

Waste Incineration and Particulate Pollution: *A failure of governance*

- Incinerators exceed pollution-reporting thresholds but public not told
- We reveal emissions of PM and NOx from English incinerators - see overleaf
- Incinerator pollution costs £billions: 'Polluter pays' principle must apply

Particulate matter (PM) is the minute particles emitted by many industrial processes; in this case we are concerned with waste incineration. PM comes in various sizes: PM10 is all particles whose average diameter is less than 10 micrometres (a micrometre is 1/1000 of a millimetre). PM2.5 is all particles that measure up to 2½ micrometres in diameter, and PM0.1 is particles up to one-tenth of a micrometre. They are invisible and dangerous to health.

Public kept in the dark

DEFRA Minister Thérèse Coffey MP has told Parliament that the Environment Agency (EA) is 'required' to set 'limit values' for PM10 and PM2.5 emissions, and that a 'strict monitoring system' is in place to enforce these rules.¹

The EA has set a reporting threshold for PM10 and PM2.5 emissions at **one tonne** per year.² This means that if emissions reach those levels then this information should be made public via the EA's Pollution Inventory.

But the Minister has also said 'there is no commercially available' equipment for the continuous monitoring of PM10 or PM2.5,³ so the EA's Pollution Inventory contains no separate data for either PM10 or PM2.5. In other words, these emissions can exceed reporting thresholds (see overleaf) **without the public being told**.

Finally, the Minister has admitted that **there is no specific limit set for PM1 emissions from incinerators**.⁴ This is concerning because smaller particles are the most likely to pass into the bloodstream and adversely affect health.

The TPM fiddle

Because PM10 and PM2.5 are not measured separately, the EA only requires incinerators to continuously monitor the **Total Particulate Matter (TPM)** emitted. The reporting threshold for TPM is set at a massive 10 tonnes per year.⁵ Because incinerators do not usually emit that level of TPM, operators are able to report that their emissions are 'below reporting threshold', **so the public is told nothing about TPM emissions either**.

The 'no equipment' fiddle

It may sound reasonable to say that there is no equipment to measure PM10 and PM2.5 separately so we can only measure TPM – until we learn that DEFRA's own National Atmospheric Emissions Inventory (NAEI) has said: 'The vast majority of emissions are very fine, so we [assume that] 100% of PM is of a size less than 2.5...hence TPM emissions = PM10 emissions = PM2.5 emissions'.⁶ In other words, smaller PMs *can* be measured by proxy. **The Government accepts this is a 'reasonable conclusion'**.⁷

Overleaf:

- Official guidance ignored
- We report emissions for first time
- Policies needed

PARTICULATE POLLUTION: THE HEALTH EFFECTS

What the Committee on the Medical Effects of Air Pollutants says:

'Particles [particulate matter] emitted directly from a range of pollution sources...and those formed by chemical reactions in the atmosphere are associated with **adverse effects on health** and the current **consensus** is that these associations are, at least in part, causal. Hence, reductions in concentrations of both types of particles are likely to benefit public health'.⁸

What Public Health England says:

'PM is inhaled into the lungs and ultrafine PM0.1 is thought to **pass into the blood**, causing **many adverse outcomes** including **systemic inflammation**'.⁹

What DEFRA says:

'Exposure to airborne PM is associated with a range of **adverse effects on human health** including effects on the **respiratory and cardiovascular systems**, leading to **hospital admissions and mortality**. There is increasing evidence that fine (PM2.5) and ultrafine (PM0.1) particulate matter plays a more significant role than previously thought'.¹⁰

...AND THE COST

Atmospheric pollution costs the UK money. That's not us talking, it's HM Treasury. The Government has published the cost-to-society figures for some of the pollutants released by waste incinerators.¹¹ The Treasury assumes particulate matter (PM) from the waste sector costs the country £24,994 per tonne of PM; for nitrogen oxides (NOx) the cost is £9,049 per tonne; for sulphur oxides (SOx) it is £1,956 and for ammonia £2,363. Using Environment Agency data we worked out the cost to society of PM and NOx, from English incinerators in 2017 (see overleaf for total emissions by area and methodology used for these calculations).

