



# KAYT-Know As You Throw VS PAYT-Pay As You Throw

Michele Giavini

ARS ambiente srl

LIFE RethinkWaste project



# RethinkWaste

- 2019-2022
- Leader: ETRA (Veneto, Italia)
- 4 pilot areas (5000 inhabitants)
  - ETRA
  - Varese
  - Sant Just Desvern
  - Bitetto
- Governance partners
  - ARPAV Ag. Reg. Protez. Ambientale Veneto
  - Agència de Residus de Catalunya
  - ATO 2 Ancona
- Technical partners
  - ARS ambiente
  - LCA consultants 2.0
- Dissemination partners
  - IFEL Istituto per la Finanza Economia Locale
  - ACR +



# PAYT, KAYT, ReThinkWaste: the rationale behind

# EU - revised waste framework directive

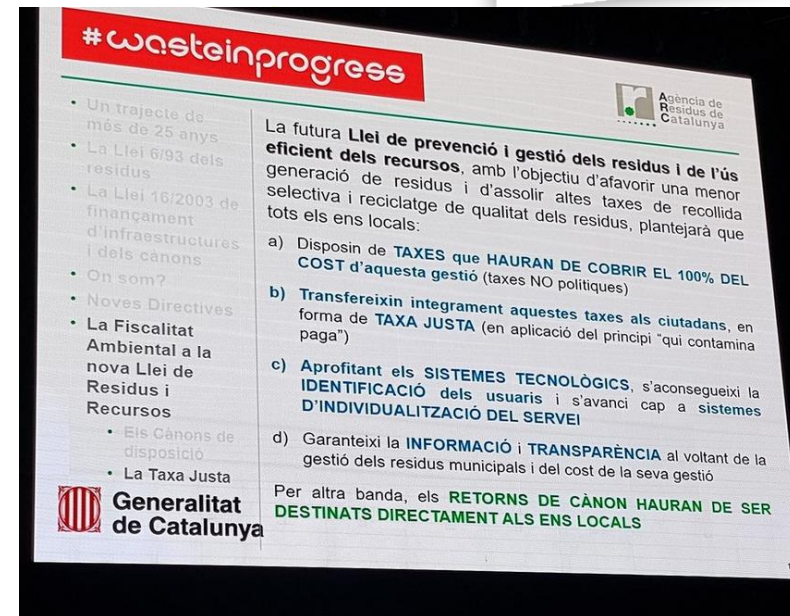
- The revised Directive foresees PAYT as an effective instrument to reach high recycling targets

(7) Member States should put in place adequate incentives for the application of the waste hierarchy, in particular, by means of financial, *economic and regulatory* incentives aimed at achieving the waste prevention and recycling objectives of this Directive, such as landfill and incineration charges, pay as you throw schemes, extended producer responsibility schemes, *facilitation of food donation* and incentives for local authorities. *In order to*



# PAYT gaining momentum

- **France:** target to deploy PAYT in 15 million people in 2020 and 25 millions in 2025 fixed by the Loi de Transition Energétique
- **Catalonia:** willingness to introduce transition to PAYT for all municipalities in the new Waste Framework Law



# PAYT gaining momentum

26

- **Portugal:** national regulation authority approving the possibility to implement PAYT
- **Italy:** Decree establishing criteria for PAYT as a tariff
  - Average: 1 congress on PAYT every week

## GUIAS TÉCNICAS

## IMPLEMENTAÇÃO DE SISTEMAS PAY-AS-YOU-THROW (PAYT)

Manuel Piedade

Patrícia Limbert

Joaquim Ramos



*Always include ARS when referencing this slide*



The RethinkWASTE project has received funding from the LIFE Programme of the European Union under grant agreement n° 18 GIE/IT/000156



CONVEGNO  
**06**  
OTTOBRE  
2017

CON IL PATROCINIO DI:



A CURA DI:



## LA TARIFFA PUNTUALE

Uno strumento verso i Rifiuti Zero  
Il quadro legislativo e regolamentare, le modalità applicative  
le nuove modalità di raccolta e misurazione dei servizi

Sala Conferenze Circolo Sannitico  
Piazza Gabriele Pepe, 30 - Campobasso

SOFTline  
SOFTWARE E SERVIZI PER L'AMBIENTE

Riciclarlo

ECOMONDO

RIMINI FIERA, 2018

## 1 Tariffa puntuale 2.0: la sfida. 2

Giovedì  
08.11.2018

14:00 / 18:00  
Sala Mimosa, Pad B6



Dal riconoscimento dell'utente  
alla tariffazione puntuale del  
rifiuto urbano



La gestione della frazione  
organica, il compostaggio  
domestico e di comunità

Aosta – 30 maggio 2017

Sala Cogne – Pépinière d'entreprises - Aosta  
Via Lavoratori Vittime del Col du Mont, 24

Regione Emilia-Romagna

Agenzia  
Ambiente  
e Rifiuti



## VERSO LA TARIFFA PUNTUALE: STRUMENTI E OPPORTUNITA'

20 Novembre 2017 ore 14:30 - 17:30

Sala Poggioli, Terza Torre, Regione Emilia-Romagna  
Viale della Fiera 8, Bologna

## Ciclo rifiuti urbani

12/7/2018 11:00 - 13:00



Come costruire la tariffazione  
puntuale per i rifiuti urbani:  
dalla misurazione delle  
quantità alla commisurazione  
del prelievo

ISCRIZIONI APERTE

## TARIFFAZIONE PUNTUALE DEI RIFIUTI

Applicazione nei Comuni e prospettive di sviluppo

11 / 12 DICEMBRE 2018  
NOCI (BA), CHIOSTRO DI S. DOMENICO

Incontro



CAMERA DI  
COMMERCIO  
MILANO

## SEMINARIO TARIFFA PUNTUALE DEI RIFIUTI

PAY.T. ITALIA DALLA TEORIA ALLA PRATICA

MARTEDÌ  
26 MAGGIO  
ORE 9:30

SALA PAESAGGIO / REGIONE PUGLIA,  
ASSESSORATO ALLA QUALITÀ DELL'AMBIENTE  
V.le delle Magnolie 6/9 - MODUGNO (BA)

MERCOLEDÌ  
27 MAGGIO  
ORE 9:30

SALA A

A cura di

operate



Patrocinato da



Tari e tariffa puntuale:

Evoluzione Normativa e modelli di applicazione sostenibile

SALA CONFERENZE -  
CONFINIDUSTRIA  
LECCO E SONDRIO

Via Caprera, n. 4  
Lecco

MERCOLEDÌ 4 LUGLIO  
ORE 9:00 - 13:00

## Tariffa Puntuale e smart city

L'innovazione tecnologica a supporto della PA per il  
raggiungimento dell'equità fiscale.

