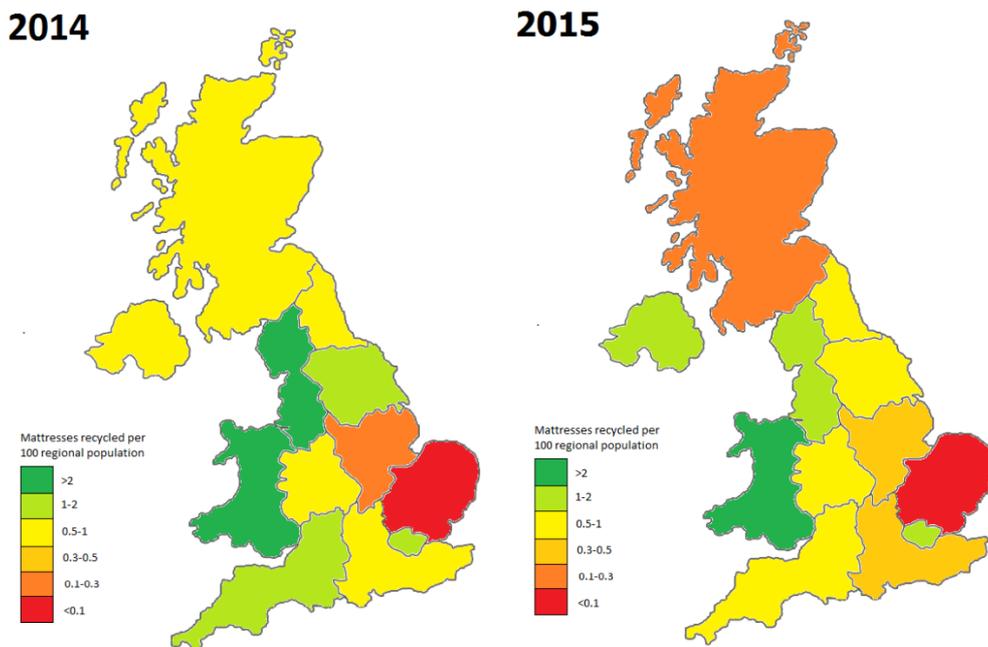
Figure 4: The change in recycling reported by local authorities between 2010 and 2015 relative to 2010



Regional breakdown of the Local Authority data analysis

Mattress recycling in the UK is characterised by large regional variations as illustrated in Figure 5.

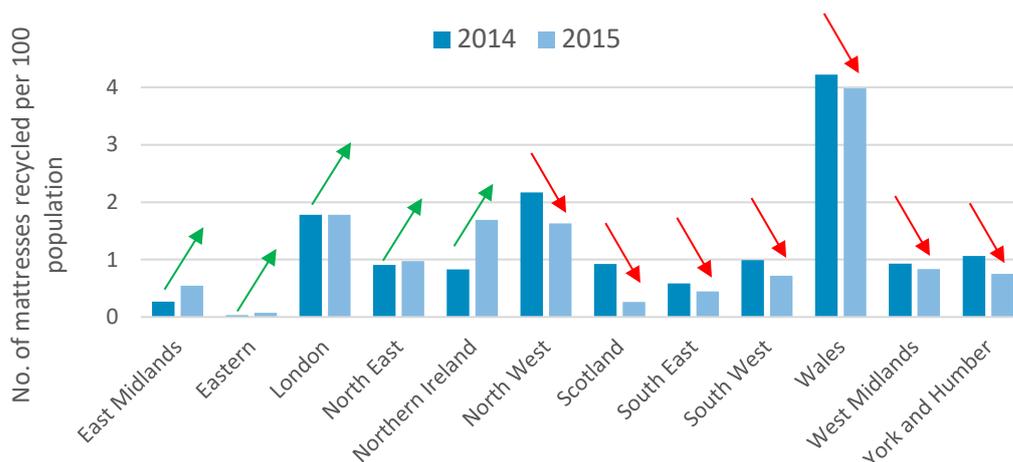
Figure 5: Mattress recycling by UK region in 2014 and 2015, normalised for population



Normalised for population (reported as number of mattresses recycled per hundred people) the maps above clearly show the regional variation in UK mattress recycling activity and how it changed between 2014 and 2015.