• PM	£5.65 million in 2017
• NOx	£102.28 million in 2017
• Total cost to society	£107.93 million in 2017
• Total cost to society × 30 years	More than £3.23 billion

Multiplying the 2017 rate of incineration by a typical operational lifetime of 30 years results in a conclusion that existing incinerators will cost society more than £3bn during their lifetime. And this calculation uses only two pollutants; when CO₂, carbon monoxide and other harmful emissions are included, we are talking about an even greater cost to society caused by incineration. We will be saying more on this matter in due course.

The 25-Year Environment Plan: The 'polluter pays' principle

The Government published a 25-year plan for the environment on 24th February 2018. The Plan explains (on page 129) that the polluter-pays principle is one of the 'key underlying principles of existing policy' that will be maintained after Brexit by the European Union (Withdrawal) Act. Applying this key principle, and bearing in mind that there are many more pollutants from incinerators in addition to PM and NOx, there can be only one conclusion: **an incineration tax must be introduced to ensure polluters pay their fair share for the harmful emissions arising from waste incinerators**.



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¹ 8.12.17 answer to PQ 117197 asked by David Drew MP on 4.12.17

² EA Pollution Inventory, Column K

³ 19.4.18 answer to PQ 135379 asked by David Drew MP on 13.4.18

⁴ 8.12.17 answer to PQ 117197 asked by David Drew MP on 4.12.17

⁵ EA Pollution Inventory, Column K

⁶ 24.5.18 e-mail from NAEI

⁷ 16.5.18 answer to FOI request NR85604

⁸ Statement on the evidence for differential health effects according to source or components (COMEAP, March 2015)

⁹ Air Quality in England: A Briefing for Directors of Public Health (PHE, DEFRA and LGA, March 2017)

¹⁰ Particle Numbers and Concentrations Network – see: <https://uk-air.defra.gov.uk/networks/network-info?view=particle>

¹¹ <https://www.gov.uk/guidance/air-quality-economic-analysis>

Revealed: Unreported and harmful incinerator emissions in your area

Official guidance ignored

In December 2012, the Environment Agency (EA) issued guidance for **England** on how to assess PM10 and PM2.5 emissions using an Emissions Factor (EF) based on the quantity of waste incinerated.¹² However, the EA admits that ‘very few, if any’ operators have been following its guidance.¹³ How few? There were just ‘five instances in the past 19 years where operators reported emissions of PM2.5’.¹⁴

What should have happened

With reporting thresholds set at 1 tonne a year for both PM10 and PM2.5, and the EA’s Emission Factor of 0.022 kg of PM10 and PM2.5 per tonne of waste combusted,¹⁵ **every incinerator burning over 45,455 tonnes of waste per year should report PM2.5 and PM10 emissions** (as 0.022 kg × 45,455 tonnes = 1 tonne). Instead, there have been just five reports in 19 years! But that doesn’t seem to bother the Government - Minister Thérèse Coffey said: ‘There is no need to monitor specifically for PM2.5’.¹⁶

Official guidance applied

We applied the official guidance by multiplying the quantity of waste incinerated in 2017 by the EF of 0.022. The results displayed in Table 1 (right) demonstrate that in 2017, according to EA guidance, **every incinerator listed emitted PM10 and PM2.5 over the reporting threshold of one tonne per year. Thus, all those operators should have reported their emissions.** Why has the EA allowed them to get away with ignoring its guidance for so many years?

Policies needed

1. PM10 and PM2.5 monitoring and reporting should be made mandatory for incinerators, and EA guidelines should be strengthened and enforced. Simply put, incinerators must develop and implement accurate systems to measure the particulate matter they release

Reason: To increase transparency on a matter of serious public concern associated with the adverse health impacts described overleaf. The Government has conceded that TPM = PM10 for incinerators. The National Atmospheric Emissions Inventory (NAEI) says PM10 = PM2.5. Page 15 of the EA guidance gives the same EF for PM10 as for PM2.5.

2. Where PM emission factors are used they should not be reduced

Reason: Reported TPM levels indicate that the EF for PM10 has been set too low, yet there are suggestions that the EF could be reduced. The lower the EF, the greater the incentive to avoid monitoring – and operators should not be encouraged to be any less transparent.

3. If possible, a limit value should be placed on PM1 emissions

Reason: Fine particles are the most damaging – see overleaf.

4. Incinerators should be taxed on their emissions

Reason: The ‘polluter pays’ principle is identified as a ‘key underlying principle’ in the Government’s 25-Year Environment Plan. In its latest publication, the industry does not argue against this principle but calls for tax changes to be ‘signalled well in advance’.¹⁷ As such, the Government should consult on an incineration tax that implements the ‘polluter pays’ principle as a matter of urgency.

