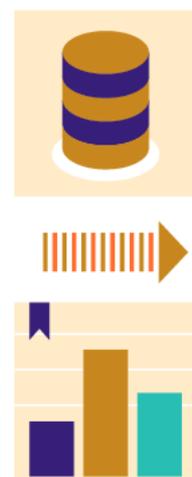




Summary of DRS for Re-cycling cost assessment in Italy

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INTRODUCTION

This document is an overview of a **study** of the **Bocconi University - Green** research centre commissioned by **CONAI** for the purposes of assessing the **costs** bound up with setting up a **Deposit Refund System for Re-cycling, DRS**, in **Italy** with a view to achieving the **recycling collection goals** set out in European Directive 2019/904 on reducing the environmental impact of certain plastics (**SUP**).

RECYCLING COLLECTION GOALS	2025	2029
Plastic beverage bottles < 3L	77%	90%

Specifically, the study looks at a hypothetical **plastic PET beverage bottle DRS for Re-cycling**, taking into account considerations such as effectiveness, efficiency and costs for the purposes of achieving the minimum standards set out in the Italian implementing legislation, Legislative Decree no. 196 of 8 November 2021.

METHODOLOGY

To proceed to an analysis of data and costs based on PET beverage packaging market release, separate collection and recycling forecasts, the methodology used is as follows:

- Gap Analysis of the divergence between current CONAI system performance and EU targets;
- Estimates of projected beverage packaging goods **put on the market** in the 2023-30 time frame;
- Estimates of projected beverage packaging **separate collection and recycling** in the 2023-30 time frame;
- Cost-benefit analysis for the setting up of a DRS for Re-cycling in Italy.

ASSESSMENT OF A DRS FOR THE ACHIEVEMENT OF RECYCLING GOALS

Commissioned by CONAI to the Bocconi University Green research centre, this **study** is for a hypothetical **DRS for Re-cycling** of plastic PET beverage bottles to be set up in Italy **based on an entirely new collection infrastructure using Reverse Vending Machines (RVM)**.

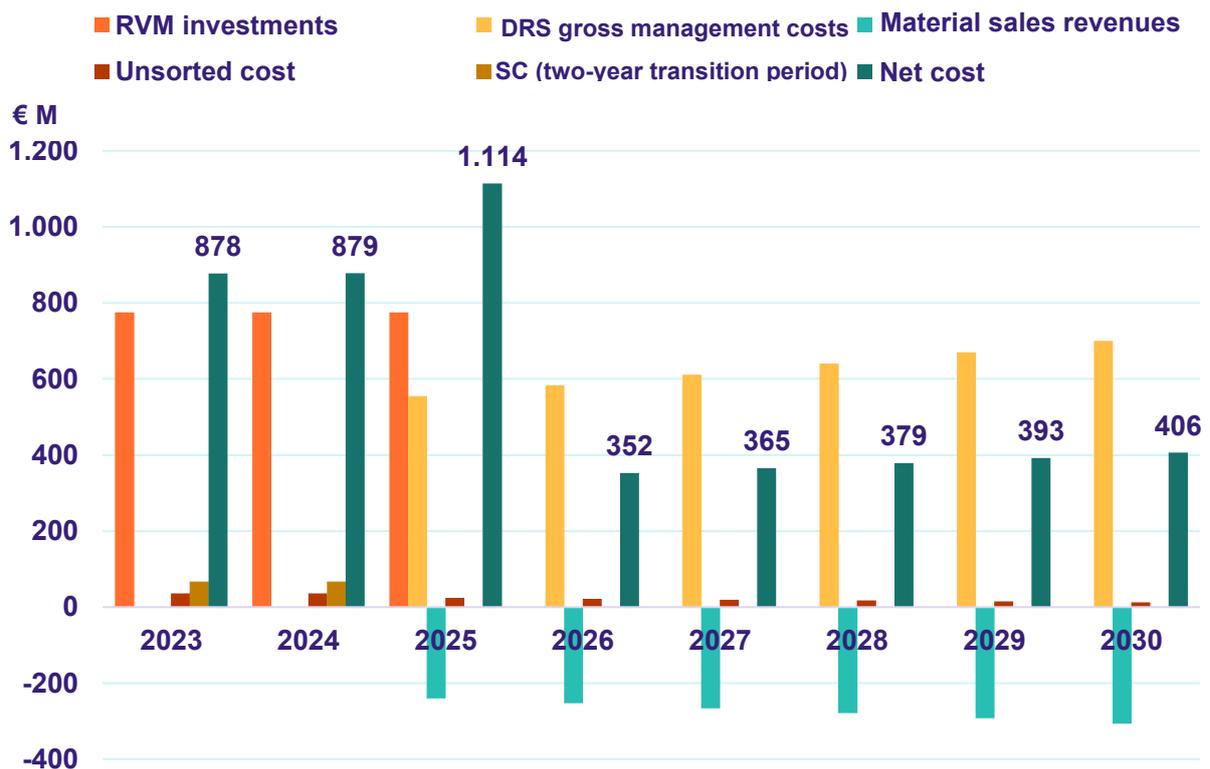
On the basis of **Italian and European data**¹, the study **hypotheses** are as follows:

¹ "Mapping of packaging return schemes in the EU"(2021) Egen-Pno study

- **450 kt of PET beverage bottles per year** put on the market on the basis of forecast data calculated in accordance with a yearly growth rate of 1% from 2023 to 2027;
- **average deposits of 15 to 25 Euro/cents**;
- **progressive average annual return rates of 75 to 90%** based on European data;
- an **RVM (Reverse Vending Machine) infrastructure** made up of **50% large machines** (0.5 tonnes/month) and **smaller machines** (0.2 tonnes/month), on the basis of a 20% daily operational performance;
- A **DRS set-up and launch period of 6 years** (amortisation first 3 years);
- system **administrative and management costs** based on **European** case studies;
- **transport costs** based on **national** RVM selective collection experiments;
- material **sales revenues** on the basis of **European average PET bale sale prices at auction**.

The graph below illustrates the **minimum costs shown by the study** needed for a plastic beverage bottle recycling DRS in Italy and **expressed independently of the forecasted scheme**:

DRS FOR RECYCLING OF PET BEVERAGE BOTTLES: COSTS



Source: Bocconi study - "Valutazione del DRS per raggiungere gli obiettivi di riciclo in Italia" (Assessment of the DRS for the achievement of recycling goals in Italy)

As the graph above illustrates, the **principal costs** of a DRS for Re-cycling in the **first three years** are:

- collection infrastructure (RVM) **investments**;

- **maintenance** of the **EPR** scheme for beverage bottle management up to the launch of the Recycling DRS in 2025.

The graph shows a **progressive increase in gross management costs and revenues** from the sale of materials **in subsequent years**.

The table below summarises the bottle packaging quantities, deposits, infrastructure investments and principal costs involved in setting up and maintaining a DRS for Re-cycling.

QUANTITIES, DEPOSITS AND COSTS INVOLVED IN SETTING UP A DRS FOR RECYCLING IN ITALY	
	Millions of tonnes
PET bottles	0.45
	Billions of €/year
Deposits managed	0.3-0.5/month
Unredeemed deposits	> 0.6
Investment in collection systems and infrastructure (6 years)	2.3
National IT system (6 years)	0.5-1
Management costs	0.4

Over a year, for an average quantity of around 450,000 tonnes of PET beverage packaging and taking account of the previous premises, the **deposits to manage** will be in the range of **€3.6 to 6 billion** with an **unredeemed deposit share of over €600 million**. In relation to the new collection infrastructure (RVM) investments will amount to approx. €2.3 billion while the costs involved in building an IT system for Recycling DRS management will be in the €500 million to 1 billion range. Estimates for yearly management costs for the system as a whole are approx. €350 million.

CONCLUSIONS OF THE STUDY

Setting up a DRS for Re-cycling to replace separate collection is an **expensive operation** as a result of the costs involved in building the infrastructure needed for around 100,000 Reverse Vending Machines across Italy.

Adding the investments to the operational costs bound up with managing a DRS results in average management costs of around **820 million €/year** or €13 per capita.

Economic analysis of the DRS are based on the hypothesis of funds deriving from deposits not being considered DRS operational revenues. The funds deriving from unreturned deposits can, however, offset net DRS costs when collection efficacy is in the region of **83 to 87%** and deposits range from **€0.15-0.25**. For this reason unreturned deposit management is a key element in DRS governance.



What is CONAI?

CONAI, the Italian National Packaging Consortium, is a private, non-profit consortium with around 760,000 members consisting of packaging producers and users. The CONAI system is a private sector response to a collective environmental challenge in accordance with the policies and goals set politically. CONAI works with Italian municipalities on the basis of specific individual agreements regulated by the ANCI CONAI Framework Agreement and constitutes a guarantee for citizens that materials from separate collection are fully used in appropriate recycling and recover processes.

