Tolvik's fifth annual report on the UK Energy from Waste (EfW) sector brings together data from a range of sources into a single document. Following engagement with the Environment Agency, Environmental Services Association and individual EfW operators, there is a clear movement towards increased standardisation in reporting (largely via the Annual Performance Reports (APR) prepared by operators in accordance with permit requirements). To some extent 2018 represents a transition period between the new reporting systems and the old.

For the first time, it is reported on compliance, including emissions to air. Previously analysis was excluded from the report due to data uncertainty; but here too there has been movement, in England at least, towards consistent reporting. Given the significance of emissions to stakeholders, there is merit to further develop this area of analysis in subsequent editions of this report.

This year references to gate fees have been excluded as this will be subject to a separate report planted to be released later in 2019.

As previously, the focus of this report is upon conventional moving grate EfWs and Advanced Conversion Technology (ACT) facilities generating energy from the combustion of Residual Waste. Residual Waste is defined as non-hazardous, solid, combustible mixed waste which remains after recycling activities. This definition is a little broader than that for Municipal Waste but primarily includes wastes falling within European Waste Catalogue (EWC) 19 12 10, 19 12 12 and 20 03 01. The report continues to exclude EfW facilities in Jersey and the Isle of Man, cement kilns and facilities solely processing Waste Wood or other biomass wastes.

Copies of this report can be downloaded via www.tolvik.com. Third parties are entitled to freely use the contents of the report, subject to appropriately acknowledging its source.
1. Summary observations

- In 2018 the tonnage of Residual Waste processed at EfWs in the UK was up 5.6 % to 11.5 Mt;
- At the end of 2018, there were 47 EfWs operational or in late commissioning and 15 EfWs in construction. The long term projected EfW capacity based on EfWs which were operational or in construction increased during the year by 0.9 Mt when compared with 2017. The increase was a result of a combination of new projects and increases in consented capacity at existing facilities;
- In preparing this report we have identified a number of market themes.

Poor turbine reliability
The stand out operational issue for 2018 was that total power export was unchanged on 2017 despite increased inputs. This was due to at least 6 EfWs experiencing significant turbine difficulties during the year. The key question is whether this poor reliability was a blip or part of a longer term trend.

Challenges around commissioning and early operations for new technologies and less experienced operators
EfW inputs in 2018 were significantly lower than we projected in the 2017 report. This was due to significant commissioning delays on a number of projects.
As at January 2019, the 3 ACTs which commenced construction in the period 2012 to 2014 had an average construction period of 63 months with an average delay to takeover of 19 months. For the 6 EfW/ACT starting construction in 2015 the equivalent figures were an average 42 months construction with an average of 17 months delay. We believe it is highly likely that there will be project failures in 2019, if nothing else as a result of the exhaustion of construction phase cashflows.

Build it and they will come ….?
In the last 12 months, 2 EfWs reached financial close where the project was based on a long term Residual Waste supply contract with an aggregator (for whom underlying contracts are typically relatively short term). This suggests strong investor confidence in the project’s future waste sourcing strategies.

Optimisation initiatives are progressively increasing capacity
For the 15 EfWs which became fully operational in the period 2012 to 2017, on average 2018 Residual Waste inputs were 4.4 % higher than the average over the preceding 3 years.

Increased focus on managing the calorific value of waste feedstocks
The composition of Residual Waste in the future will depend on how individual Local Authorities respond to DEFRA’s Waste and Resources Strategy [5]. Whilst on average across all operational EfWs material year-on-year changes in calorific value are unlikely, smaller EfWs dependent on a limited number of Local Authority suppliers for their tonnage could be adversely impacted.
Existing consents (both planning and permits) will continue to be increased

Permits and planning consents continue to be increased for existing EfWs – by as much as 20 % over the original consented capacity, reflecting operational optimisation and providing EfW operators with additional flexibility.

Cyclical pattern of EfW construction

New orders for EfWs seem to follow 3 yearly cycles, 2012/13, 2015/16 and based on the last 9 months activity, 2018/19. This can create a challenge for specialist contractors with multiple projects at a similar stage of development and commissioning.

Efficiency and heat in focus

Operators continue to seek heat offtake opportunities and export continues to rise steadily. The most recent example being Wilton 11 which exported 100 GWh of heat. Our expectation is that this will continue but with specific exceptions in the near term industrial heat solutions are likely to be the more deliverable.