5. Moratorium on new incinerators until these policies are in place

Reason: New sites must not begin operating on the basis of current inadequate practices and policies. Given the current level of incineration overcapacity and plans to increase recycling, there is no reason to risk public health by allowing more incinerator pollution.

Table 1: PM and NOx emissions based on EA Emissions Factors (2017)

Incinerator	Constituency	Tonnes waste burnt ¹⁸	Tonnes PM10 & PM2.5 emitted	Tonnes NOx emitted
Allington	Maidstone and the Weald	469,162	10.3	516.1
Ardley	Banbury	286,157	6.3	314.8
Belvedere	Erith and Thamesmead	746,326	16.4	821.0
Billingham	Stockton North	563,349	12.4	619.7
Bolton	Bolton South East	50,202	1.1	55.2
Chineham	Basingstoke	93,374	2.1	102.7
Colnbrook	Windsor	455,692	10.0	501.3
Coventry	Coventry South	292,989	6.4	322.3
Devonport	Plymouth Moor View	250,992	5.5	276.1
Dudley	Dudley North	95,216	2.1	104.7
Edmonton	Edmonton	511,930	11.3	563.1
Ellesmere Port	Ellesmere Port and Neston	71,934	1.6	79.1
Exeter	Exeter	55,685	1.2	61.3
Ferrybridge C	Normanton Pontefract and Castleford	631,515	13.9	694.7
Four Ashes	South Staffordshire	337,701	7.4	371.5
Greatmoor	Buckingham	291,352	6.4	320.5
Grimsby	Great Grimsby	54,363	1.2	59.8
Hartlebury	Mid Worcestershire	197,076	4.3	216.8
Huddersfield	Huddersfield	132,448	2.9	145.7
Ipswich	Central Suffolk & N. Ipswich	261,670	5.8	287.8
Leeds	Leeds Central	171,567	3.8	188.7
Marchwood	New Forest East	201,781	4.4	222.0
Middlesbrough	Middlesbrough	393,235	8.7	432.6
Newhaven	Lewes	222,960	4.9	245.3
N. Hykeham	Sleaford and N. Hykeham	168,759	3.7	185.6
Nottingham	Nottingham South	150,682	3.3	165.8
Peterborough	Peterborough	81,248	1.8	89.4
Portsmouth	Portsmouth North	202,192	4.4	222.4
Runcorn	Halton	890,932	19.6	980.0
Sevenside	Filton and Bradley Stoke	340,422	7.5	374.5
Sheffield	Sheffield South East	229,662	5.1	252.6
Shrewsbury	Shrewsbury and Atcham	96,831	2.1	106.5
SELCHP	Lewisham Deptford	446,363	9.8	491.0
St Dennis	St Austell and Newquay	188,728	4.2	207.6
Stoke-on-Trent	Stoke-on-Trent Central	183,974	4.0	202.4
Tyesley	Birmingham Yardley	344,851	7.6	379.3
Wolverhampton	Wolverhampton North East	112,213	2.5	123.4
Totals		10,275,533	226.1	11,303.1

Methodology for calculating emissions and assessing cost to society

For PM we used the EA’s emissions factor (EF) of 0.022kg per tonne of waste burnt, as explained opposite. We multiplied the tonnes of waste burnt (Column 3) by the EF of 0.022 kg/tonne. The results shown in Column 4 are rounded to one decimal place. To obtain the costs to society listed overleaf, we then multiplied 226.1 tonnes by £24,994 per tonne (as per the HM Treasury’s Green Book¹⁹) = £5,651,143.

For NOx there is no emissions factor set by the EA, so we used the EA-advised method to create one. To do this we added up the total emissions of NOx from those sites that reported a figure (some did not) for 2016 (the most recent year available in the pollution inventory) and then divided it by the total tonnes of waste incinerated in that year by those sites. That gave us an EF of 0.0011 which we then applied to the 2017 figures for total waste incinerated at each site (Column 3). To obtain the costs to society listed overleaf, we then multiplied 11,303.1 tonnes by £9,049 per tonne (as per the Green Book) = £102,281,752.

