



RETHINKING MUNICIPAL TARIFF SYSTEMS
TO IMPROVE URBAN WASTE GOVERNANCE



PAYT systems and communication as tools to reach the recycling targets: ETRA and LIFE REthinkWASTE project

Circwaste Final Seminar
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Company Presentation



ABOUT ETRA



- **Etra is a multi-utility company with a totally public asset.**
- It serves more than **600.000 citizens.**
- Etra is owned by **70 Municipalities**, belonging to the Provinces of Padua, Vicenza and Treviso.
- Etra employs more than **1000** people.
- The main services Etra provides are **integrated water supply, waste management and renewable energy.**

THE TERRITORY

Morphology

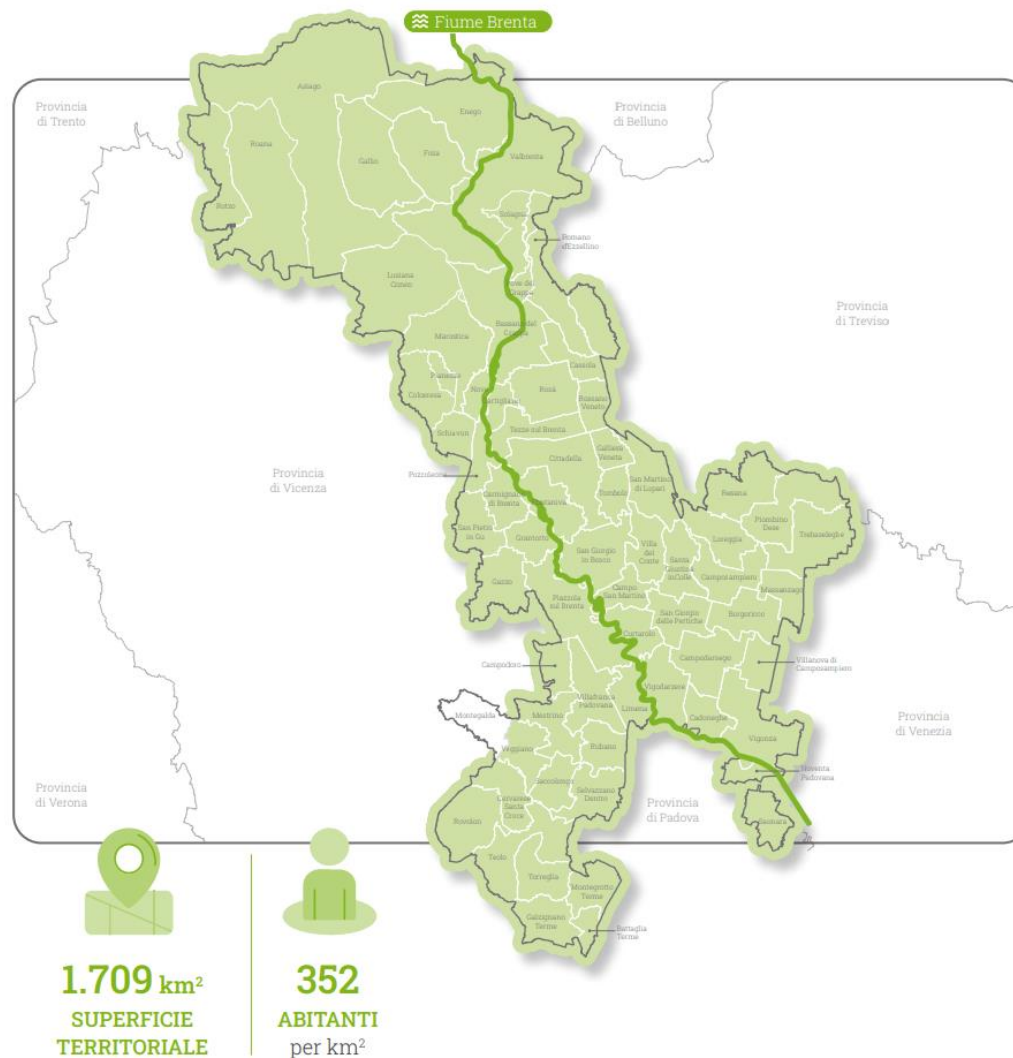
	%
Mountains	34%
Hills	14%
Plains	52%

Territory data

	Etra
Population	604,172
Surface extension km ²	1.709
Population density [inhabitants/km ²]	352
Number of Municipalities	69

Etra Municipalities size

	% Municipalities
Up to 3.000 inhabitants	13%
From 3.001 to 5.000 inhabitants	19%
From 5.001 to 10.000 inhabitants	35%
From 10.001 to 20.000 inhabitants	28%
From 20.001 to 30.000 inhabitants	4%
From 30.001 to 100.000 inhabitants	1%
More than 100.000 inhabitants	0%



SERVICES PROVIDED

Integrated Water Supply

Managing water supply
and sewer system
including mains, wells,
pumping plants and WWTPs.