Giovedì 9/11/2017

ore 14:00 - 16:10  
Sala Cedro Hall Ovest

LA TARIFFA PUNTUALE  
NEL SISTEMA DI GESTIONE  
DEI RIFIUTI  
Il seminario nazionale

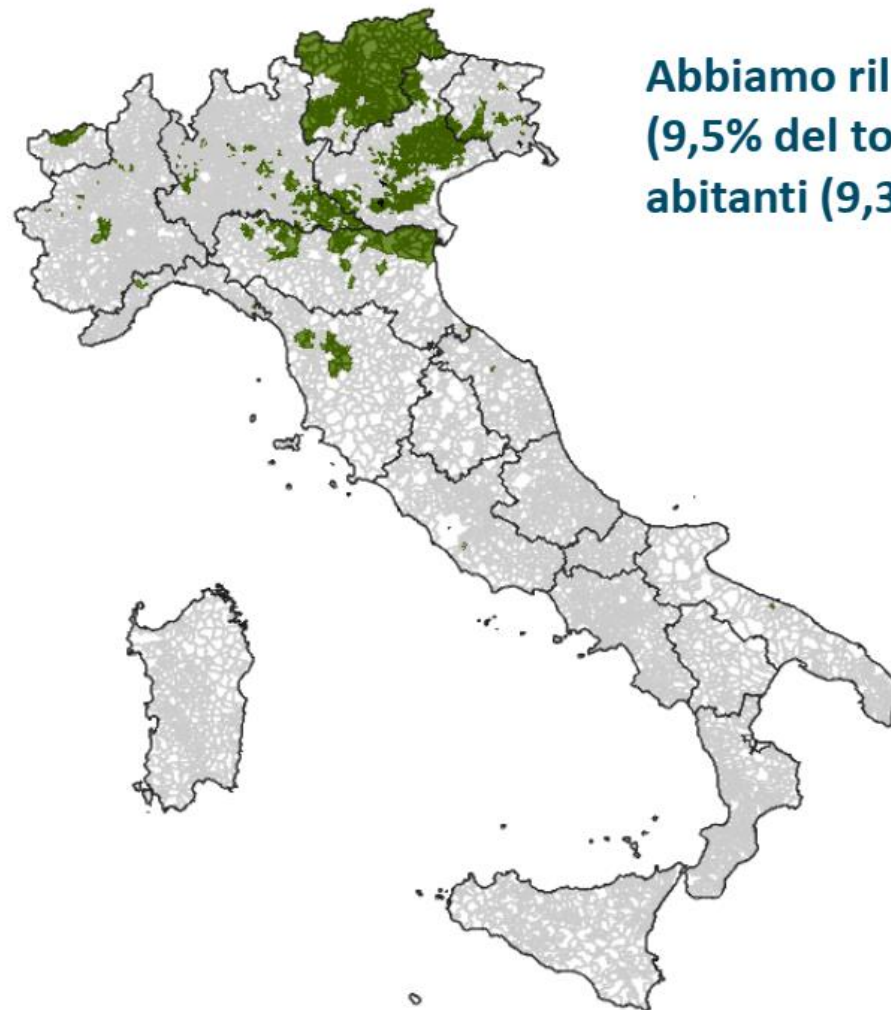
Giovedì, 25 Febbraio 2016

Palazzo Turati - Sala Conferenze  
via Meravigli 9/b, Milano



- **PAYT**
- **5,6 milioni**  
**755 Comuni**  
**(9% tot)**

## Quanti sono i Comuni italiani in TP nel 2018?



Abbiamo rilevato **755 Comuni** che applicano la TP (9,5% del tot.), per una pop. tot. di **5.593.766** abitanti (9,3% del tot.)

### Forte concentrazione territoriale della TP:

- nessun Comune con TP attiva rilevato in Umbria e in 6 regioni del Sud (Abruzzo, Molise, Campania, Basilicata, Calabria e Sardegna)
- **Nord-Est: 594 Comuni in TP, con quasi 4 mil. di ab. (42% dei Comuni, 34% della pop. tot.)**
- Nord-Ovest: 139 Comuni in TP, per circa 1.150.000 abitanti (4,6% dei Comuni e 7,1% della pop. tot.)
- Centro: 20 Comuni (18 in Toscana, 1 nel Lazio e 1 nelle Marche, per circa 400.000 ab. tot.)
- Mezzogiorno e Isole: solo 2 Comuni con TP attiva (1 in Puglia e 1 in Sicilia)

Source IFEL,  
guideline on PAYT  
2019

<https://www.fondazioneifel.it/documenti-e-pubblicazioni/item/9907-guida-alla-tariffazione-puntuale-dei-rifiuti-urbani>

Rilevazione ISPRA 2017 (Rapporto Rifiuti Urbani 2018):  
341 Comuni in TP, pop. tot. 2.520.117 ab.



# Italy, schemes with «identification», without PAYT: ≈20-30 million people



**40/120 liters  
buckets/bins with chip**



**Bags with chip**



**Locked containers  
with chamber system**



**Standard bags with  
numeric / barcode**

# Big (and lost?) data

- 5,6 M people: data used for PAYT
- 20-25 M people: data «lost»