¹² Pollution inventory reporting – incineration activities guidance note (Environment Agency, 2012), page 15. <https://www.gov.uk/government/publications/pollution-inventory-reporting-guidance-notes>

¹³ 8.5.18 reply to FOI request to EA National Request Ref. NR85604

¹⁴ 15.5.18 e-mail to EA from National Atmospheric Emissions Inventory Helpdesk

¹⁵ Pollution inventory reporting (Environment Agency, 2012), page 15

¹⁶ 19.4.18 answer to PQ 131978 asked by David Drew MP on 12.3.2018

¹⁷ Energy for the Circular Economy (ESA, June 2018), recommendation 2 on page 7

¹⁸ 2017 Incineration Inputs and Capacity (Environment Agency)

¹⁹ <https://www.gov.uk/guidance/air-quality-economic-analysis>

BIN THE BURNERS!



Removing barriers to a circular economy ukwin.org.uk/bin

Details of the motion:

Tabled: 22nd November 2017

Primary sponsor: John Grogan

Sponsors: Caroline Lucas, Philip Davies, Sharon Hodgson, Jim Shannon, and Roger Godsiff

Text of the motion:

"That this House notes in the UK there is now **more waste incineration capacity built and under construction than it is forecast there will be genuinely residual combustible waste to burn**; further notes that **incineration overcapacity can be a barrier to achieving the recycling society**; believes that realising such a recycling society would result in **significant economic, social and environmental benefits**; acknowledges the need to send a clear message that **the waste hierarchy should shift focus away from incineration** and towards waste reduction, reuse, recycling and composting; and calls on the Government and the devolved governments to introduce a **complete moratorium on new waste incineration capacity**, covering both conventional waste incineration and other forms such as gasification and pyrolysis, as a matter of urgency."

Motion signed by at least one member of every political party at Westminster:

Name	Party	Constituency	Date Signed
John Grogan	Labour Party	Keighley	22.11.2017
Philip Davies	Conservative Party	Shipley	22.11.2017
Caroline Lucas	Green Party	Brighton Pavilion	22.11.2017
Sharon Hodgson	Labour Party	Washington and Sunderland West	22.11.2017
Roger Godsiff	Labour Party	Birmingham Hall Green	22.11.2017
Jim Shannon	Democratic Unionist Party	Strangford	22.11.2017
Mohammad Yasin	Labour Party	Bedford	23.11.2017
Christopher Stephens	Scottish National Party	Glasgow South West	27.11.2017
Jonathan Edwards	Plaid Cymru	Carmarthen East and Dinefwr	28.11.2017
Rosie Cooper	Labour Party	West Lancashire	28.11.2017
Marie Rimmer	Labour Party	St Helens South and Whiston	28.11.2017
Lady Hermon	Independent	North Down	29.11.2017
Henry Bellingham	Conservative Party	North West Norfolk	01.12.2017
Norman Lamb	Liberal Democrats	North Norfolk	04.12.2017
Frank Field	Labour Party	Birkenhead	06.12.2017
Anne Main	Conservative Party	St Albans	14.12.2017
David Crausby	Labour Party	Bolton North East	19.12.2017
Preet Gill	Labour Party	Birmingham Edgbaston	08.01.2018
Paul Girvan	Democratic Unionist Party	South Antrim	31.01.2018



A tax on waste incineration would:

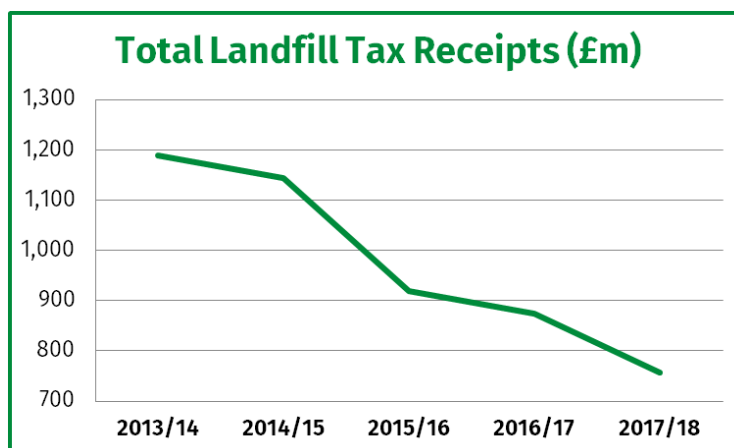
- **Compensate for the loss of Landfill Tax revenue;**
- **Support recycling; and**
- **Reflect the harm caused by waste incinerator emissions.**

Compensate for the loss of Landfill Tax revenue

The volume of waste landfilled at the Standard Rate has seen a strong downward trend (even taking into account the devolution of Landfill Tax in Scotland from April 2015).