Alternative Energy

Energy efficiency
Renewable energy production.

Environmental Services

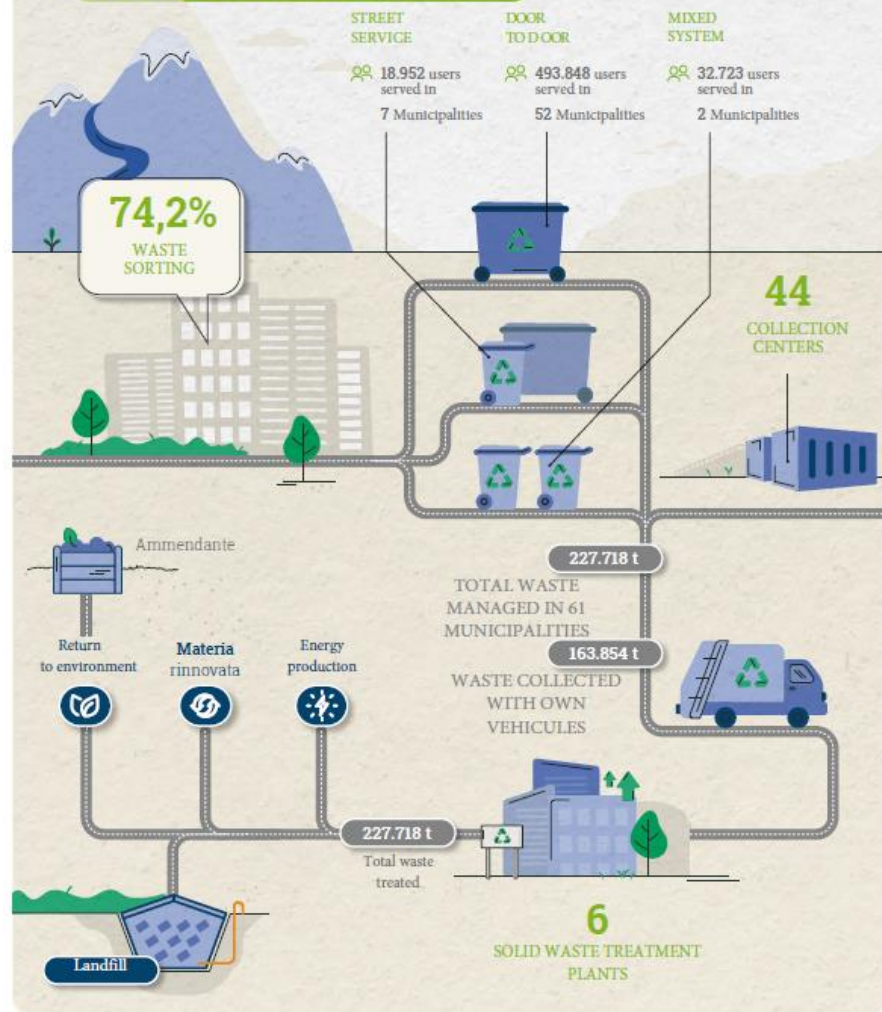
Managing the separated
waste collection.
Waste treatment plants.
Pest control.
Street cleaning.
Waste tariff

Services for Private Customers

Managing special waste.
Environmental remediation.
Environmental counseling.

INFRASTRUCTURE OF THE WASTE AND ENVIRONMENTAL HYGIENE SERVICE

The calculation of the percentage of separate collection was made according to the DGRV 288/2014 method (including domestic composting).



THE SERVICES - ENVIRONMENTAL SERVICES

545.523

INHABITANTS SERVED
to 31.12.2021



61

MUNICIPALITIES SERVED by
the Waste and Environmental
Hygiene Service

524.947

INHABITANTS WITH
ETRA TARIFF MANAGEMENT
to 31.12.2021



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The PAYT model applied by ETRA

What is PAYT?



PAYT = “Pay-as-you-throw”, accordingly to the *polluter-pays* EU principle

- PAYT foresees that users pay a fee based on the amount of waste actually produced by them and the services used.
- Thus providing incentives for the recycling of waste fractions and the reduction of unsorted waste.
- Increasing citizens' responsibility, PAYT's effect is to make waste prevention, reuse and better sorting more cost-effective.
- Transparency and fairness of tariffs also improve.

