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Report on urban metabolism analysis of lighthouse cities and regions

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1. Executive summary

This report provides an overview of basic waste information of the HOOP lighthouse cities and regions (LHC/Rs). It applies the Urban Metabolism concept as basis for the collection and analysis of the data on waste collection and treatment that were provided by the various project partners. Additional data have been collected from urban, regional, national and international sources where appropriate. The report provides a basic overview of the way food, wood and water are supplied to LHC/Rs, and how waste materials are collected and treated. Data refer to 2019, unless stated otherwise, in order to avoid the effect of the COVID-19 pandemic on data.

The eight HOOP LHC/Rs are home to 2.8 million inhabitants. Together, they generate over 1.1 million ton of mixed municipal waste (excluding imports), containing 317 kton of biowaste. Separately collected biowaste amounts to 147 kton (excluding post-consumer wood) plus 66 kton post-consumer wood. Average generation of biowaste, excluding wood, amounts to 149 kg per person per year which is in the range of the European average of 168 kg provided by the European Environment Agency. From the 1.7 million tons food supplied to the LHC/Rs, an average of 21% becomes food waste.

In terms of treatment of biowaste, incineration dominates in Almere, Bergen Region, Greater Porto Region and Kuopio. Murcia and Western Macedonia treat the mixed waste in a similar way, composting the organic fraction after mechanical sorting and landfilling the fractions that cannot be further valorised. Anaerobic Digestion (AD) of selectively collected food waste is prevalent in half of the LHC/Rs, especially in Kuopio and Münster.

Mixed urban waste contains a considerable amount of organic matter that often is not valorised. The share of OFMSW in total biowaste (excluding wood but including selectively collected food and garden and park waste) is very variable, ranging from very low values (6.2%), in cities with high collection rate, to very high (96.3%) in cities where selective collection of biowaste is still not fully implemented, being the average 56.1%.

The eight HOOP lighthouse cities and regions generate and import nearly 518 kton of biowaste as part of mixed municipal waste and separately collected biowaste. Half of this quantity is composted (258.6 kton or 50 %). Nearly 41 % (214.0 kton) is incinerated. Some 40.0 kton (7.7%) is treated through AD with or without composting and 5 kton (1.0 %) is used in material recovery. No landfill of biowaste has been reported.

It is not easy to obtain reliable data on wastewater generation. Water treatment often is organized for several cities, covering different numbers of people as do the cities and regions in the project. Often, the regions covered are larger (Albano) or different than the LHC/Rs (i.e. municipalities in Greater Porto Region). In total, 247 million m³ of treated wastewater have been reported. More than 150 kton of urban wastewater sludge (UWWS) is recovered from the treatment plants. This is often fed to AD or composting facilities. High use of sewage sludge has been reported in some LHC/Rs through AD and in others by means of agricultural uses, besides composting.

It is concluded that the LHC/Rs included in the HOOP project are a representative sample of the way waste is generated and treated in the EU. They show considerable scope for improved waste valorisation. Large differences are, however, found between the individual LHC/Rs.