Incineration tax will increasingly become a subject of debate

Hansard’s record of parliamentary affairs recorded 9 references to Incineration tax in 2018, compared to nil during the preceding 3 years. By end of March 2019 there were 5 references. The debate will no doubt continue.

2. Market overview

The EfWs falling within the scope of this report are listed in Appendix 1.

(Website version)

As at December 2018 there were 42 fully operational EfWs in the UK, with a further 5 EfWs accepting waste during the year as part of late stage commissioning. As a result, total Headline Capacity was 13.48 Mtpa. At the same time there was a further 3.37 Mtpa of EfW capacity either in construction or about to commence construction. The 6 % increase in total Headline Capacity in 2018 was a result of 4 EfWs reaching financial close during 2018 together with modest increases in consented capacity at several operational EfWs.

<table>
<thead>
<tr>
<th>Year</th>
<th>Mtpa</th>
<th>Fully Operational</th>
<th>In Late Stage Commissioning</th>
<th>Total Headline Capacity</th>
<th>In Construction</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>6.77</td>
<td>1.65</td>
<td></td>
<td>8.42</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2015</td>
<td>8.87</td>
<td>1.21</td>
<td></td>
<td>10.08</td>
<td>4.16</td>
<td>14.24</td>
</tr>
<tr>
<td>2016</td>
<td>10.48</td>
<td>1.28</td>
<td></td>
<td>11.76</td>
<td>4.16</td>
<td>15.92</td>
</tr>
<tr>
<td>2017</td>
<td>11.85</td>
<td>0.41</td>
<td></td>
<td>12.26</td>
<td>3.64</td>
<td>15.90</td>
</tr>
<tr>
<td>2018</td>
<td>12.41</td>
<td>1.07</td>
<td></td>
<td>13.48</td>
<td>3.37</td>
<td>16.85</td>
</tr>
</tbody>
</table>
Figure 3 shows the capacity-weighted average age of UK EfWs. 2018 was the second consecutive year in which there was an increase in the overall average age, reflecting that as the total EfW capacity in the UK increases, the impact of newly operational EfWs on the average age is proportionally less significant.

It is worth noting that 1.24 Mt of Headline Capacity was built in the 1970’s with the next oldest EfW reaching its 25th operational anniversary this year.

3. Waste inputs

In 2018 a total of 11.49 Mt of Residual Waste was processed in UK EfWs, an increase of 5.6 % on 2017. Not unsurprisingly, as in 2017, the rate of growth has continued to slow down from the 2013 – 16 peak.

Total inputs were the equivalent, for EfWs operational throughout the year, to 91 % of the total Headline Capacity – not dissimilar to the figure for previous years.

The role of EfW in the UK residual waste market

In 2018 it is estimated that Residual Waste inputs to EfWs in the UK represented 41.8 % (2017: 39.5 %) of the overall UK Residual Waste market.

It was projected in the 2017 report that 2018 would see the tonnage of Residual Waste sent to EfW in the UK exceed the tonnage sent to landfill – however this proved not to be the case as a result of the commissioning challenges faced by a number of EfWs during the year (see Section 1).

It is estimated that in 2018 RDF Exports from the UK declined by around 8 % when compared with 2017.
Based on a detailed review of APRs for 2018 and Wastedataflow [7] for 2017/18, it is estimated that in 2018 82.4 % of all EfW inputs were derived from Residual Local Authority Collected Waste (LACW) with the rest being Commercial and Industrial (C&I) Waste.

The continued (albeit modest) increase in C&I Waste inputs reflects the development of merchant EfW capacity in the UK.
Input by EWC codes

According to available data, 68.7% of inputs to EfW in 2017 (the last year for which data was available) was unprocessed Municipal Waste with a further 30.5% of inputs being Residual Waste arising after prior treatment.

Table 3: Inputs by EWC

<table>
<thead>
<tr>
<th>year</th>
<th>EWC code</th>
<th>20 03 xx</th>
<th>19 12 10 or 19 12 12</th>
<th>other codes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td></td>
<td>68.7</td>
<td>30.5</td>
<td>0.8</td>
<td></td>
</tr>
</tbody>
</table>

Net calorific value of residual waste

There was very limited reporting of Net Calorific Value (NCV) in the 2018 APR and this data was insufficient to provide any evidence of meaningful trends.

Tolvik’s most recent analysis of operator NCV data (from a variety of sources, some of which was under confidentiality) relates to 2017. This data suggested that the average NCV for Residual LACW in 2017 was 8.9 MJ/Kg and for Residual C&I Waste was 11.0 MJ/Kg. As previously reported, there is a very wide range of results and so these averages need to be treated with caution.