With the application of the PAYT scheme, two similar households (e.g. 3 people living in a 100 sqm house), but with very different behaviour and lifestyles, will pay different fees.

PAYT: results

PAYT schemes are in use for decades in many European countries. They are quite common in the Netherlands, Flanders (Belgium), Germany and, more and more, in France and Italy.

Compared to the flat rate, the PAYT tariff contributes to improve the results of separate collection (+ RECYCLING) and to reduce the production of the unsorted waste fraction

Thanks to PAYT, separate collection is more CONVENIENT and the fee is perceived as FAIRER by users.



PAYT in Etra's area

In Etra's territory PAYT has been introduced in some municipalities already since 2005:

- ▶ door to door collection in areas with medium population density (most of Etra's territory): **bins with microchips** for the unsorted residual waste;
- ▶ street containers collection in central areas or with high population density: **card with microchip** for opening press containers or controlled-opening containers.

The microchip enables the **association of the delivery with the user and the quantity of unsorted residual waste produced**. Allowing by this way the application of a tariff proportional with the actual production of waste accordingly to the EU 'polluter pays' principle



PAYT in Etra's area

Until today, each municipality maintained its own tariff structure. Generally speaking, the tariff structure is composed of:

- ▶ a fixed part to cover the common, general and indivisible costs of the service (e.g. sweeping, depreciation, provisions, ...)
- ▶ a variable part to cover the costs linked to waste production (e.g. collection, treatment, disposal, ...).



RETHINK
WASTE



PAYT in Etra's area: households



For domestic users:

- ▶ the **fixed part** is related to the **surface area of the house**
- ▶ the **variable part** is divided into:
 - ▶ a basic part calculated according to parameters depending on the number of components and including a certain number of emptyings of the residual unsorted waste (**proportional to the number of family members**).
 - ▶ An **additional charge is applied for each additional emptying**.



PAYT in Etra's area: business/commercial users



For business users fixed and variable part are both related to the **surface area of the house** according to parameters depending on different categories

To the basic variable fee is added a quota of extra charges, in response to requests for larger containers or higher collection frequencies.



Progress towards a standard tariff

The resolution 12/2022 of the Assembly of the Consiglio di Bacino Brenta, paved the way for the beginning of the **standardization process** of tariffs at area level.

Homogeneous tariffs were approved at area level for some types of service:

- ▶ **number of emptyings** of unsorted waste included in the basic variable tariff and the price of any additional emptying
- ▶ fee for the **door-to-door collection service for green and garden waste** in 120/240 litre bins
- ▶ fee for the **door-to-door bulky waste** collection service
- ▶ annual **limits and fees** for the disposal of the green, tyre and bulky waste fractions at the **Recycling Centre**



Evolution of PAYT for households

The target set by the Consiglio di Bacino Brenta is the convergence of tariffs towards a single tariff for the whole area, accordingly to the service provided.

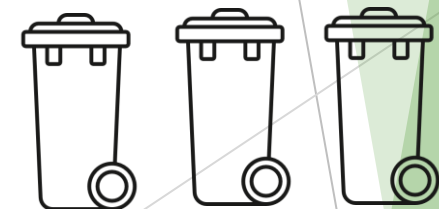
Many efforts and investments are planned in order to **offer the best service to all users**, although considering the specific territorial characteristics of the municipalities.

For domestic users, the current structure will be maintained, consisting of a fixed fee, a basic variable fee and an extra fee depending on the **additional emptying**.



The monitoring of deliveries for single **users in apartment blocks**, will be enabled by replacing the current containers with controlled ones opening only through identification card.

Furthermore, overcoming the PAYT based only on the measurement of unsorted residual waste by introducing a polynomial tariff based also on the **measurement of other waste fractions**, enabled by the provision of containers with tag-rfid for all fractions collected door-to-door.



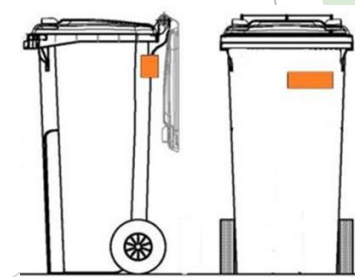
RFID tech for delivery reading: from handheld to on-board reader

Containers are equipped with a tag, featuring dual radio frequency identification (RFID) technology in LF.

To record the emptying of bins it is used a **handheld reader** able to record also georeferenced information in case.

