

# Environmental and economic footprint of Know-as-you-Throw

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RETHINKING MUNICIPAL TARIFF SYSTEMS TO IMPROVE URBAN WASTE GOVERNANCE



## Goal and scope

The goal is to assess the life-cycle environmental and economic performance of Know-as-you-Throw (KAYT) in four pilot sites: Sant Just Desvern (Spain), Bassano (Italy), Varese (Italy), and Bitetto (Italy). The scope covers the management of unsorted, organic, light packaging, paper and cardboard, and glass household waste in the pilot areas in 2019 (baseline) and in 2022 (after the implementation of KAYT) from a cradle-to-grave perspective. The system boundary includes all activities related to waste management until its final disposal, including secondary waste transport and administrative and other services. The modelling is based on consequential thinking, including substitution of by- and co-products and marginal supply of products. The impact assessment is done using the Stepwise2006 method which includes 18 impact categories including global warming.

## Life cycle inventory analysis

Foreground data has been collected directly from the corresponding project partners from March 2020 to September 2022. Background data is obtained largely from the life cycle inventory database Ecoinvent version 3.6. Missing service activities and some foreground activities not recorded in physical units are obtained from the input-output database EXIOBASE 3 hybrid. The effects of KAYT actions are measured by (1) Changes in the amount collected of unsorted and/or organic waste, and subsequent changes in the other fractions, (2) Changes in the characterisation of waste for all of the fractions under scope, and (3) Additional inventories related to the deployment of KAYT actions.

## Life cycle impact assessment

All pilots achieve notable reductions in total carbon footprint as well as other impact categories (see Figure 1 for an example) largely due to notable reductions in unsorted waste generation.

The economic efficiency of KAYT actions is high as notable reductions in environmental footprints are achieved with minimal investment and maintenance costs (see Figure 2). Sometimes overall costs are reduced, presenting a win-win opportunity (see Figure 3).