Operator market shares

In 2018 Veolia and Viridor had the greatest market share by operator based on input tonnages. There has been no material change in market shares since 2017.

![Operator market shares diagram]

Figure 6: 2018 share of input tonnage (include joint ventures)
4. Energy

The total power exported by EfWs in the UK in 2018 was 6,153 GWh – approximately 1.9% of total UK generation. Despite a 5.6% increase in Residual Waste inputs in 2018, major turbine issues at 6 operational EfWs means that the total power export showed little change on 2017. As a consequence, in 2018 the average power generated per tonne fell to 536 kWh/t.

Table 4: 2018 power generation

<table>
<thead>
<tr>
<th>Year</th>
<th>Est. gross power generation GWh</th>
<th>net power export GWh</th>
<th>parasitic load (excl. power import) %</th>
<th>parasitic load (incl. power import) %</th>
<th>average net power export kWh/tonne input</th>
<th>net heat export GWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>3,936</td>
<td>3,368</td>
<td>14.4</td>
<td></td>
<td>468</td>
<td>N/A</td>
</tr>
<tr>
<td>2015</td>
<td>5,460</td>
<td>4,636</td>
<td>15.1</td>
<td></td>
<td>549</td>
<td>554</td>
</tr>
<tr>
<td>2016</td>
<td>6,120</td>
<td>5,214</td>
<td>14.8</td>
<td>15.3</td>
<td>516</td>
<td>730</td>
</tr>
<tr>
<td>2017</td>
<td>7,146</td>
<td>6,187</td>
<td>13.4</td>
<td>14.2</td>
<td>569</td>
<td>865</td>
</tr>
<tr>
<td>2018</td>
<td>7,074</td>
<td>6,153</td>
<td>13.0</td>
<td>14.0</td>
<td>536</td>
<td>1,112</td>
</tr>
</tbody>
</table>

Notwithstanding these challenges, for those EfWs reporting in the APR, parasitic loads (expressed as a percentage of total power generation) continued the steady improvement in efficiency seen in recent years.

Figure 7: Power generation from EfW

Figure 8: Average power generation

Power: Benchmarking

For each EfW, for which data was reported, Figures 9 and 10 show the distribution of the average net power exported per tonne of input and the average parasitic power load for the year.
With an average 536 kWh/t generated per tonne of waste input in 2018 (2017: 569 kWh/t), across all EfWs the output ranged from Bolton with no power exported during the year to 906 kWh/t. Ferrybridge FM1 once again by some margin delivered the highest figure which in part reflects its feedstock (solely RDF with a higher NCV), optimised design and the fact that it does not export heat.

Data on parasitic loads in 2018 was less readily available than in 2017 but for those EfWs which reported loads ranged between 8.9 % (Severnside) and 20.0 % (Leeds which uses power for other onsite activities) with an average of 13.0 %.

![Figure 9: 2018 net power exported per tonne of input](image1)

![Figure 10: 2018 parasitic load distribution](image2)

### Beneficial heat use

In 2018 10 EfWs in the UK exported heat for beneficial use alongside power with an estimated total export of 1,112 GWh_th. (2017: 865 GWh_th). Across all EfWs this was the equivalent of 97 kWh_th/tonne of inputs (2017: 80 kWh_th/tonne).

<table>
<thead>
<tr>
<th>EfW</th>
<th>Est. export GWh_th</th>
<th>Heat/Steam offtake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runcorn</td>
<td>408</td>
<td>steam supply to Ineos</td>
</tr>
<tr>
<td>Eastcroft</td>
<td>332</td>
<td>enviroenergy for electricity generation and hot water</td>
</tr>
<tr>
<td>Sheffield</td>
<td>112</td>
<td>district heating operated by Veolia</td>
</tr>
<tr>
<td>Wilton 11</td>
<td>100</td>
<td>adjacent Wilton International site</td>
</tr>
<tr>
<td>Devonport</td>
<td>59</td>
<td>adjacent naval dock yard</td>
</tr>
<tr>
<td>Gremista</td>
<td>40 (est)</td>
<td>district heating on the Shetland Islands</td>
</tr>
<tr>
<td>SELCHP</td>
<td>38</td>
<td>district heating operated by Veolia</td>
</tr>
<tr>
<td>Coventry</td>
<td>11</td>
<td>district heating operated by Engie</td>
</tr>
<tr>
<td>Leeds</td>
<td>8</td>
<td>district heating operated by Vital Energi</td>
</tr>
<tr>
<td>NewLincs</td>
<td>3</td>
<td>to industry (produced 17GWhth but limited demand)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,112</strong></td>
<td><strong>865</strong></td>
</tr>
</tbody>
</table>

Source: APR
TONS OF ENERGY!