Thanks to **on-board readers** trucks will be equipped with antennas and sensors, to **automatize the reading** and by this way reduce execution times and guarantee greater certainty of the data.

Thus, readings, today limited to the fraction of non-recyclable unsorted waste, can be extended to all fractions, resulting in an expansion of the database offering greater capacity for analysis.



Eco Card for access monitoring

Etra applies a method of access control to some services through a card given to the user.

This physical support allows the **user to be identified**, either through a barcode or through a chip with radio frequency identification (RFID).

We are moving towards a **progressive dematerialisation** of the support integrating the barcode into the app, or thanks to the mobile device identification technologies.



RETHINK WASTE



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REthinkWASTE: PROJECT OVERVIEW

PAYT – video animation



The contribution of Local Authorities to circular economy. The PAYT and KAYT approaches



PAYT

It stands for **Pay-as-you-throw** (i.e. 'pay for what you throw away'), the principle on which the **DYNAMIC TARIFF** is based. According to this scheme, the amount of the tariff is proportional to the quantity and quality of the waste produced by each user. As a result, this system provides **incentives** for the collection of recyclable waste and the reduction of unsorted waste. In Italy about 1,000 municipalities (with a total of over 7 million inhabitants) implement PAYT with remarkable results: in 2020, on average, their separate collection rate exceeded 80% and the average residual waste per capita was about 83 kg/inhabitant per year.



KAYT

It stands for **Know-as-you-throw**. It is an approach that relies on user's **INFORMATION** and **PERSUASION** to improve waste collection, and make use of the **big data** available thanks to the counting of waste delivered by each user. The main idea of KAYT is that the habits of waste producers towards separate collection can be orientated and improved simply by informing them in a **continuous, personalized and convenient way**, combining technology (messages via apps, gamification, etc.), one-to-one meetings with real informers and some economic and/or social rewards.

Project's objectives

- ✓ **Rethink** municipal tariff systems to improve urban **WASTE GOVERNANCE** through an innovative model based on the PAYT-KAYT approach
- ✓ Increase separate waste collection, reduce undifferentiated waste per capita and increase the recovery rate, and reduce tariffs for the most virtuous citizens
- ✓ **TEST** the KAYT (Know-as-you-throw) approach in some pilot areas, combining it with the PAYT (Pay-as-you-throw) scheme
- ✓ **Integrate the PAYT-KAYT paradigm** in the planning and governance tools of municipal waste management: Local Area Plans, municipal regulations
- ✓ **Support European local authorities** in the definition of new municipal waste management and pricing strategies, also by providing them with self-assessment and decision support tools



PAYT
“Pay-as-you-throw”



KAYT
“Know-as-you-throw”



Partnership

- Etra spa
- ARPAV Environmental Authority of Veneto Region
- ARS Ambiente Srl
- ATA Enviromental Local Authority Ancona
- Municipality of Bitetto (BA)
- Municipality of Varese (VA)
- IFEL Financial Entity for Local Authorities



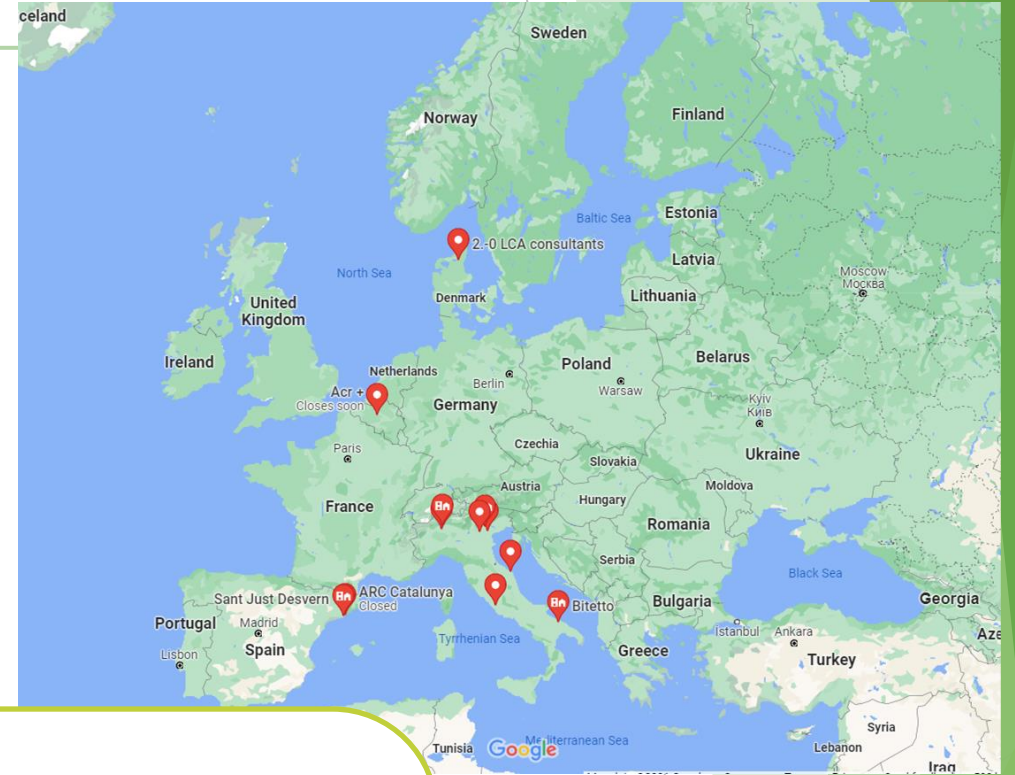
- ARC Regional Agency for Waste management
- Municipality of Sant Just Desvern



