

Pembrokeshire, UK



Figure 1 The Municipality of Pembrokeshire. Map data: Google, CNES / Airbus, Data SIO, NOAA, U.S. Navy, NGA, GEBCO and TerraMetrics.

This summary presents the main conclusions of one of the regional case studies conducted during the COLLECTORS project. The studies included a life cycle assessment, a cost-benefit assessment, and a circularity assessment. Social aspects were analysed on a general level based on information provided by the municipality and using focus group discussions in different European regions. References to original research reports are provided at the end of this document.

The case studies were focused on collection of three specific categories of WEEE, namely small household appliances, information technology (IT) equipment and lamps. These categories were selected as high quantities of these materials are still ending up in residual waste.

Description of the region

Pembrokeshire is a coastal county in the south-west of Wales and therefore part of the UK, with around 125,000 citizens living on 1,590 km², i.e. 79 inhabitants/km². In Wales, the GDP per capita amounted to £19,002 (Pembrokeshire County Council, 2019).

Wales follows UK legislation in terms of recycling and waste collection. The United Kingdom in turn follows the European WEEE directive introduced in 2012 on WEEE collection (European Commission, 2012). The directive introduced the “Producer Responsibility” principle, obliging producers (importers, producers, retailers) to have a capture rate of 85% (based on the average of electrical and electronic equipment put on the market in the last three years) or 65% of electrical and electronic waste produced that year by 2025. In addition, they are to be financially responsible for at least the transport of WEEE from the communal collection points to the sorting facilities.

WEEE collection system

The collection system in Wales follows the “Municipal Sector plan collections blueprint” from 2011. It was a result of the “Towards zero waste”-initiative which aims at making Wales a waste-free country by 2050. The blueprint contains non-obligatory guidelines on how best to organize the collection system.

The collection of WEEE in Pembrokeshire is not organized via a Producer Responsibility Organisation (PRO); no WEEE is collected from households directly. REPIC is the contracted PRO for the region and is in charge of bringing the waste from the collection points to the material recovery plants. The collection points categorize the items according to their treatment method. REPIC hires a company that picks up the equipment and brings it to a dedicated treatment facility. Producers pay for collection and treatment costs based on the amount of EEE they put on the market by category. Residents are obliged and encouraged to bring their potential electronic waste to one of the eight collection sites. Some of the collection sites offer repair or second-hand shops where certain products can be fixed and resold, or donated to a charitable organization. Take back schemes with retailers are also available. In the UK however, the retailers have the option to opt out.

Extra pick-up service can be requested online on the local government website. This is especially used for the white goods such as for example, washing machines and refrigerators. Also, in case of incapability of the householder to bring the items to the collection point (due to age or disability), a direct in-house collection service can be requested directly from the community via an online account, or via a telephone call to the Pembrokeshire Remakery.

Actions to improve collection

The capture rate of small WEEE, IT and lamps have increased in the last couple of years by more than 30%. Investments into school education programs, research and development funding, as well as public awareness campaigns (“Don’t bin it, bring it”) have likely contributed to this increase. These programs have been established in cooperation with WRAP, a charity organization dedicated to improving circular economy (My Recycling Wales, 2018). Recently, reuse centres such as “The green shed” and “Pembrokeshire Remakery” have been built.