According to HMRC the total cash receipts from Landfill Tax has fallen from nearly £1.2bn in 2013/14 to only around £750m in 2017/18.¹

Landfill Tax is currently £88.95/tonne. In 2017 more than 10m tonnes of waste was incinerated in England, so we can expect that an incineration tax set at £50/tonne would raise more than £500m a year.



Support recycling

More than half of what currently goes to incineration could have been recycled or composted, and so greater economic incentives are clearly needed to support investment in education and infrastructure at the top tiers of the Waste Hierarchy.² As Policy Exchange put it: "By introducing taxation on incineration a clear preference is signalled to reduce, reuse, recycle or compost where possible".³

As explained in our briefing about how incineration harms recycling, some Councils are burning material that other Councils are recycling, and those Councils that are burning the most are recycling the least. Funds raised from an incineration tax could be used to help Councils pay towards measures to separately collect and compost food waste, and to divert plastics and other materials from incineration.

Implement the 'polluter pays' principle

It has long been acknowledged that: "Failing to price in the environmental cost...of generating waste leads to inefficient production and consumption patterns, and excess waste being produced"⁴ and that incinerators are "creating GHG emissions without paying the relevant price".⁵

The 'polluter pays' principle means the cost to society of harmful emissions should be reflected in the price of that activity. Landfill has the landfill tax, but incineration does not yet have its own equivalent.

According to one operator, their London incinerator releases 0.454 tonnes of fossil CO₂ per tonne of waste burned;⁶ when applied to the 2017 rate of incineration in England, this would equate around 4.7m tonnes of fossil CO₂. Based on HM Treasury's Green Book approach⁷, 4.7 million tonnes of fossil CO₂ would have cost society more than £300m in 2017, yet no taxes were collected for these GHG emissions.

As explained in our 'Waste Incineration and Particulate Pollution' report, the costs from PM and NO_x emissions from English incinerators amounted to an additional unpaid cost to society of £108m in 2017.

¹ <https://www.uktradeinfo.com/Statistics/Pages/TaxAndDutybulletins.aspx> - Sheet 4 of Landfill Tax Bulletin for April 2018

² <https://resource.co/article/despise-leading-way-welsh-bins-still-half-full-recyclables-11171>

³ A Wasted Opportunity: Getting the most out of Britain's Bins. Policy Exchange, 20 July 2009

⁴ <http://webarchive.nationalarchives.gov.uk/20130402151656/http://archive.defra.gov.uk/environment/waste/documents/ia-review-waste-policy.pdf>

⁵ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69500/pb13548-economic-principles-wr110613.pdf

⁶ <http://www.coryenergy.com/wp-content/uploads/2017/05/Cory-Carbon-Report.pdf> - Page 17

⁷ <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal> - Data Table 3

Incineration overcapacity



Incineration overcapacity wastes money that should be invested in recycling and composting. A compelling argument against allowing new incinerators is that there just won't be enough genuinely residual combustible material to keep them fed. High rates of incineration are inconsistent with more ambitious recycling targets.

Some in the waste industry define overcapacity as the point where current capacity exceeds current demand. They then often proceed to underestimate capacity and overestimate demand, especially those with a financial stake in building new incinerators. However, a more practical approach defines overcapacity as where capacity built and under construction is higher than future demand would be were we to reduce, re-use and recycle in line with the waste hierarchy. It makes no sense to talk about a 'capacity gap' for incinerators to burn material that could and should be recycled or composted.

In 2002 UK household waste had been rising by 3% a year, and the Prime Minister's Strategy Unit noted that if this trend continued waste could double by 2020. Coupled with a recycling rate of less than 15%, this led to a 'residual waste scare', resulting in a big push for new waste incineration capacity at any cost. Since then, the range of materials that can be readily recycled has significantly increased, anaerobic digestion (AD) has become a preferred method for treating food waste, and waste levels have actually fallen. In recognition of these trends, the Government cancelled PFI funding for 11 incineration projects between 2010 and 2014 on the basis that their capacity was no longer needed to meet landfill diversion targets.

Municipal waste then and now...