- ACR+ Association of Cities and Regions for Sustainable Resource Management



- 2.0 LCA consultants

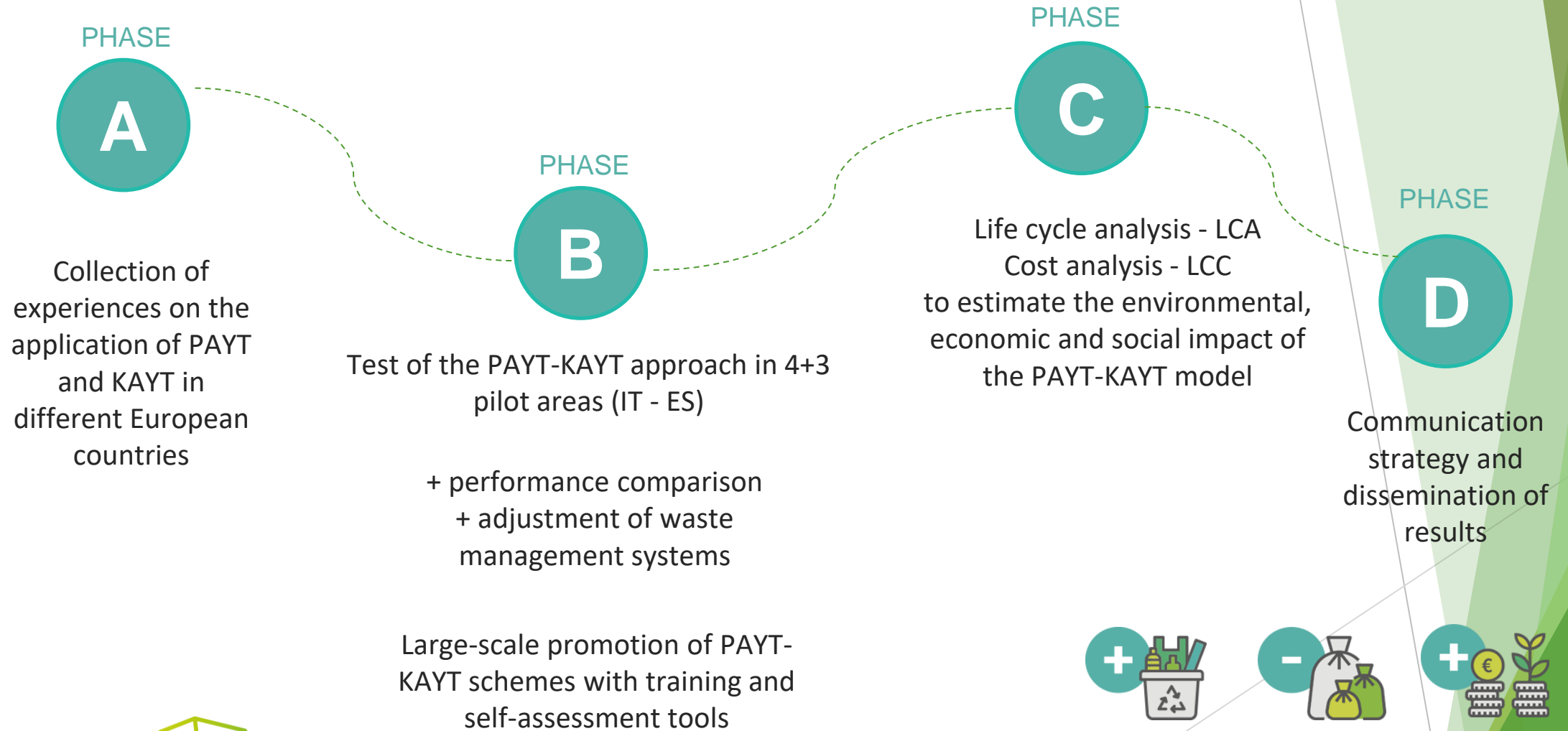


11 partners, 4 EU countries

- ▶ 4 +3 pilot areas
- ▶ 3 Regional Authorities
- ▶ 1 National Network
- ▶ 1 European Network
- ▶ 2 Technical experts