Material flows in the region

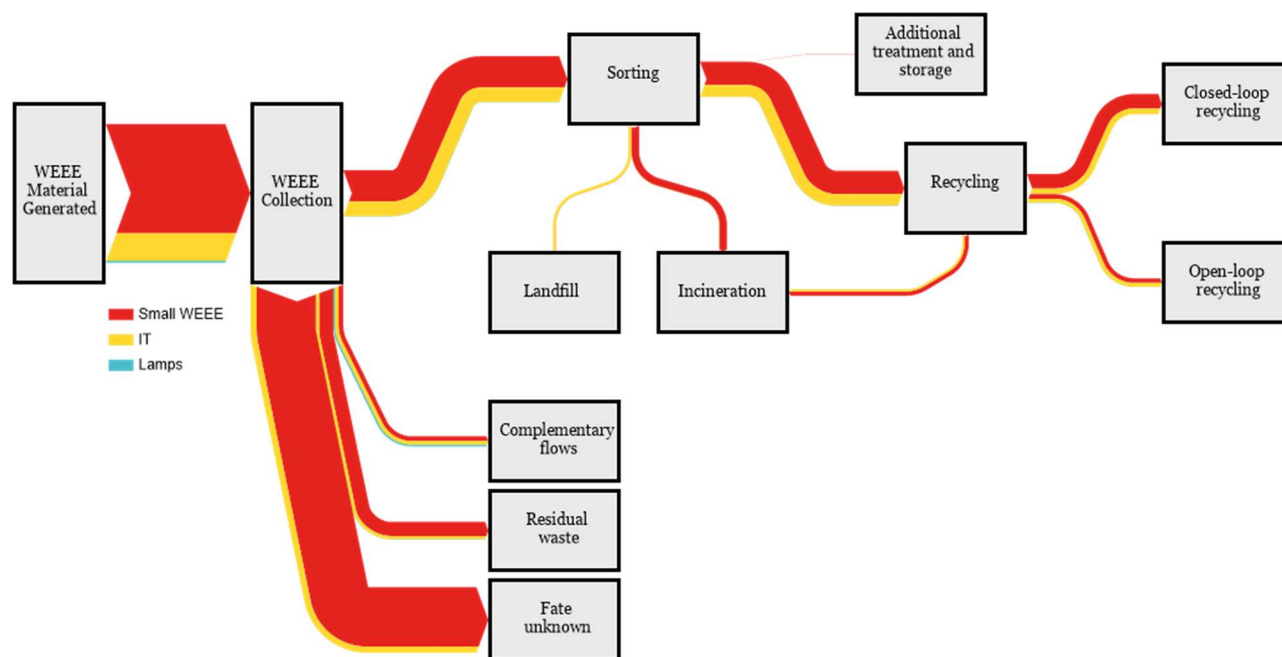


Figure 2 Material flows in the municipality of Pembrokeshire reflecting the situation after improvements (Source COLLECTORS D3.3)

The material flows in Pembrokeshire are presented in Figure 2. The municipality of Pembrokeshire reported to have collected an estimated 399 tonnes and 589 tonnes of small WEEE in 2013 and 2018 respectively, meaning that the capture rate for small WEEE increased from 32% to 40% in this timeframe. An estimated 201 tonnes and 276 tonnes of IT equipment were collected in these years with a capture rate of 46% and 59% respectively. An estimated 3.5 tonnes and 3.8 tonnes of lamps were collected, with a capture rate of 9.1% and 11% respectively. Of the WEEE that is not collected by a designated WCS, 70% of WEEE has an unknown fate. It is believed that the improvements made during this time are in part due to local campaigns run by REPIC. In July 2018, “Green Shed” reuse centres opened; whilst it is unclear if these centres made an impact to the results over the assessed period, it is thought that these should increase collection rate of small WEEE, IT & lamps in the coming years. Pembrokeshire also increased the efficiency of transportation by 15% during this period.

Findings from environmental assessment

In most cases, the production of the constituent materials of electrical and electronic equipment is the largest contributor to the environmental impacts of the WEEE. However, in some cases the disposal is the most important factor. The environmental impacts associated with collection and sorting of WEEE is only a small portion of the overall environmental impact for each assessed environmental impact category (ranging between 0.01-0.8% for small WEEE, 0.6-2.6% for IT

equipment and 2.6-8.9% for lamps). When comparing the assessed WEEE categories, lamps have the lowest environmental impacts, and IT equipment has the highest impacts except for the marine eutrophication potential (MEP) impact category, in which highest impacts were related to small household appliances.

There were some difficulties in assessing the environmental benefits related to increasing capture rates of WEEE. This relates to the fact that the fate of large shares of the assessed WEEE categories is still unknown. Evaluating impacts from re-use was not within the scope of the project, but it was assumed that directing functional devices to re-use could create significant environmental benefits. However, in order to include these benefits in system level assessment, the amount of re-used devices should be known.

Findings from economic assessment

Assuming the operational costs have not increased due to the implementation of the new WEEE collection system, we can assess the cost effectiveness of the investment. By investing € 104,238 between 2013-2018, the Welsh government was able to increase the collection rates of SHA and lamps significantly (see graph in introduction). Assuming 2013 as reference year, with 742 tons of SHA and 3.5 tons of lamps collected, the 2018 collection values show an increase in collection numbers of 122.96 tons of SHA and 0.30 tons of lamps. Taking the investments between 2013 and 2018, we find a price of € 845.68/ton of additional WEEE collected. It is important to note that collection, transport and processing costs are not included in this cost-effectiveness calculation.

For more information, please see

D2.4 Report on solutions for tackling systemic and technical boundary conditions. Available at: <https://www.collectors2020.eu/results/analysis-of-boundary-condition/>

D2.5 Report on implemented solutions and key elements in selected cases for societal acceptance. Available at: <https://www.collectors2020.eu/wp-content/uploads/2020/06/Collectors-Deliverable2.5.pdf>

D3.2 Report on the economic and financial performance of waste collection systems. Available at: https://www.collectors2020.eu/wp-content/uploads/2020/04/Deliverable3.2_COLLECTORS-project-1.pdf

D3.3 Report of recommendations for improvement of single systems and optimum operation conditions. Available at: <https://www.collectors2020.eu/results/environmental-impact/>



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