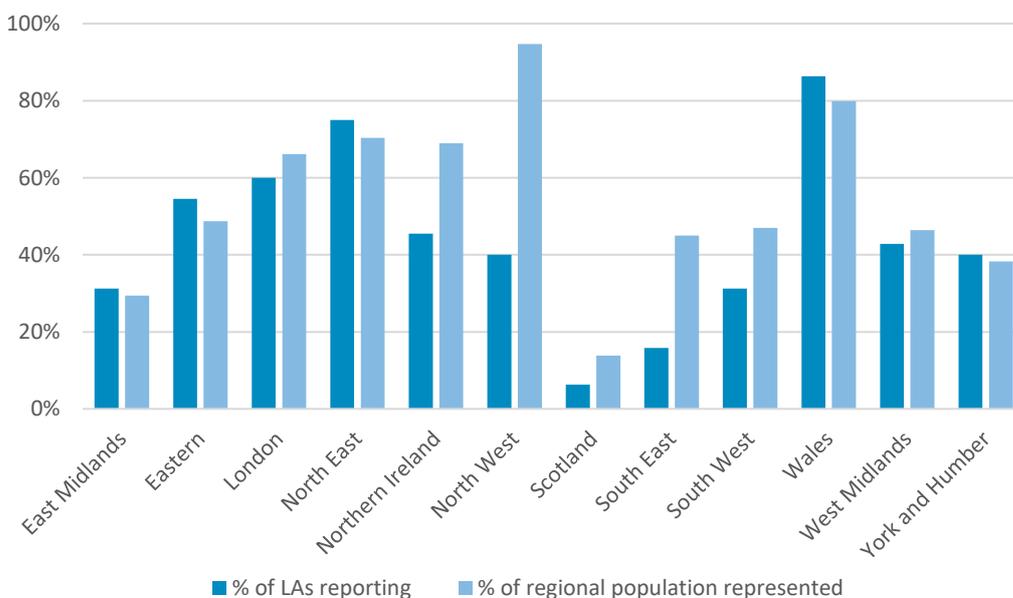
Of the 12 UK regions depicted in the maps, the mattress recycling rate decreased in seven and increased in five between 2014 and 2015 (see Figure 6). Wales had by far the highest level of mattress recycling recorded, whilst the Eastern part of England had the lowest.

Figure 6: Regional mattress recycling rates (per 100 population) in 2014 and 2015



The level of mattress recycling activity in a region is weakly correlated with the number of its LAs reporting mattress recycling, see Figure 7. In Scotland, for example, fewer than 10% of LAs report on mattress recycling whilst in Wales over 80% do.

Figure 7: Regional variation in the number of population represented by the combination of WDF data and survey responses for 2015



Historic mattress recycling data from WDF for each UK region



Appendix IV: Mattress recycling from commercial sources

Estimate of all commercial (non-LA) recycling

In order to estimate an overall UK mattress recycling rate, it is necessary to first estimate the number of mattresses from commercial sources that are being recycled. This is to capture all mattresses that are recycled but do not pass through LAs or LA contractors. Table 3 summarises the commercial mattress recycling reported by stakeholders as part of this survey. The number of prison mattress recycled was obtained via a freedom of information request to the Ministry of Justice.

Table 3: Summary of commercial mattress recycling reported in 2015

	Units recycled	% increase since 2014	% of market captured
Manufacturers	60,875	24	45
Retailers	83,288	64	8
Prisons	19,737	10	90
Total	163,900	39	

No attempt was made to scale up the data collected from the survey, taking into account the market share of the retailers and manufacturers, as we were not confident that the samples were representative of the sector. Also, not captured in this methodology are the mattresses that reach mattress recyclers from commercial sources but not through retailer- and manufacturer-facilitated take-back schemes. Facility management companies and contract mattress providers, who do not also manufacture the mattresses, may organise the recycling of large quantities of mattresses (as produced during halls of residence, hotel or hospital refurbishments) directly with the recycler or through waste contractors. The low coverage of large waste management companies remains one of the shortcomings of this research.

Project Team



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With a degree in Theoretical Physics and a PhD in Materials Science, Nia's background is in nanomaterial research at the UCal San Diego and at the NPL, UK. She has a critical and thorough approach to analysing complex technical data sets, and the ability to concisely communicate complex topics. Recent work has been on which metals are critical to the EU defence sector, minor metals by-production, and an EU-wide assessment of the impact of nanotechnology funding. She was also the main author of the NBF's 2016 EoL Mattress Report.



Peter Lee PhD, Principal Consultant

Peter has project-managed and written major studies on resource efficiency, sustainability, carbon reduction and energy, with much of his focus being on the food manufacturing and retail sectors. His specialisms include: waste prevention, waste logistics and reverse supply chains, packaging and waste management in the food and drink industry, environmental impact assessments, and recycling technologies. An expert in Lean techniques, he has worked with manufacturing clients to implement waste prevention.



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Much of Steve's consultancy experience has involved leading research and analysis projects for key public and private sector organisations in the field of waste management, resource efficiency and sustainable technologies. He has advised a major national retailer in its commitment to eliminate landfilling of operational waste and has been directly involved with the client in implementing its plans.

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