Budget € 2,764,715
UE funding € 1,520,588
July 2019 – January 2023

Project's phases and activities



KAYT – REthinkWASTE approach



The pilots of the REthinkWASTE project tested, for one year, the innovative KAYT approach to promote **COLLABORATIVE AND PARTICIPATIVE BEHAVIOUR** of users, in order to improve recycling collection.

Combining the **ECONOMIC LEVER**, i.e. the dynamic tariff (PAYT), with **INFORMATION** (KAYT), sending Whatsapp, Telegram and SMS messages to improve user awareness and participation.



Different backgrounds of KAYT pilots

	San Just Desvern - Catalunya, Spain -	Varese - Lombardy, Italy -	Bassano del Grappa - Veneto, Italy -	Bitetto - Apulia, Italy -
Main collection system:	street containers (with e-card)	door-to-door	door-to-door with record of user deliveries	door-to-door with record of user deliveries
PAYT:	No (no waste tax)	No	Yes (since 2017)	Yes (launched together with KAYT)
Separate waste collection (2019 data - before the pilot):	58,05%	70%	78,3%	78,44%
Area of testing:	First phase: La Miranda Canigò (2.360 inhabitants, 1.062 users) Second phase: whole municipality (18.670 inhabitants, 8.013 users)	Bustecche e San Carlo (5.000 inhabitants, 1.982 users)	D collection area (11.278 inhabitants, 5.584 users)	Whole municipality (11.923 inhabitants, 4.217 users)



Messages to registered users

Registered users received 3 types of messages on their smartphones with a periodic frequency (at least one message per week).

Each interaction is anticipated by a TRIGGER message in which the user is invited to reply with a keyword in order to obtain the next message

The mood used is informal and fun, with useful tips and case references

Sent message category:

- **QUIZZES**
- **GENERAL MESSAGES** on proper waste sorting
- **PERSONALISED MESSAGES**

