Reimerswaal, The Netherlands

Figure 1. The municipality of Reimerswaal. Map data: Google, SIO, NOAA, U.S. Navy, NGA and GEBCO.

Construction and demolition waste (CDW) is one of the heaviest and most voluminous waste streams generated in the EU and as such, the European Union has identified it as a priority waste stream. It accounts for approximately 25% - 30% of all waste generated in the EU and consists of numerous materials, including concrete, bricks, gypsum, wood, glass, ceramics, metals, plastic, solvents, asbestos and excavated soil, many of which can be recycled. In this case study, the focus was on collection and management of gypsum waste produced by the municipality.

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. References to original research reports are provided at the end of this document.

Copyright © 2020 COLLECTORS PROJECT

Description of the region

Reimerswaal is a municipality in the province of Zeeland in the south-western Netherlands on Zuid-Beveland, named after the lost city. The municipality had a population of 22,432 in 2017, and has a surface area of 242 km^2 of which 140 km^2 is water. The municipality of Reimerswaal was established in 1970, from the aggregation of the municipalities Krabbendijke, Kruiningen, Rilland-Bath, Waarde, and Yerseke.

CDW collection system

The municipality is responsible for the collection and management of household waste and has this outsourced to private scheme The Zeeuwse Reinigingsdienst (ZRD). ZRD does the collection of all household waste (residual, organic, plastics and beverage cartons) as well as the management of all the CAS in Zeeland, where all CDW materials are collected. ZRD operates the CAS in Reimerswaal and 12 other CAS in the province. The scope of the economic assessment is the operation of ZRD in the municipality Reimerswaal.

ZRD collects about 25 separate waste streams at the CAS, amongst which are gypsum, wood, bricks and concrete, glass, plate glass, hard plastics, metals, and many more. Within this case study, the assessment was focused on recycling of gypsum waste.

Actions to improve collection

The actions are defined as the separate collection of the specific waste streams at the CAS and the subsequent transport to a dedicated recycling facility. The cost, benefits and savings from other waste streams collected at the CAS are not included in the assessment.

Gypsum waste is collected on every CAS in Zeeland (except for Kapelle). ZRD focusses on collecting clean gypsum waste, free from contamination, such as tiles and wood. The flow scheme for gypsum waste collection in Reimerswaal is shown in the Figure 2 below. Gypsum that is not collected is assumed to be disposed of in road filling and or sanitary landfills.

Copyright © 2020 COLLECTORS PROJECT

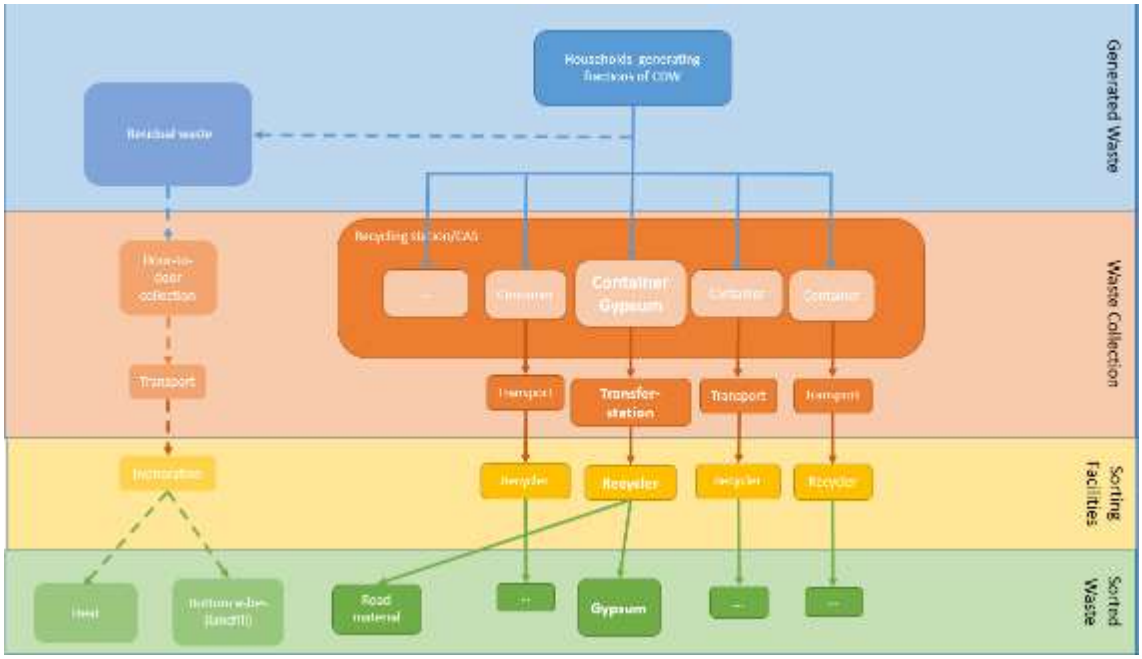

Figure 2. Flow scheme of CDW collection at CAS and corresponding recycling in Reimerswaal.

After collection in a separate container, all gypsum waste from ZRD is transported to their CAS in Middelburg from where it is transported to New West Gypsum Recycling in Kallo near Antwerp. It is essential that the recycled gypsum achieves a pre-determined quality suitable for the manufacturing of new gypsum products. Presently there is no standard pre-determining the recycled gypsum's quality and the criteria vary from plant to plant. By choosing closed loop recycling, the need for manufacturers to acquire virgin gypsum is reduced. The most advanced plants have substituted up to 30% of virgin gypsum raw materials with recycled gypsum.

Findings from environmental assessment

Recycling gypsum yields considerable environmental benefits for all environmental impact categories analysed in this study. However, recycling gypsum is also associated with notable environmental impacts, mainly due to the energy requirements in the recycling process.

In the case of gypsum, important environmental benefits are associated with a closed-loop recycling of these materials. However, these are partially offset by the additional energy and material inputs required during the recycling processes (this is strongly related to the environmental impacts of the energy mix and thus in the future, with an increased share of renewables, we expect the impact linked to the recycling processes to decrease). Transport is also an important source of environmental impacts when managing CDW wastes due to their weight, particularly compared to PPW and WEEE. Thus, while we find that there are generally rather large environmental benefits associated with the reuse and recycling of CDW, it is important to

Copyright © 2020 COLLECTORS PROJECT

1) identify the best options for reuse and recycling using an LCA approach (preferring reuse whenever possible and considering in parallel economic and social drivers), and

2) balancing the optimal reuse and recycling options with transport as to not transport the material too far.

Findings from economic assessment

It can be concluded that with a limited investment, ZRD managed to implement a financially viable practice for separate collection and recycling of gypsum waste in Reimerswaal. For waste collectors such as ZRD, it is financially more attractive to dispose gypsum waste at gypsum recyclers, as shown in Table 1 below. This is caused mainly by the high 'hypothetical' landfill tariff and low recycling gate fee. The values in the table are calculated based on 2018 figures.

Table 1. Evaluation of Odense results

Total investment	**€ 3.000**
Investment per inhabitant	€ 0,13 per inhabitant
Total disposal cost recycling bricks	€ 55,02 per ton
Total disposal cost landfill bricks	€ 121,30 per ton

Copyright © 2020 COLLECTORS PROJECT

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/

COLLECTORS
WASTE COLLECTION SYSTEMS ASSESSED AND GOOD PRACTICES IDENTIFIED

www.collectors2020.eu

Disclaimer

The sole responsibility of this publication lies with the author. The European Union is not responsible for any use that may be made of the information contained therein.

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 776745