	Then (2002)	Now (2017)
Number of incinerators (UK)	11	64
Incineration capacity (UK)	2.6 million tonnes	17 million tonnes*
Tonnes arising (England)	29 million	26 million
Tonnes incinerated (England)	2.5 million	9 million
Percentage incinerated (England)	9%	35%
Recycling rate (England)	14%	42%

* Existing and under construction (only incineration, not total residual treatment capacity)

However, due to a combination of inertia, contractual commitments, low ambitions for recycling and perverse financial incentives to burn recyclable waste, the number of incinerators has kept on growing and without intervention will continue to grow even though we already have incineration overcapacity.

Unlike the waste industry studies produced simply to promote incineration, the waste capacity forecasts from environmental consultancy Eunomia are more independent and were unsurprisingly the only figures cited in the Government's Energy from Waste Guide. Eunomia's July 2017 Residual Waste Infrastructure Review (RWIR) states: "In 2017, given the level of residual waste treatment infrastructure already committed, we forecast that the maximum recycling rate achievable in 2030 if all treatment capacity is fully utilised has fallen to 63%...in scenario 1, our analysis suggests that the UK's supply of capacity will exceed the available quantity of residual waste in 2020/21...The level of excess demand rises to 9.5 million tonnes in 2030/31..."

Residual treatment overcapacity*



*Calculation of residual treatment overcapacity based on Eunomia RWIR Scenario 1 (July 2017). 10.4 million tonnes of waste is expected to be available for residual treatment in 2030. When we take away the 14.9 million tonnes of current (2017) operational residual treatment capacity, and take away the 4.5 million tonnes of capacity currently under construction (in 2017), we are left with a residual treatment overcapacity (without further new construction) of 9 million tonnes.

How incineration harms recycling



Recycling is harmed by incineration because:

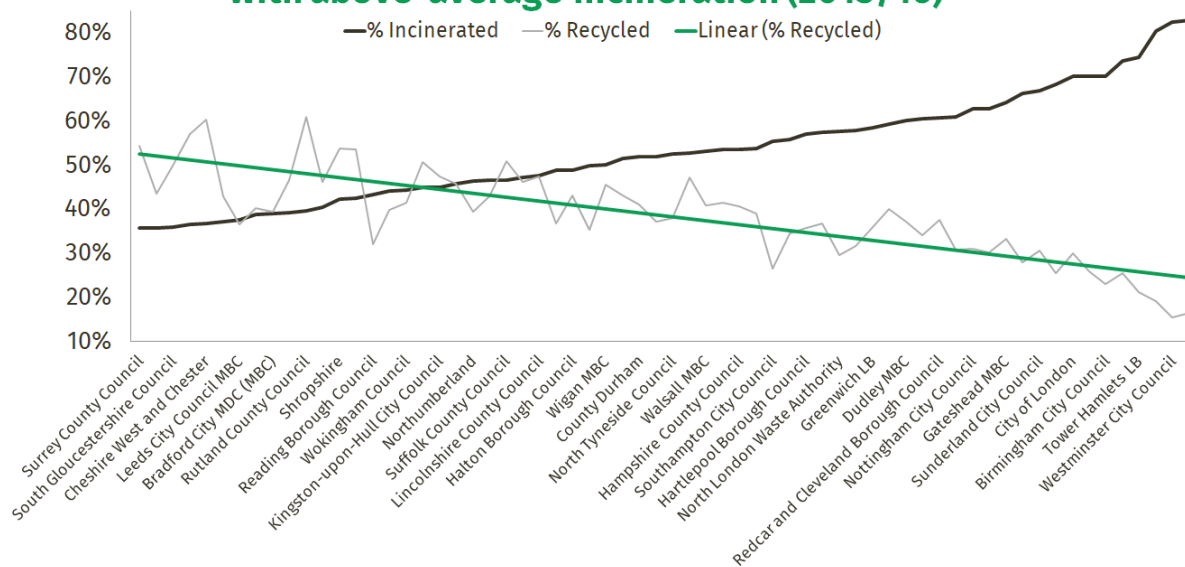
- Much of what ends up as incinerator feedstock is not genuinely residual waste, it is material that could and should have been recycled and composted.
- The prospect of worsening incineration over-capacity discourages investment in recycling by reducing the market for, and confidence in, recycling infrastructure.
- Money and feedstock are locked in to existing and proposed incinerators and this reduces flexibility and means that money is diverted from investment in recycling and that feedstock becomes unavailable for reprocessing.
- For a range of reasons including Government subsidies, environmental externalities, and put-or-pay contracts, the true cost of incineration is not reflected in the price of treatment. This means that the return on investment in recycling and recycling education is undermined.