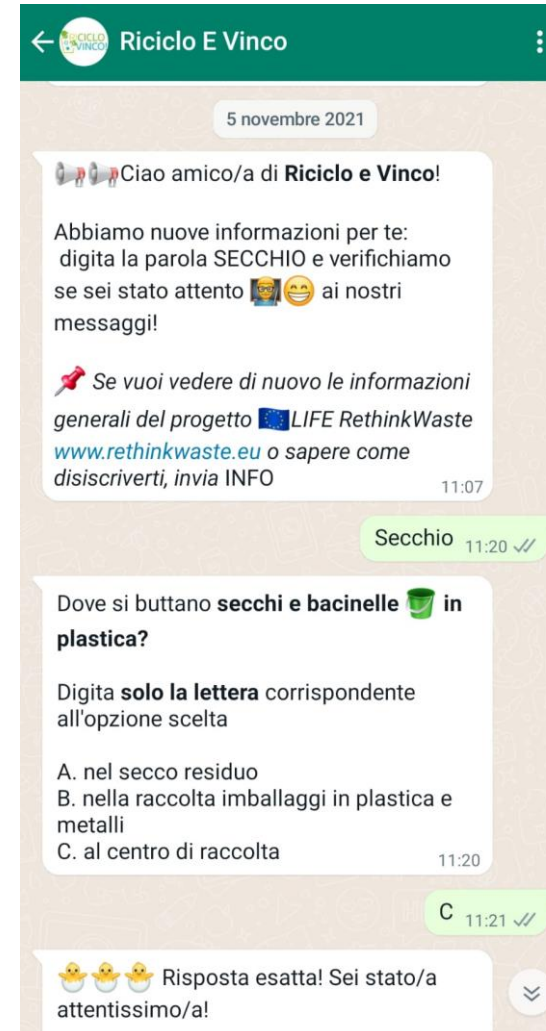


TRIGGER
Message



Quiz and general messages

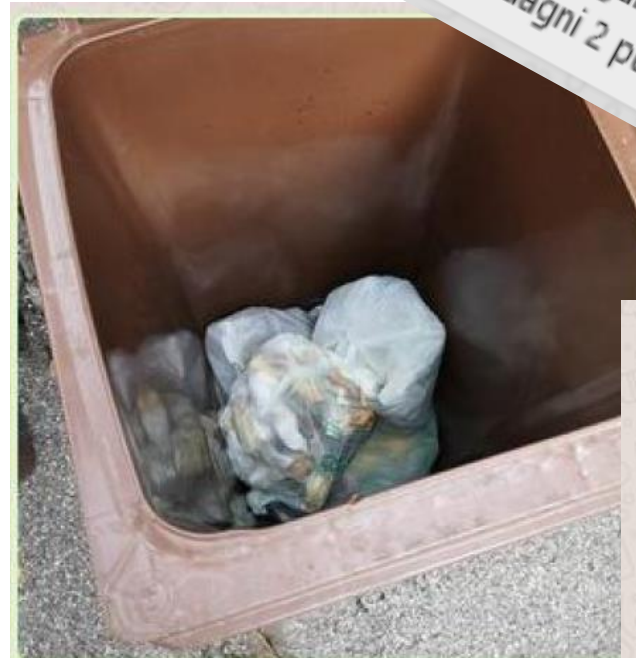
Messages refer to **SPECIFIC CASES** of waste that often cause doubts in the user when sorting.



Personalised messages

Personalised messages may concern:

- the **NUMBER OF DELIVERIES** made, and comparisons with deliveries from the previous year;
- **COMPARISON** with deliveries made by similar families in terms of number of members;
- Results of **QUALITATIVE INSPECTIONS** on the appropriate disposal of waste in the area or block of flats involved (with photos)



👍 Nel vostro edificio state facendo bene la raccolta dell'organico. Ma, Attenzione! !!! Abbiamo visto che ci sono dei **sacchetti non compostabili**, in polietilene. Sono vietati! 🚫 Utilizza solo quelli compostabili! 🌱

20:51

Un **eco-coach** 🌱 ha visitato il vostro palazzo e ha verificato la raccolta differenziata dell'organico. 🌱🌱🌱 Vuoi sapere come è andata? rispondi **UMIDO** e guadagni 2 punti!

20:42 ✓



En aquesta fotografia pots observar la diferència entre les bosses compostables i les de plàstic en un contenidor del barri de La Miranda - Canigó. Recorda utilitzar les compostables! Per més informació escriu la paraula **COMPOSTABLE**.

17:58

Eco-coaches

Thanks to the involvement of **VOLUNTEER** 'eco-coaches' in the municipalities of Varese and Sant Just, it has been possible to involve registered users in a direct and personalised way.



Un **eco-coach** 👁️ ha visitato il vostro palazzo e ha verificato la raccolta differenziata dell'organico. ♻️ Vuoi sapere come è andata? rispondi **UMIDO** e guadagni 2 punti! 20:42 ✓

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“Riciclo e vinco!” prize award

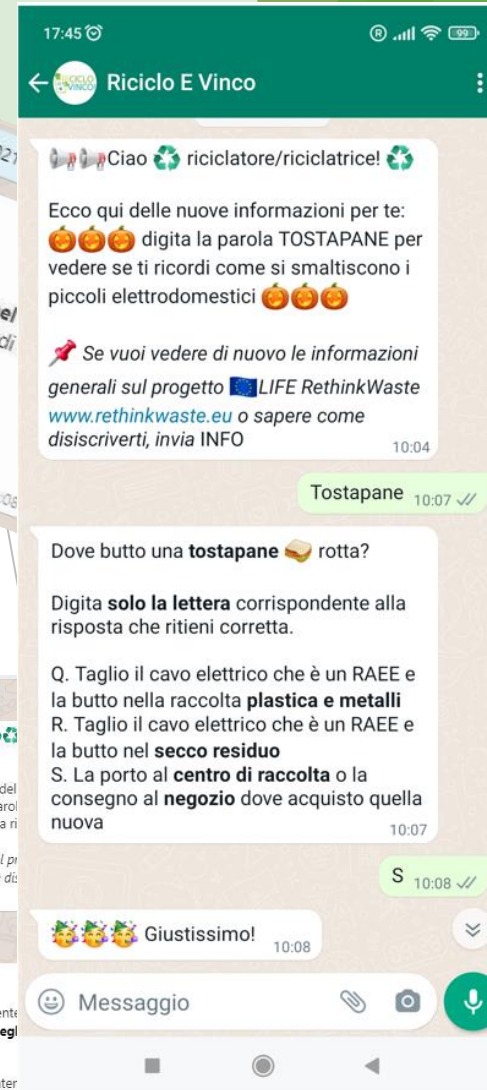
The pilot phase were connected with the implementation of the ‘Riciclo e Vinco!’ and #Coneixelquellences competitions.