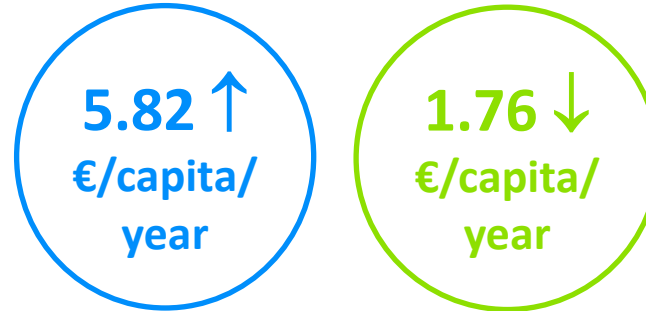
# PAYT – issues to be addressed



# Case study Seveso, project H2020 Waste4Think

- Economics

PAYT – related costs



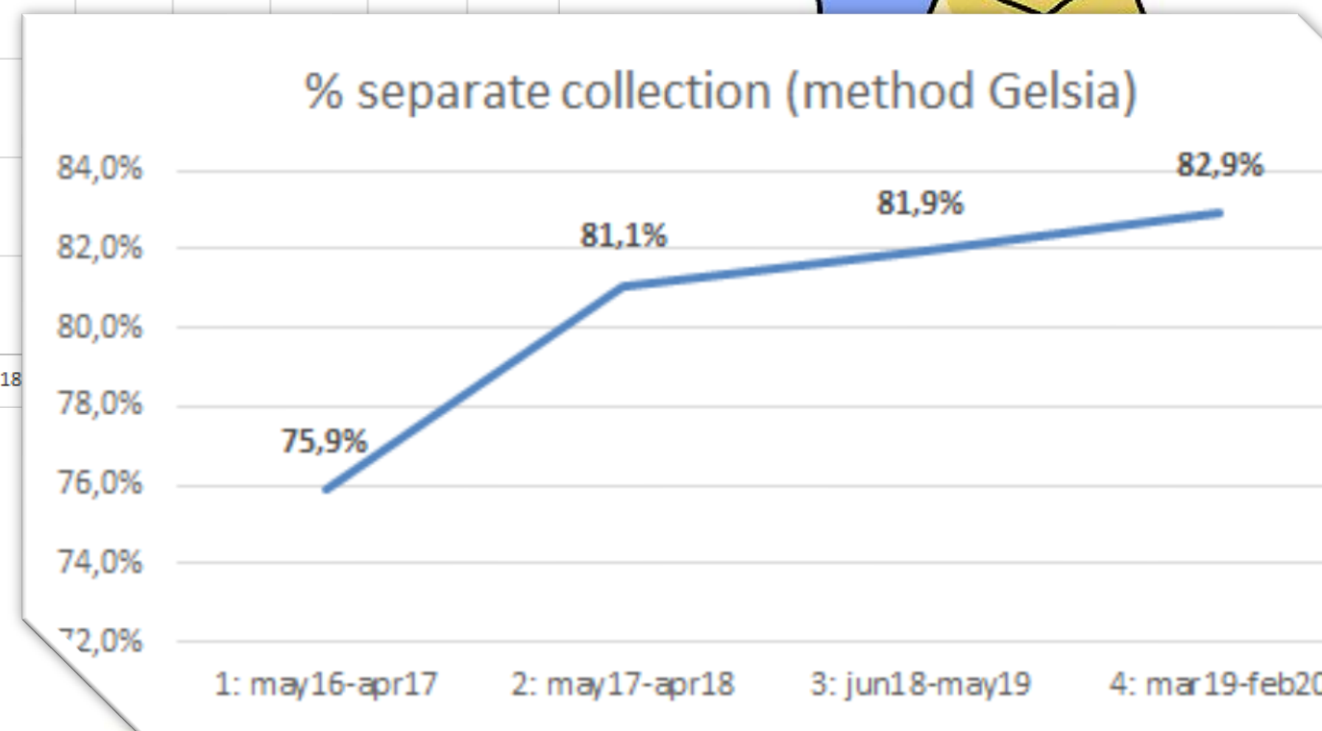
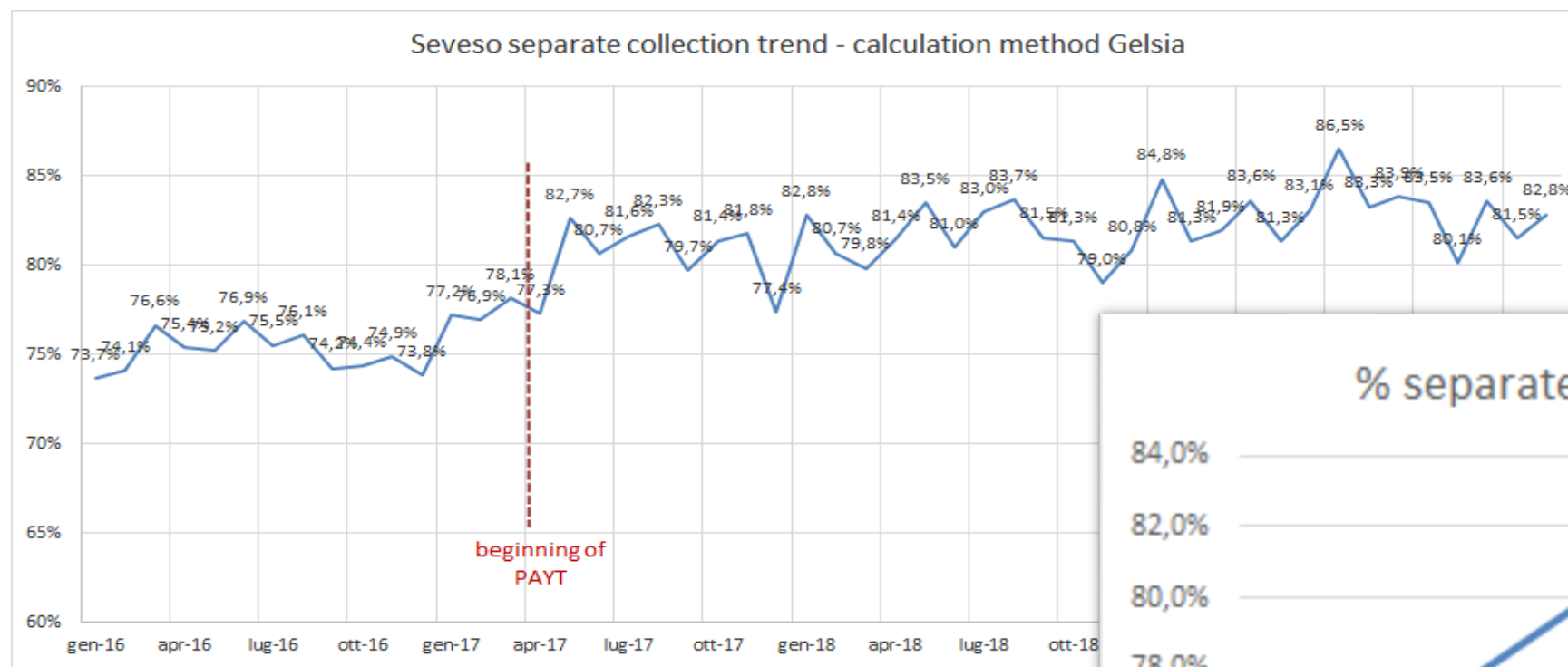
**WASTE**  
**4think** Moving  
towards Life  
Cycle Thinking