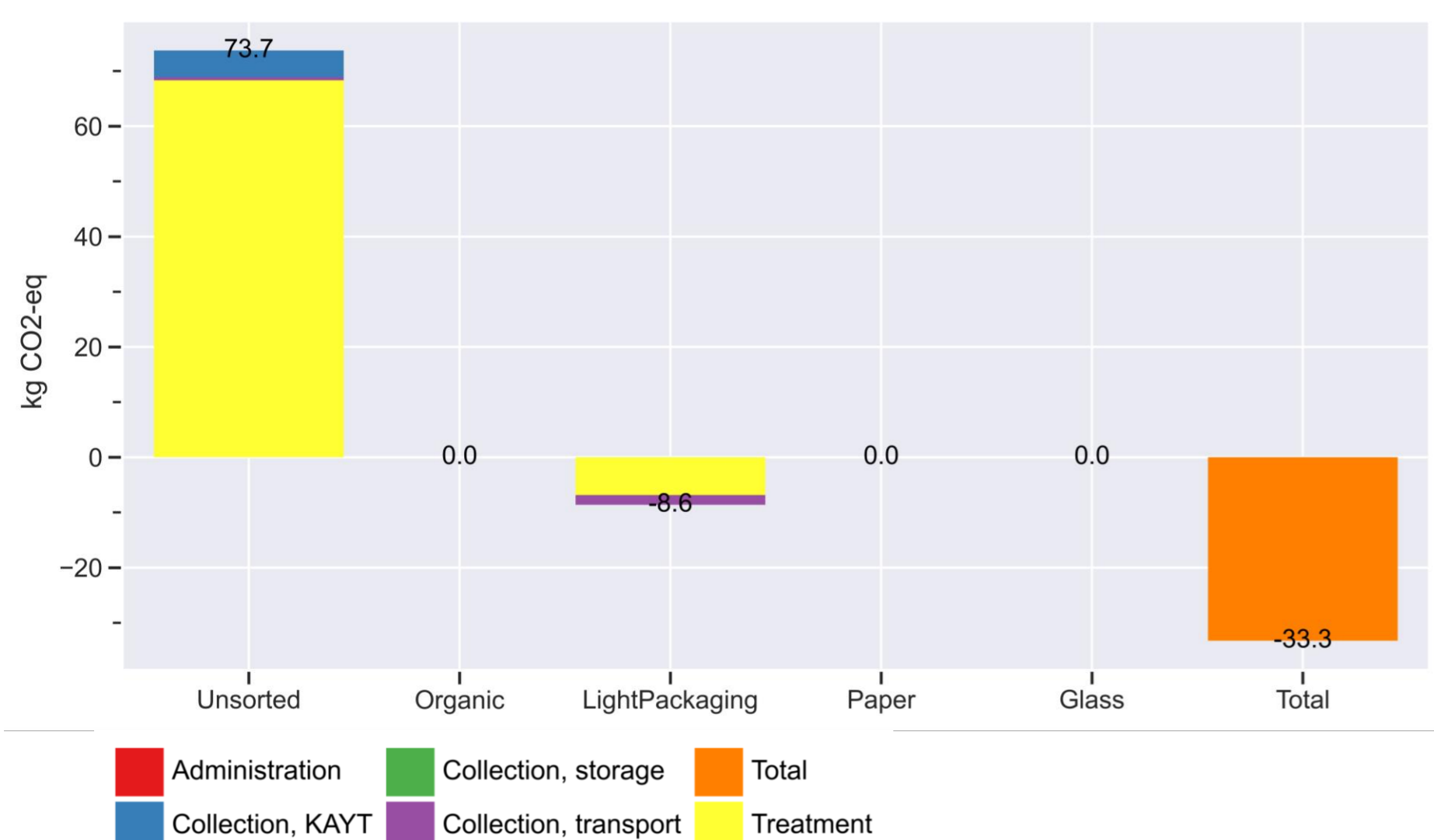


Figure 1. Difference in global warming impacts after KAYT in Varese, per ton of waste.

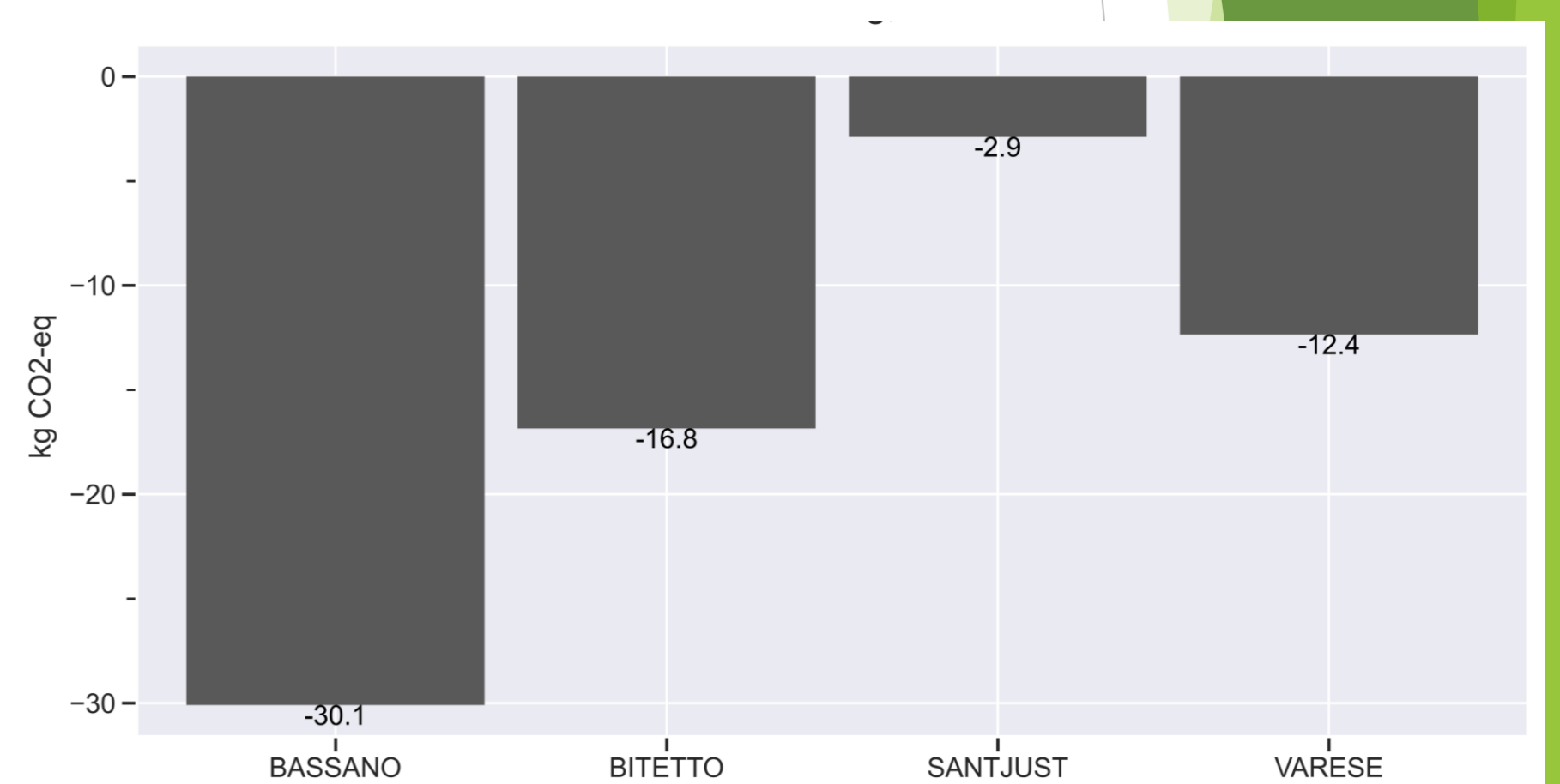


Figure 2. Economic efficiency of KAYT for global warming impacts, in euro/habitant per ton of total waste.