ENERGY GENERATION FROM RESIDUES: EFFICIENT & ECO-FRIENDLY.

Energy costs are continually rising. Making it all the more important for companies and municipalities to explore cheaper fuel alternatives for their energy supply.

We are experts in them: household and commercial waste, industrial residues and refuse derived fuels. And for many years now, we have been proving how they can be used in thermal recycling processes to produce useable energy for generating electricity, process steam and district heat.

For more information and references, visit:
www.standardkessel-baumgarte.com
Joint Forces

Integrated Power Generation Solutions

Mitsubishi Hitachi Power Systems Europe supplies up-to-date, efficient products. We construct most modern power plants and Waste-to-Energy plants. And we deliver reliable and cost-effective service solutions. Our green technologies – in energy storage and biomass, for instance – are examples for our innovation capabilities. Intelligent power generation solutions require know-how and experience. Mitsubishi Hitachi Power Systems has them both – making us a globally successful energy plant constructor and service provider.

www.emea.mhps.com
Efficiency and R1

As at January 2019 across the UK 28 EfWs (67 % of the number of operational EfWs, 79 % of the Headline Capacity) were accredited as R1 (Recovery) operations.

No Scottish EfWs were reported as being R1 accredited.

5. Operations

In 2018 EfW availability, based on average operational hours for each EfW, fell to 87.3 %, due to two smaller facilities having availability below 40 %. A new measure has been introduced in this report, the capacity weighted availability, which acknowledges that it is often more challenging to maintain high availability at smaller EfWs. In 2018 this was 89.8 % – largely unchanged from previous years.

As Table 6 shows IBA and APCr produced per tonne of input waste have fallen modestly in recent years.

Table 6: Operational data

<table>
<thead>
<tr>
<th></th>
<th>Availability-hours</th>
<th>Input tonnage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Simple average</td>
<td>Capacity weighted average</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>2014</td>
<td>89.0</td>
<td>89.2</td>
</tr>
<tr>
<td>2015</td>
<td>88.3</td>
<td>88.7</td>
</tr>
<tr>
<td>2016</td>
<td>90.2</td>
<td>90.3</td>
</tr>
<tr>
<td>2017</td>
<td>88.6</td>
<td>89.3</td>
</tr>
<tr>
<td>2018</td>
<td>87.3</td>
<td>89.8</td>
</tr>
</tbody>
</table>

Source: APR

Figure 11: Average EfW availability-hours

Figure 12: Trend in IBA outputs
Availability

MFE, operator of Ferrybridge FM1, had the highest reported average operator availability whilst Veolia’s Portsmouth had the highest availability for an individual facility of 98.5 % in 2018.

Viridor’s average as reported in Table 7 was adversely impacted by Bolton (22 % availability following major fire in late 2017). Excluding Bolton, Viridor’s average would have been 89.0 %.

With the exception of two EfWs – Bolton and Milton Keynes ACT, all others EfWs had an availability in excess of 75 %.

Outputs

_Incinerator bottom ash_

In 2018 IBA accounted on average for 19.9 % (2017: 20.1 %) of all waste inputs. In total, the tonnage of IBA generated was 2.3 Mt.

IBA outputs expressed as a percentage of waste inputs generally fell within the 11 % – 25 % range, with Allington, as a fluidised bed facility, once again reporting the lowest percentage. Almost all IBA is now recycled rather than landfilled.
**air pollution control residue**

In 2018, APCr generation was 3.3 % of waste inputs (2017: 3.4 %).

The total generation of APCr in 2018 was reported to be 378 kt, an increase of circa 5 % on 2017. Allington, as a large fluidised bed EfW once again produced the greatest portion of APCr as a percentage of inputs.

In 2017 it was estimated that around 20 % of APCr was recycled. Figures for 2018 are not currently available.

**Consumable use**

The level of data reporting relating to the use of consumables – specifically water, lime (or other alkaline reagents), urea and carbon in the APR continues to rise. Data is generally calibrated to *Specific Usage* i.e. usage per tonne of input and this is the approach taken in this report.