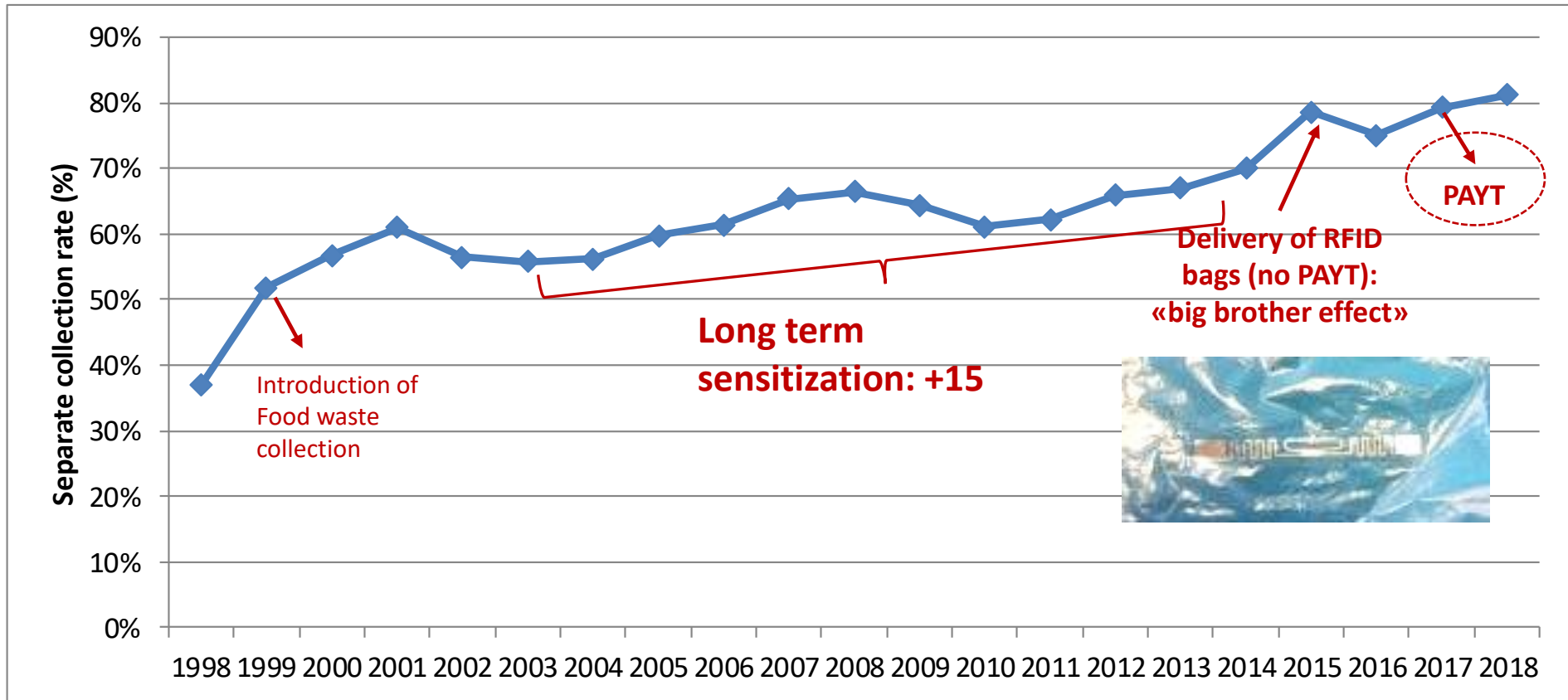
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 688995  
The dissemination of results herein reflects only the author's view and the European Commission is not responsible for any use that may be made of the information it contains