Winners, either drawn at random or according to the score earned from the messages sent, received vouchers to spend in local participating shops.



Users interaction

- ▶ User interaction was high, averaging **around 90%**; however, the trend is declining and attention was drawn to the competition message



Main results

VARESE

Through the "citizen science method" (citizens texted a message every time they deliver their unsorted waste) was observed a **reduction of 9.6% of deliveries in the intensive phase** of the information campaign and 2.6% in the final phase. 75% of the participants perceived that their **awareness** of separate waste collection had **increased**.

BITETTO

Significant **reduction in deliveries** of almost all fractions, in particular unsorted waste. All participants in "Riciclo e Vinco!" consider that the initiative contributed to a better differentiation of waste

BASSANO

Among the participants in "Riciclo e Vinco!" initiative, **deliveries of all fractions decreased**; unsorted waste deliveries reduced by more than **13%**. The initiative was highly appreciated (**93% of participants very satisfied**) and citizens perceived themselves

SANT JUST

In total, **separate waste collection increased by 4.5 percentage points** compared to 2019, reaching 62.5%, while the production of **unsorted waste was reduced by 22%**. Participants in the initiative recorded better performance than the average

Joint SWOT analysis of pilots

STRENGTHS - STRENGTHS

- **WELL ACCEPTED TOOLS, as they** exploit common messaging channels already used by citizens
- **CITIZENS FEEL MORE INFORMED** and find communication through social media more effective than the traditional booklet
- **HIGH ACCEPTANCE** of the initiative as measured by surveys
- RECOGNISED A **CHANGE IN HABITS OF CONFERENCE** → tool to leverage social pressure and knowledge for improvements
- **CORRESPONSIBILITY PERCEIVED** in the management of the service
- Ability to send **PERSONALISED MESSAGES** and give positive individual feedback

WEAKNESSES - WEAK POINTS

- **MAINTENANCE COSTS** (messaging platform and educators in general)
- It requires a high level of **COMMITMENT** to prepare effective messages and surveys
- The real effect on improving waste collection seems limited

The use of economic incentives does not seem to be the main motivation for user participation in KAYT

Joint SWOT analysis of pilots

OPPORTUNITIES

- Effective way to **ALERT CITIZENS IN CASE OF INTRODUCTION OF NEW PRODUCTS**, not only related to waste management
- Increasing good habits and **CRITICAL SENSE** (educators, chat)
- **USERS MAY REPORT PROBLEMS** related to the waste collection service
- It can be a **VALID TOOL TO ACCOMPANY THE PAYT APPROACH**
- Improving waste collection through big data analysis
- Statistical analysis to evaluate the effectiveness of the KAYT campaign

THREATS

- Risk of **INVOLVING** mostly **PEOPLE ALREADY SENSITIVE TO THEME**
- Resistance to change
- **RESISTANCE TO CONTROL AND MONITORING** and transfer of personal data
- Risk of disengagement of citizens after the competition
- Risk of **becoming boring**, resulting in disenrolment (maximum duration 6 months)
- Privacy regulations may limit full use of the tool as a single communication channel
- It can become a channel for **COMPLAINTS**

KEY MESSAGES

- ▶ Users have greatly appreciated receiving **USEFUL INFORMATION** in a **FUN** way, such as friendly messages and quizzes; communication becomes much more immediate than an instruction booklet, prompting users to improve even more!
- ▶ The availability of data from PAYT offers the **POSSIBILITY TO SEND PERSONALISED MESSAGES**, but it is essential to ensure that the data are reliable.
- ▶ KAYT can **ENCOURAGE CITIZENS TO THE SERVICE PROVIDER**, conveying the message that improvement is a shared responsibility.



Normative transition: adoption of KAYT and PAYT approach

- ▶ The test area are reviewing their own waste management plan in order to include PAYT-KAYT paradigm.
- ▶ Given the different normative framework of each area, there are several approaches to achieve the target and integrate PAYT-KAYT systems into their operational routines
- ▶ The deliverable **COLLECTING THE NORMATIVE SPECIFICITIES** of the pilots and the **NORMATIVE PACKAGES** used will be published on the project website within November, in order to offer a model to inspire new municipalities in adopting the PAYT-KAYT schemes.



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Thank you for your attention!

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