To date there have been no discernible trends across UK EfWs, in part because, as Table 8 shows, consumable use varies greatly from facility to facility, and changes in the mix of facilities impacts on the overall UK performance.

**Table 8: Specific consumable usage (where reported)**

<table>
<thead>
<tr>
<th>Consumable</th>
<th>Unit</th>
<th>Year</th>
<th>Low</th>
<th>Median</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total water usage (both potable and non-potable)</td>
<td>m³/tonne input</td>
<td>2016</td>
<td>0.05</td>
<td>0.29</td>
<td>2.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2017</td>
<td>0.03</td>
<td>0.24</td>
<td>2.66</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2018</td>
<td>0.06</td>
<td>0.28</td>
<td>3.54</td>
</tr>
<tr>
<td>Activated carbon or coke</td>
<td>kg/tonne of input</td>
<td>2016</td>
<td>0.03</td>
<td>0.30</td>
<td>1.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2017</td>
<td>0.06</td>
<td>0.25</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2018</td>
<td>0.05</td>
<td>0.26</td>
<td>0.60</td>
</tr>
<tr>
<td>(Hydrated) lime or sodium bicarbonate</td>
<td></td>
<td>2016</td>
<td>3.92</td>
<td>9.87</td>
<td>30.91</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2017</td>
<td>1.87</td>
<td>9.74</td>
<td>31.88</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2018</td>
<td>1.82</td>
<td>9.80</td>
<td>23.90</td>
</tr>
<tr>
<td>Urea</td>
<td></td>
<td>2016</td>
<td>0.04</td>
<td>1.83</td>
<td>3.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2017</td>
<td>0.62</td>
<td>2.36</td>
<td>4.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2018</td>
<td>0.01</td>
<td>1.54</td>
<td>3.39</td>
</tr>
<tr>
<td>Ammonia</td>
<td></td>
<td>2017</td>
<td>0.62</td>
<td>2.36</td>
<td>4.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2018</td>
<td>0.56</td>
<td>1.70</td>
<td>4.13</td>
</tr>
</tbody>
</table>

Source: APR, 34 records
6. Compliance

Background

This section of the report is new for 2018. Compliance in the EfW sector is a combination of operator self-monitoring, reporting to and monitoring by the relevant regulator (EA, SEPA, NRW and NIEA).

EfWs, like most large industrial installations, are required under EU and UK law to monitor their emissions to air both continuously (on site) and periodically (by sample sent to an accredited laboratory). Emissions to water and composition of ash residues are also monitored at regular intervals.

General permit compliance (as measured in England by the OPRA score) is assessed by the regulator whilst operators are now being requested to include details of abnormal operations in their APR. In this context abnormal operations are defined as any technically unavoidable stoppages, disturbances, or failures of the abatement plant or the measurement devices, during which the emissions into the air and the discharges of waste water may exceed the prescribed maximum Emission Limit Value (ELV).

To date the focus of compliance has typically been at a facility level, but there is an increasing stakeholder interest in the performance of the UK EfW sector as a whole.

Emissions to air – continuous monitoring by EfWs

The data presented in this section relates to 37 of the 42 EfWs fully operational during 2018 – or the equivalent of approximately 92 % by 2018 inputs in the UK. Data on the remaining EfWs was not provided as part of regulator responses to a Freedom of Information Act request. Across all continuously monitored substances, on average in 2018 emissions were 28 % of the ELV (2017: 31%).

![Average specific consumable usage (where reported)](source: APR, 34 records)
The emission levels of Hydrogen Chlorides (HCl), Sulphur Dioxide (SO₂) and Oxides of Nitrogen (NOₓ) are controlled by the dosing rate of consumable reagents (see Section 5). Typically in the UK, operators look to optimise resource consumption against achieving emissions levels within the specified ELV.

**Emissions to air – periodic assessments**

EfW permits also specify the type and frequency (usually bi-annually) of sampling to be undertaken of various specific substances emitted.

Figure 20 shows the results of these periodic assessments in 2018 those EfWs reporting data ranging between 3 % and 14 % of the ELV. Operators advise that measurement uncertainty, limits of detection for small samples and impact of background pollutant levels can all affect the analysis, but that the protocols used by the sector should be such that reported results are effectively a worst case.
Abnormal operations

39 of the 42 fully operational EfWs reported the cumulative hours, per line, of abnormal operations during 2018 with an aggregated total of 130 hours - just 0.02% of cumulative operating hours across all lines during 2018.