# Seveso, PAYT - Separate collection



# Before implementing PAYT: EFFECT OF long term sensitization. Seveso, Waste4Think



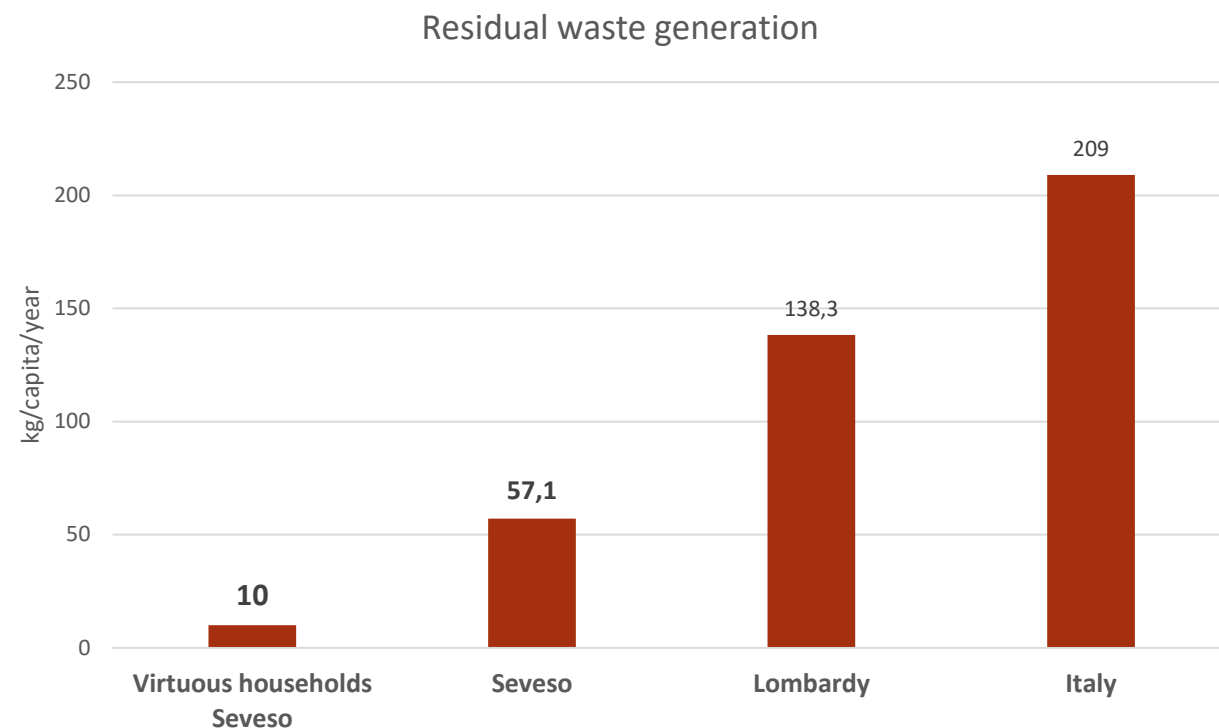
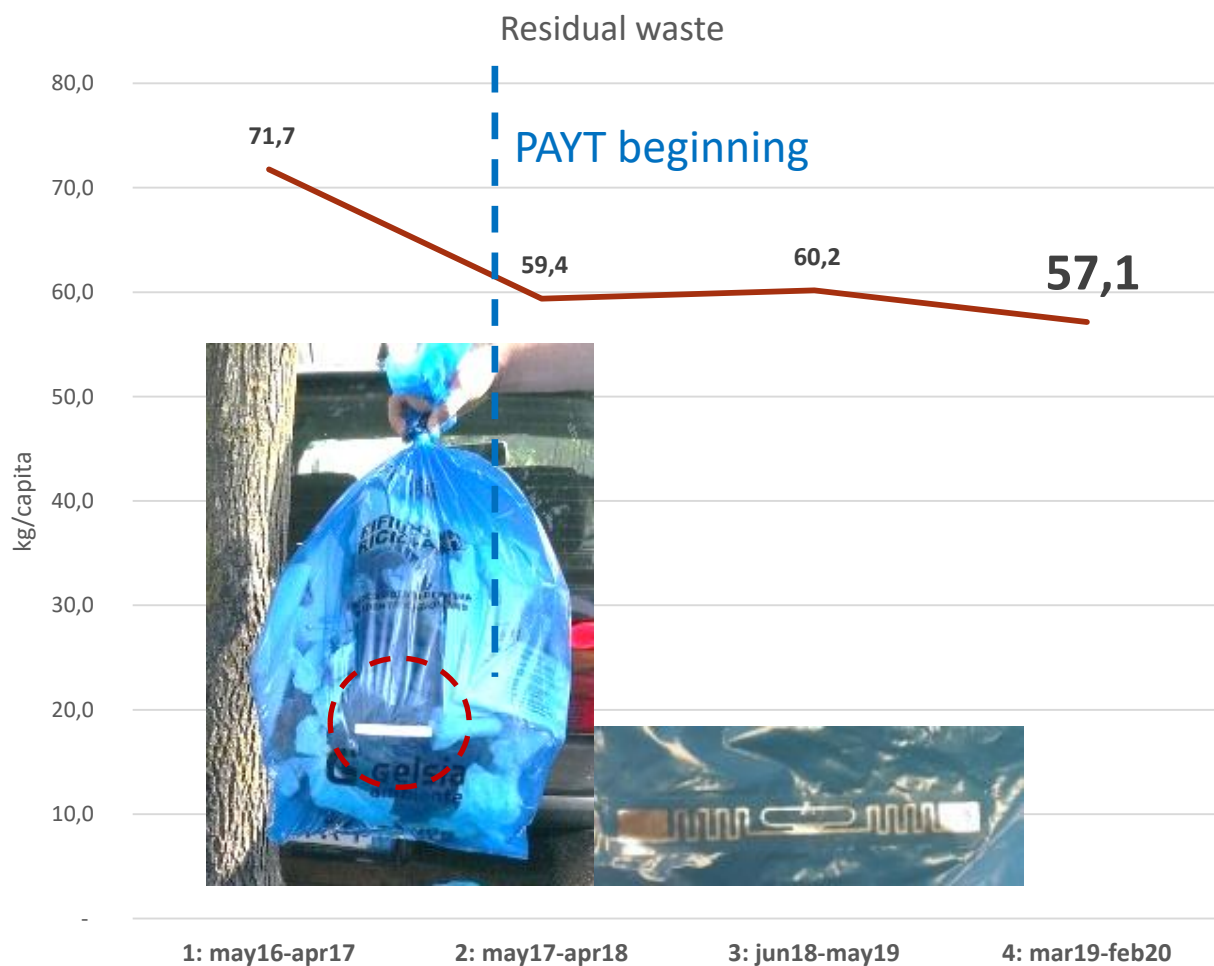
Moving  
towards Life  
Cycle Thinking



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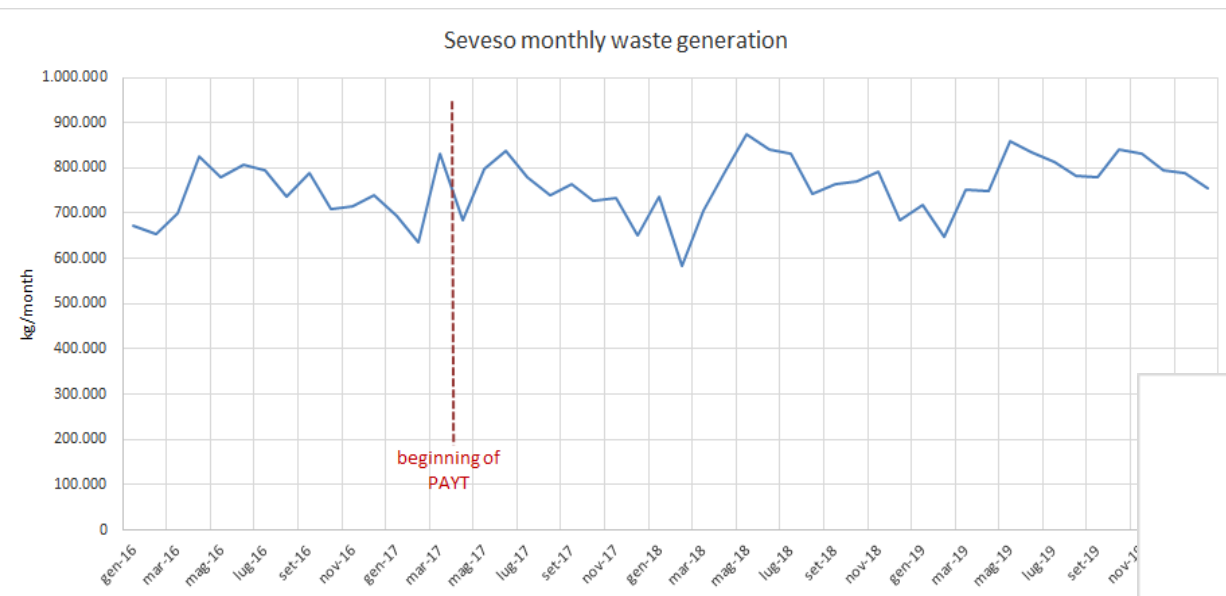