Taken together, these factors serve to perversely disincentivise councils and businesses from maximising high quality recycling of plastics, food and other waste, and in turn this reduces the market for such services, hampering investment in the research and development of technologies and the construction of domestic recycling and reprocessing facilities.

Success factors contributing to high rates of recycling include:

- The widest array of materials being collected for recycling (e.g. separate food waste collection).
- The flexibility to increase the range of materials collected as they become easier and more profitable to recycle.
- The availability of sorting and treatment facilities that can recycle or compost this material.
- Recycling education so that people put the right things in the right bins.

Municipal waste treatment rates for councils with above-average incineration (2015/16)



...lower [recycling] rates could result from an authority focusing on avoiding landfill by investing in incineration and targeting its waste management policies on that treatment solution, rather than poor recycling awareness or initiatives.

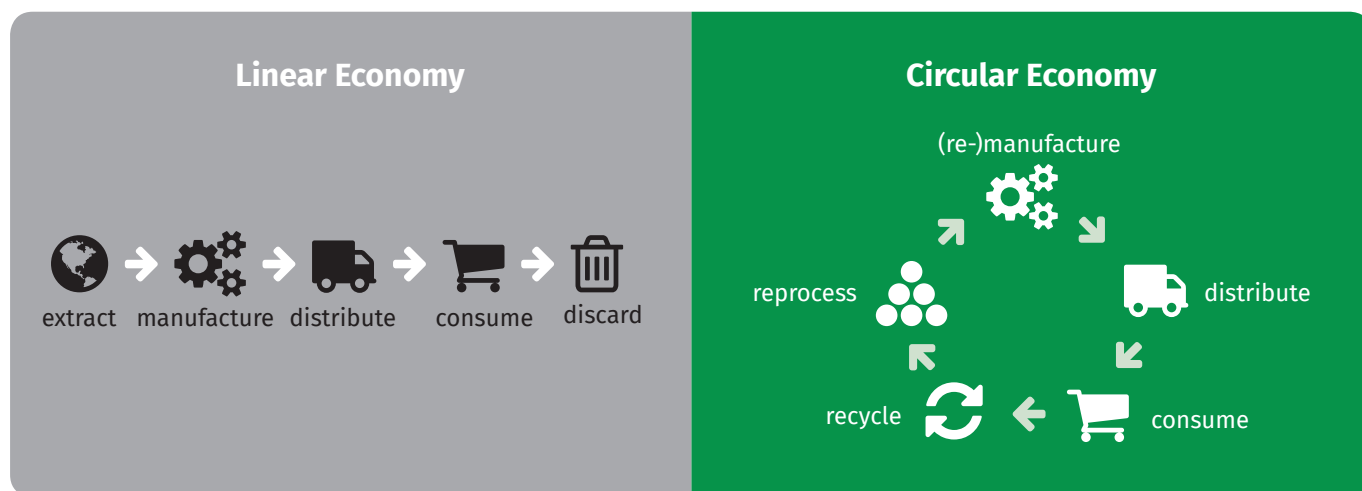
Defra (2012)

The circular economy and resource productivity



What is the circular economy?

The 'linear economy' relies on extraction and processing, followed by consumption and disposal (via incineration or landfill). Extraction and disposal deplete finite resources and cause environmental and social harm. With a circular economy the value of resources is preserved, material and nutrients that are needed to create new products are maintained, and the most is made of existing resources. Such prudent use of resources can be described as increasing resource productivity.



Social, environmental and economic benefits of a more circular economy

→ The Ellen MacArthur Foundation's list of key benefits of moving to the circular economy:

1. Substantial net material savings and reduced exposure to price volatility
2. Increased innovation and job creation potential
3. Increased resilience in living systems and in the economy

→ Friends of the Earth estimated that reaching 70% recycling would create more than 70,000 jobs in the UK by 2025.

→ WRAP estimated that by 2030 the circular economy could create more than 200,000 jobs and noted that these jobs could be focussed in areas where unemployment is higher.

→ Redesign means creating products that last longer and that are more recyclable, reusable and repairable. This is good for consumers and supports the remanufacturing industry.