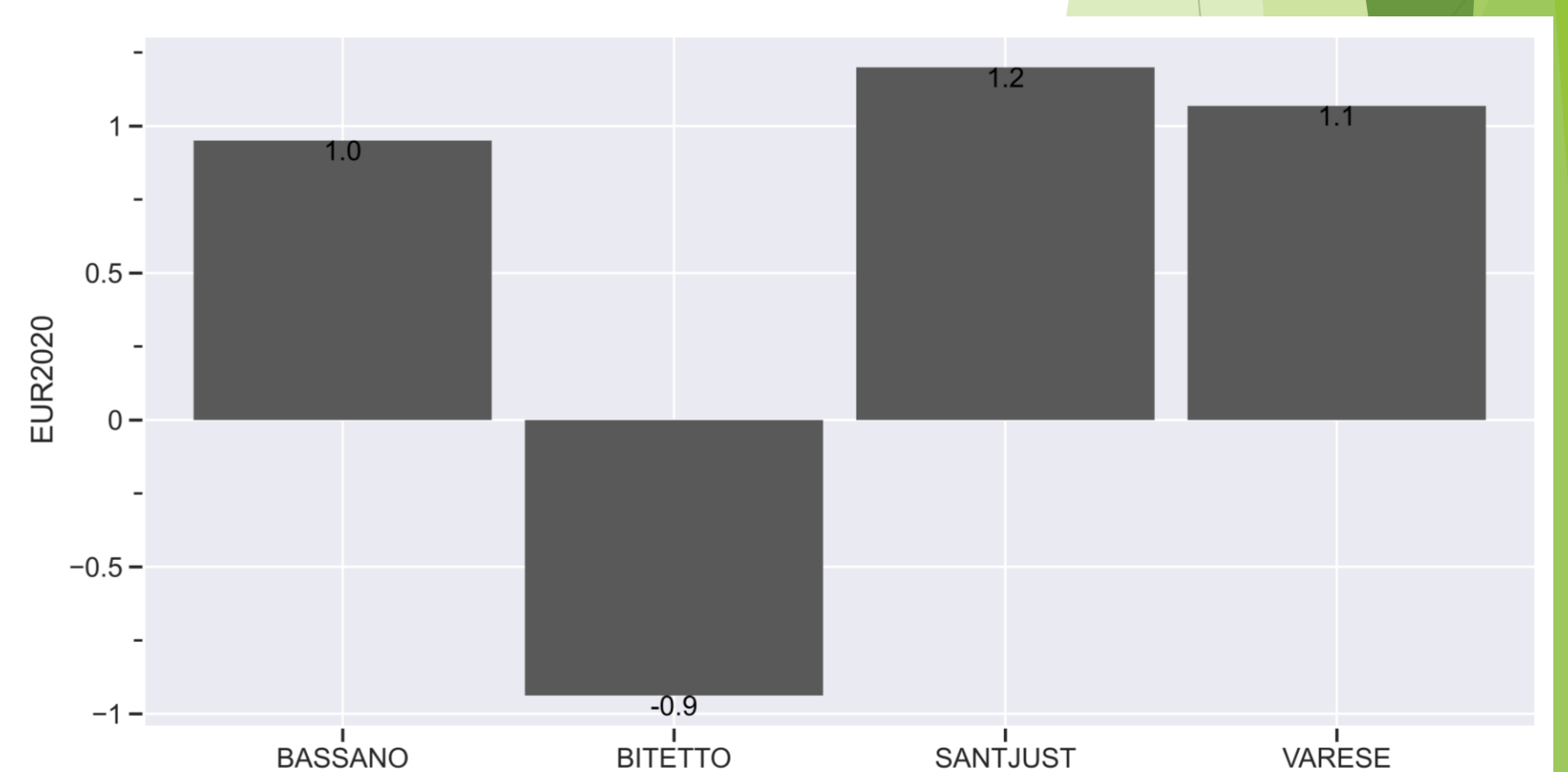


Figure 3. Economic efficiency of KAYT for economic costs, in euro/habitant per ton of total waste.

## Conclusions

The baseline results show a robust, detailed, comprehensive, and novel picture of the environmental and economic performance of the waste management systems of the four pilot areas. Key impact hotspots have been identified, thus facilitating cost-effective improvement actions. KAYT shows promising avenues to notably reduce the environmental footprint/cost of waste management without major investments and/or substantial changes in the waste management system. The best economic efficiency is achieved in combination with door-to-door collection schemes due to lower implementation costs and possibly due to higher citizen awareness and willingness to change.