Operational risk assessment (OPRA) scores

All permitted facilities have an OPRA score or equivalent provided by the relevant regulatory authority. A score of A represents the best assessment. Using the latest available data for 2017, the previous steady improvement in OPRA scores appears to have been somewhat reversed.

7. Capacity development

Based on EfWs which were operational or in construction as at December 2018, Section 2 identifies a Headline Capacity of 16.85 Mt. Headline Capacity is not suitable for projecting future EfW capacity in any analysis of the UK Residual Waste market; this is more appropriately measured by the Operational Capacity. It is estimated (based upon the EfWs listed in Appendix 1 (of website copy), that by 2023 the UK Operational Capacity will be 16.9 Mt. This reflects an increase of 1.2 Mt from the 2017 projection as a result of additional projects reaching financial close and increases in capacity at existing operational facilities.
EfW in development – additional capacity

The actual Operational Capacity beyond 2023 will be dependent upon the development of additional EfWs. Tolvik’s databases (which are a representation of the market but cannot be guaranteed to be comprehensive), show 16.3 Mt of Headline Capacity which either is seeking planning consent, have planning consent or for which planning consent has been refused but some form of appeal/new submission is expected.

55 % of this potential additional EfW capacity has planning consent.

Just over a third of the potential additional capacity is being developed by those who are already active in the UK EfW market – either as an operator or as a funder, a further 7 % is supported by international EfW operators whilst the remainder (> 50 %) is being developed by parties with no prior experience in the EfW sector.
Appendix: International benchmarks

As in previous years, this report has pulled together the latest available published EfW data from other northern European countries for the purposes of a comparison with the UK EfW market. There will be differences in the categorisation of EfW facilities and in the calculation/measurement methodologies applied, but it is hoped that the data provides a useful high-level overview of some key operational metrics.

<table>
<thead>
<tr>
<th>Country</th>
<th>Data year</th>
<th>Reported inputs</th>
<th>Associated capacity</th>
<th>Inputs of head-line capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>2017</td>
<td>6.15</td>
<td>6.51</td>
<td>94.5</td>
</tr>
<tr>
<td>Denmark</td>
<td>2015</td>
<td>3.58</td>
<td>3.79</td>
<td>94.5</td>
</tr>
<tr>
<td>Germany</td>
<td>2017</td>
<td>23.49</td>
<td>24.38</td>
<td>96.3</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2017</td>
<td>7.63</td>
<td>8.20</td>
<td>93.0</td>
</tr>
<tr>
<td>UK</td>
<td>2018</td>
<td>11.49</td>
<td>12.61</td>
<td>91.0</td>
</tr>
</tbody>
</table>

* (data fra 2015) Forbrænding

As Figure 27 shows, whilst in the UK EfWs are largely focussed on electricity export, in most other European markets energy is exported through a mix of power, hot water and steam.

The UK’s figures for IBA, APCr and metal outputs are broadly in line with the rest of Europe.
8. Data sources


[2] APR either provided by operators or released under the Freedom of Information Act
  EA: Contains public sector information licensed under the Open Government Licence v3.0
  NIEA: Contains public sector information licensed under the Open Government Licence v3.0
  NRW: Contains Natural Resources Wales information © Natural Resources Wales and database right
  SEPA: Contains SEPA data © Scottish Environmental Protection Agency and database right
  2018. All rights reserved


Glossary

ACT Advanced Conversion Technology
APCr Air Pollution Control residue
APR Annual Performance Reports
C&I Commercial and Industrial Waste
EA Environment Agency
EfW(s) Energy from Waste (facilities)
ELV Emission Limit Value
EWC European Waste Catalogue
Headline Capacity The maximum annual throughput contained within the Environmental Permit except where an operator has publicly reported an alternative figure.
IBA Incinerator Bottom Ash
Kt (pa) ‘000s tonnes (per annum)
LACW Local Authority Collected Waste
Mt (pa) Million tonnes (per annum)
NIEA Northern Ireland Environment Agency
NCV Net Calorific Value
NRW Natural Resources Wales
OPRA Operational Risk Assessment
RDF Refuse Derived Fuel
Residual Waste Solid, non-hazardous, combustible waste which remains after recycling either treated (in the form of an RDF or SRF) or untreated (as black bag waste).
SEPA Scottish Environmental Protection Agency

Contact Person

Chris Jonas
Tolvik Consulting Ltd
Director
The Old Vicarag, Fairmead
GL11 5JR Cam, Dursley
Gloucestershire
UNITED KINGDOM
+44 1934712005
chris@tolvik.com