# Seveso: residual waste generation

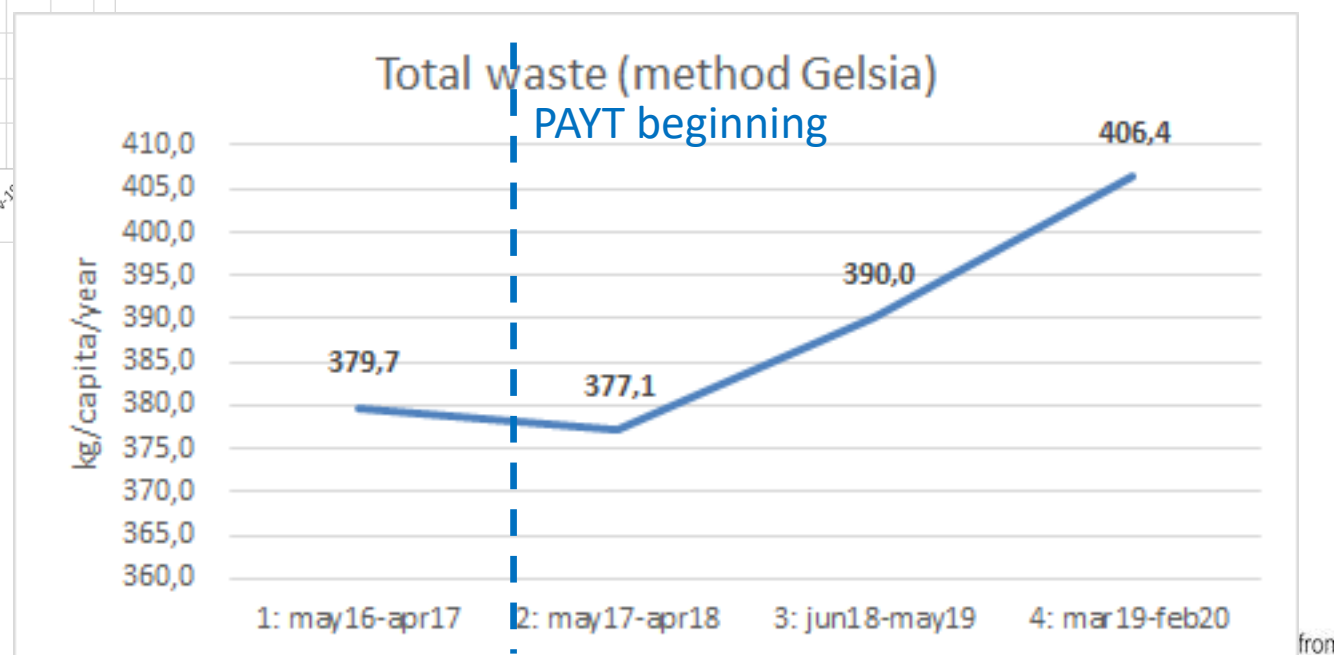


- Virtuous households Seveso: 10 kg/capita
- Seveso: 57.1
- Average Lombardy: 138.3
- Average Italy: 209

# Waste generation

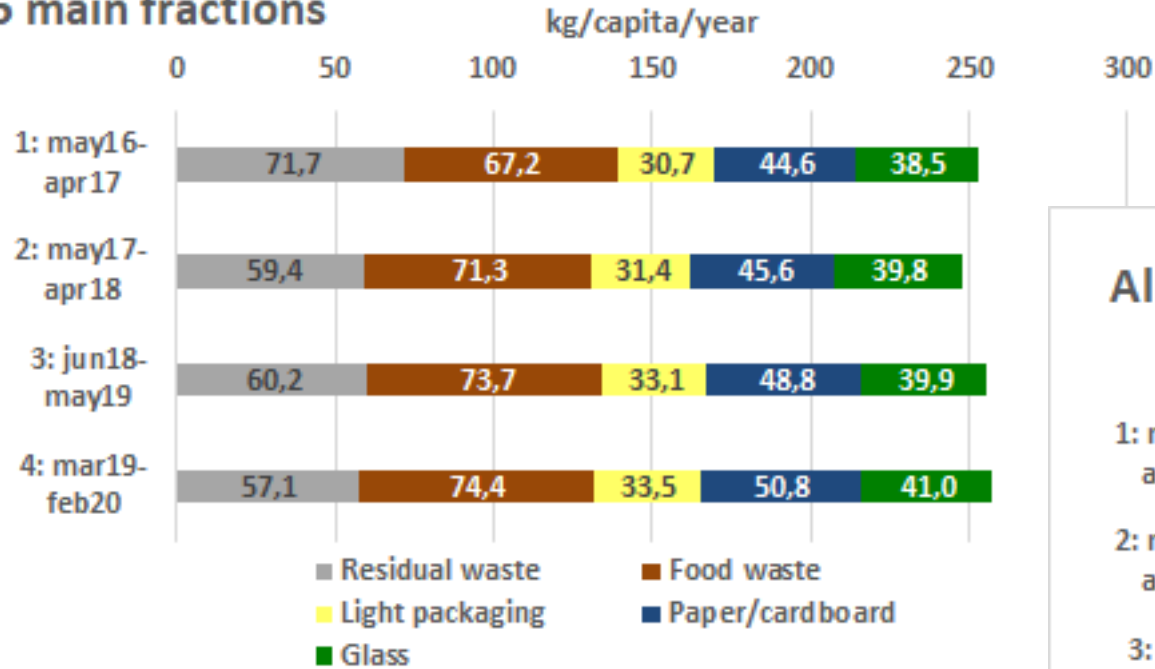


Immediately after the introduction of PAYT there was a **slight decrease** (-0.7%) which actually is in line with the average waste variation in surrounding municipalities in Lombardy (-0.9%). Year 2018 compared to 2017 for Lombardy show an average increase in overall waste generation data (**Lombardy +2.6%; Seveso +2.75%**). we still don't have official data from Lombardy about the whole 2019, but early findings from the regional environmental agency point out a stable situation. In Seveso, period 4 of charts below show an **increase of +4.2%** with respect to period 3.



