

## Energy Efficiency

At the time the original audit was completed in 2012 there was only three months energy usage data for the solid recovered fuel (SRF) manufacturing plant in Building 3, which had been commissioned in September 2011. This process was the most intensive consumer of electricity at the facility and resulted in an increase from, 37,575 kW/hr to 147,800 kW/hr per month.

In 2012 there was a fire in Building 3 where the SRF manufacturing plant was housed. This led to temporary cessation of SRF manufacture and a reduction in the annual waste inputs. The SRF manufacture was relocated to Building 1, while Building 3 was refurbished. The manufacture of SRF recommenced in Building 3 in 2013. In addition there has been a major expansion of staff numbers in the customer service call centre, with total numbers increasing from 60 to 99.

A summary of the resource consumption in 2011 and 2016 is presented in Table 1. There are separate electricity meters for the electrical waste processing plant in Buildings 1, 2 and 3, and the administration building and lighting. Gas oil usage is linked to the type of waste processing, with the handling of C&D and C&I waste being more energy intensive than the SRF.

Summary details of the energy consumption rates reported in the 2011 and 2016 energy audits are presented in Table 1.

**Table 1 Energy Consumption 2011 and 2016**

Year	Gas Oil (litres)	Electricity Waste Processing (kW/hr)	Electricity Admin/Other (kW/hr)	Annual Tonnage
2011	278,492	1,029,894	607,387	169,906
2016	248,167	4,438,375	534,907	178,088

Given the changes that have occurred between 2011 and 2016, in particular the installation of the energy intensive SRF manufacturing plant, it is not possible to accurately assess any changes in energy efficiency over that period based on the data in the respective energy audit reports.

In this context the Agency requested a breakdown on energy consumption at the installation for 2011 through to 2016 and this is presented in Table 2. To allow an assessment of overall energy usage at the installation between 2011 and 2016, the gas oil has been converted to kWhr, combined with the total electricity consumption and this figure used to estimate energy usage /tonne of waste processed the installation.

**Table 2: Energy Consumption 2011 to 2016**

Year	Gas Oil (litres)	Electricity (kWhr)	Gas Oil (kWhr) <sup>1</sup>	Total kWhr
2011	278,492	1,639,760	2,938,091	4,577,851
2012	270,400	2,175,710	2,852,720	5,028,430
2013	290,365	2,376,430	3,063,351	5,439,781
2014	238,714	3,306,590	2,518,433	5,825,023
2015	244,147	4,053,660	2,575,756	6,629,416
2016	248,167	4,973,282	2,618,168	7,056,543

While the 2011 and 2106 audits broke out the electricity usage into that consumed by the waste processing plant and separately by admin/lighting, such a breakdown is not available for 2012 to 2015. Therefore the electricity usage for those years includes that consumed by both waste processing and administration.

The primary driver of energy use at the installation is expected to be tonnes of waste processed. All other things being equal tonnes processed is expected to have a partial proportionate impact on electricity use (in addition to fixed use associated with offices, lighting etc) and diesel.

The 'per tonne' figure, termed Energy Performance Indicators (EnPI), provide a useful way of benchmarking against past performance at a facility where there has not been any significant changes in activities. They also allow benchmarking between facilities that conduct similar activities against each other to identify well performing facilities, and to focus on seemingly poor performers to implement efficiency improvements.

EnPIs were calculated for the 2011 to 2016 period and these are presented in Table 3. The diesel EnPI for 2016 is lower than in 2011, however the electricity EnPI increased as a result of the installation and operation of the SRF manufacturing plant.

There are no Irish waste industry benchmarks with which to compare energy use/tonne processed. Nurendale carried out a survey of the waste management facilities in the Panda Green Group, where energy audits had been completed based on 2015 data, to determine if there was one that was generally comparable to the operations carried out at Beuaparc. The results are presented in Table 4. None of the facilities has a similar configuration to the Beuaparc installation.

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**Table 3 Energy Performance Indicators Beuparc (W0140-04)**

Year	Gas Oil (litres)	Electricity (kW/hr)	Oil/kW/hr	Total kW/hr	Tonnage	Electricity EnPI (kWh/Tonne)	Diesel EnPI (kWh/Tonne)
2011	278,492	1,639,760	2938091	4,577,851	169,906	9.65	17.29
2012	270,400	2,175,710	2852720	5,028,430	154,784	14.06	18.43
2013	290,365	2,376,430	3063351	5,439,781	125,618	18.92	24.39
2014	238,714	3,306,590	2518433	5,825,023	130,507	25.34	19.30
2015	244,147.50	4,053,660	2575756	6,629,416	164,076	24.71	15.70
2016	248,167.54	4,973,282	2618168	7,591,450	178,088	27.93	14.70

<sup>1</sup> Cv of Oil = 10.55 kWh/l

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Table 4 Energy Performance Indicators Materials Recovery Facilities

Installation	Waste Processes	Tonnage	Electricity EnPI kWh/Tonne	Diesel EnPI kWh/Tonne
<b>Sligo (W0058-01)</b>	Baling Recyclables: Baling MSW Paper Shredding: Baling Recyclables: MSW Transfer	25,433	2.4	7.8
<b>Millennium (W0183-01)</b>	Confidential Paper Shredding and Baling Commercial Cardboard Baling Municipal Solid Waste(MSW)Storage and Transfer	101,288	9.2	6.2
<b>Fassaroe (W0053-03)</b>	Dry Mixed Recyclables Processing C&D/C&I Processing Municipal Solid Waste(MSW) Storage and Transfer	157,676	10.1	14.1
<b>Greenogue (W0188-01)</b>	Transfer Station	54,971	1.2	8.5
<b>Limerick (W082-03)</b>	Cardboard Baling Municipal Solid Waste(MSW) Storage and Transfer	89,555	1.7	10.1
<b>Waterford (W0177-03)</b>	MSW Transfer Station Skip Maintenance	20,922	3.4	7.4
<b>Sarsfieldcourt (W0136-03)</b>	C&I and C&D Transfer Station Municipal Solid Waste(MSW) Shredding, Processing and Baling	85,802	3.4	38.5