The Environmental Audit Committee noted: "There are potentially billions of pounds of benefits for businesses across the economy by becoming more resource efficient" and recommend that: "Reducing the dependency on primary resource use for economic growth is an essential part of moving to a more sustainable economic system. Some businesses are showing real leadership and innovation to adjust their business models and become more resource efficient. However, the Government must do more to ensure that the right conditions are in place so that many more businesses shift from a linear approach to a circular one."

Incineration and the circular economy

Incineration has no place in the circular economy towards which we should be working. Incinerators depress recycling, destroy finite resources, and release greenhouse gasses. For every tonne of waste burned more than one tonne of CO₂ is released into the atmosphere, and this is significantly higher if one takes into account the CO₂ required to make the products in the first place. Thus, incineration is unsustainable and has significantly higher carbon intensity than burning gas or coal.

How councils can improve their recycling rates



There is a significant gap between the councils with the highest recycling rates and those that lag behind. South Oxfordshire District sent 67% of their household waste for recycling, reuse or composting in 2015. In just one year Richmondshire District increased their recycling and composting rates by 14.7 percentage points, from 37.7% in 2014/15 to 52.4% in 2015/16. Lessons can be learnt from higher performing and rapidly improving areas.

Invest to save: Good quality recycling and composting may require short-term investment to yield long-term cost savings.

Council Waste Officers, Environment Portfolio Holders, Council Leaders, Chief Executives and Mayors are all able to work for their Council to achieve higher levels of waste reduction, reuse and recycling. There is also a great opportunity for councils to work together, especially where one council is responsible for collecting waste and another is responsible for treatment.

Ways councils can improve recycling rates

- Provide a weekly food waste collection for composting or anaerobic digestion
- Ensure waste contracts reward reductions in residual waste by avoiding or exiting long-term waste incineration contracts
- Invest in waste education to save money that would otherwise be spent on disposal
- Introduce a re-use scheme for local bring sites (HWRCs)
- Promote re-use networks such as Freegle and Freecycle, including to those seeking bulky waste collection
- Enhance commitment to green procurement and give preference to buying items that can be (or that have been) recycled
- Provide a free garden waste service for grass cuttings and hedge trimmings
- Introduce kerbside glass collection

Councils with the greatest improvement in recycling (2015/16)

↗ 14.7%

Richmondshire

↗ 8.6%

East Riding of Yorkshire

↗ 7.8%

Tameside

What some of the higher-recycling councils collect

	South Oxfordshire District (household recycling rate of 67% in 2015/16)	North Somerset (household recycling rate of 59% in 2015/16)	South Cambridgeshire (household recycling rate of 57% in 2015/16)
Food Waste Collection	Kerbside	Kerbside	Kerbside
Glass Jars & Bottles	Kerbside	Kerbside	Kerbside
Cartons (e.g. Tetra Paks)	Kerbside	HWRCs	Kerbside
Batteries	Kerbside	HWRCs	Kerbside
Textiles (clothes)	Kerbside	Kerbside	Recycling points
Food Trays	Kerbside	Not Yet	Kerbside
Plastic Bottle Tops	Kerbside	Not Yet	Kerbside

"If there is one way of quickly extinguishing the value in a material, it is to stick it in an incinerator and burn it. It may give you energy out at the end of the day, but some of those materials, even if they are plastics, with a little ingenuity, can be given more positive value. One thing that worries me is that we are taking these materials, we are putting them in incinerators, we are losing them forever and we are creating carbon dioxide out of them, which is not a great thing...I think that incineration is not a good direction to go in."

- Professor Ian Boyd, Chief Scientific Adviser, Department for Environment, Food and Rural Affairs (January 2018). *Oral Evidence: The Work of Defra's Chief Scientific Adviser*, HC 775

"Burning waste takes materials out of the circular economy, releases carbon into the atmosphere and may have negative health effects... Burning recyclable materials perpetuates our linear economy model of take-make-dispose and further depletes our natural resources... Investing in more EfW [incineration] can negatively affect long term recycling rates...incineration should not be exempt from London's ambition to improve air quality. It is therefore essential that London burns less organic and plastic waste, as well as recyclable materials."

- London Assembly Environment Committee. *Energy from Waste report* (February 2018)

"Reducing the waste sent to energy from waste plants (incinerators) by recycling more plastic and converting more food waste into biogas can also help reduce overall emissions...The successful delivery of a low cost, low carbon energy and waste system requires...encouraging more recycling, and less waste incineration."

- National Infrastructure Commission. *National Infrastructure Assessment* (July 2018)