# Detail - fractions

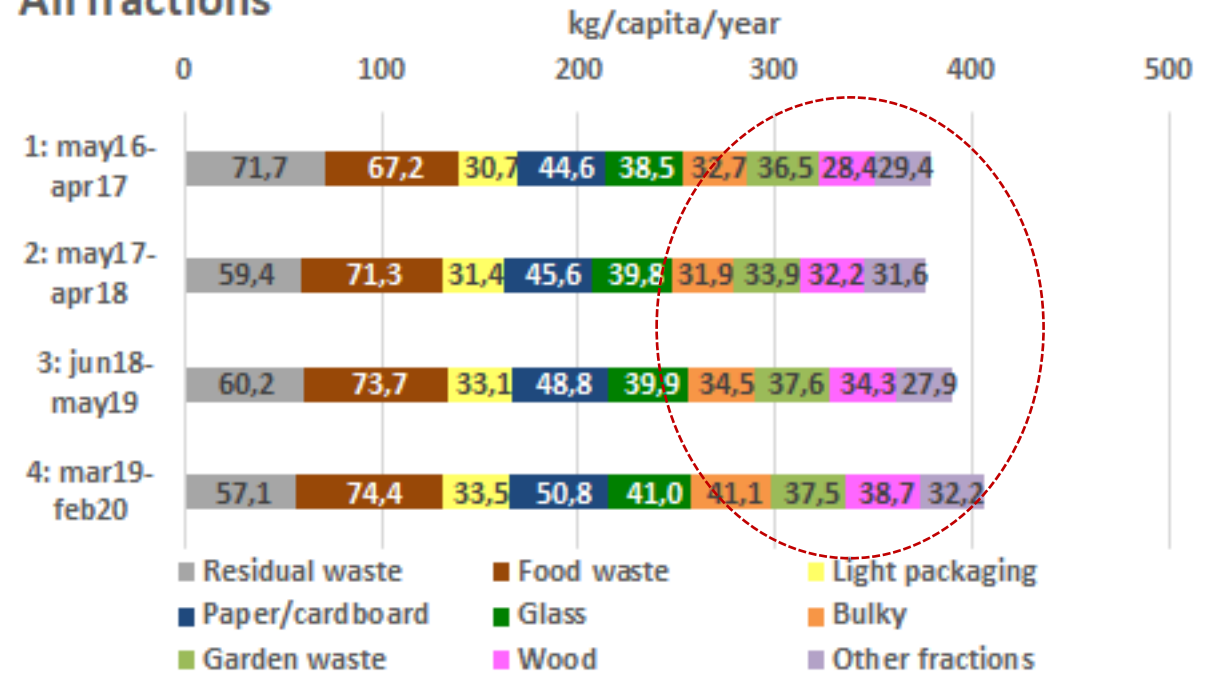
## 5 main fractions



Interestingly enough, considering only the **5 main fraction** (residual waste, food waste, light packaging, paper/cardboard and glass) **the increase have been just +0.5%.**

Looking at the carts below, we can see that the fractions that have primarily driven the increase of overall waste generation are **bulky waste, garden waste, and wood**

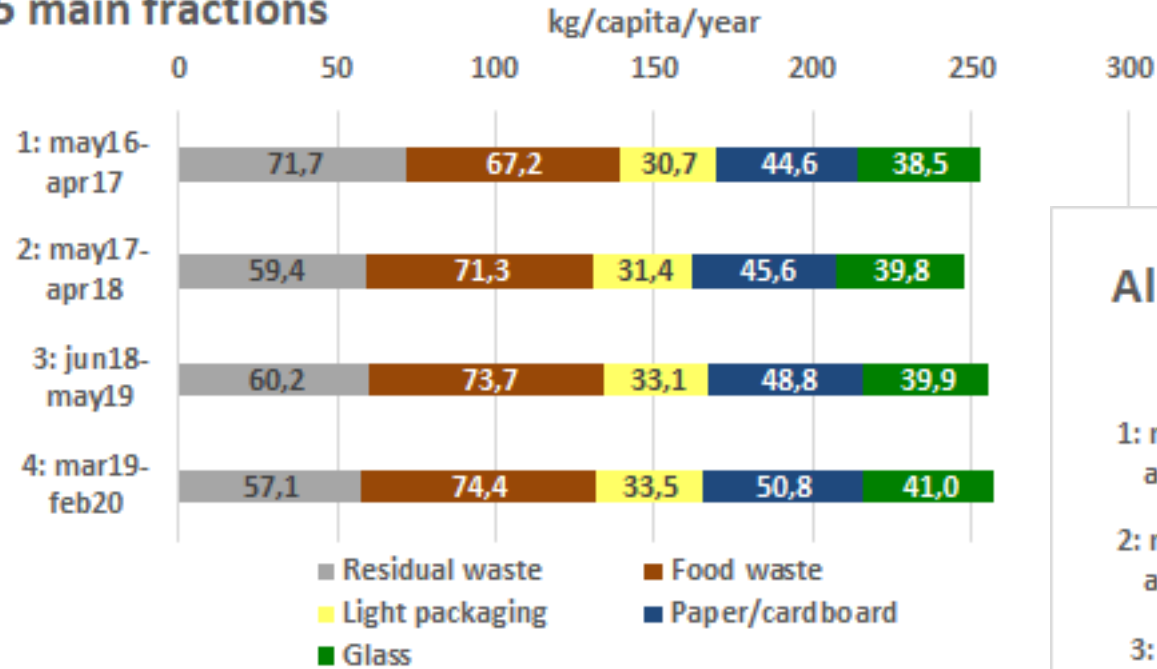
## All fractions





# Detail - fractions

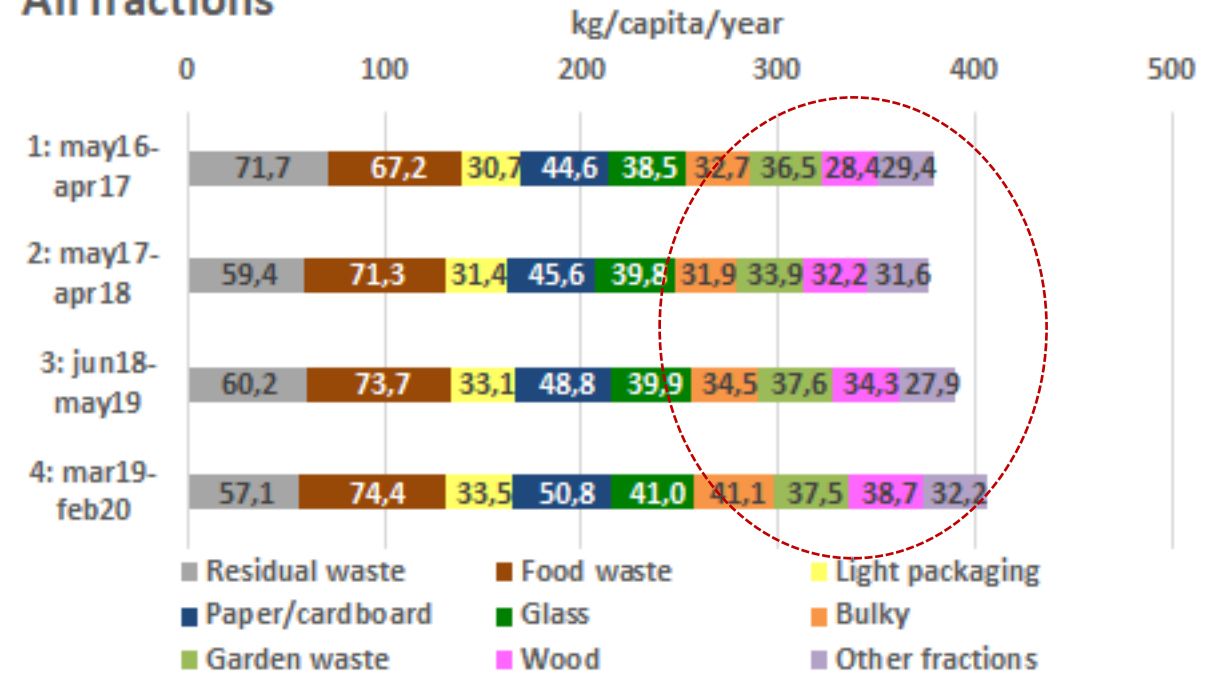
## 5 main fractions



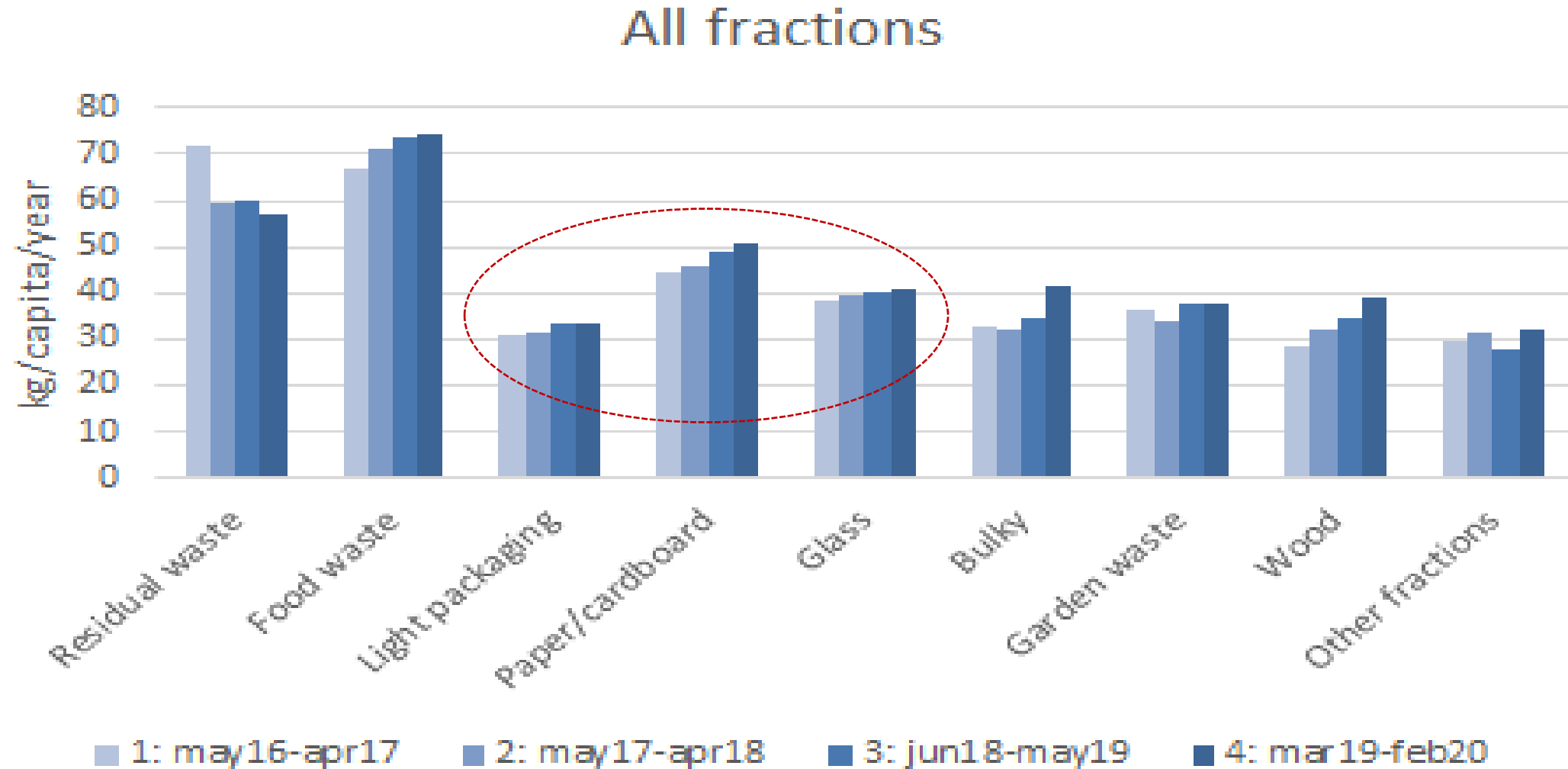
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## All fractions



# Detail - fractions



# Waste generation – considerations (D1.7)

- So we can conclude that :
- • PAYT didn't affect much behaviour on waste prevention of common packaging fractions on the whole city, as the only charged fraction was **residual waste**; however, specific campaigns performed in the framework of Waste4Think had an important effect in limited contexts such as ecoevents or virtuous households (speak later)
- • Apart from small packaging waste, waste prevention campaigns for the future should address also fractions that are typically delivered to the recycling area: **bulky waste, wood and WEEE**, but also garden waste should be addressed pushing for instance for more home composting.



# PAYT or KAYT = KNOW AS YOU THROW

New innovative concept complimentary to PAYT

# PAYT, delicate balance



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## Littering







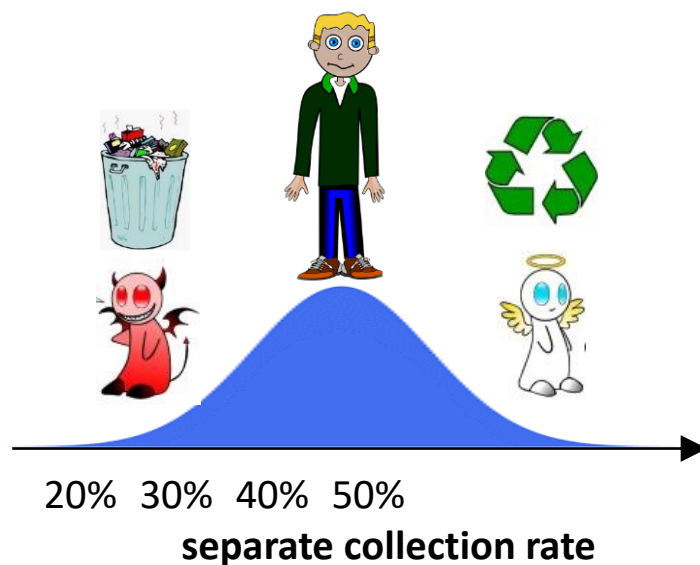
Quality of  
recyclables



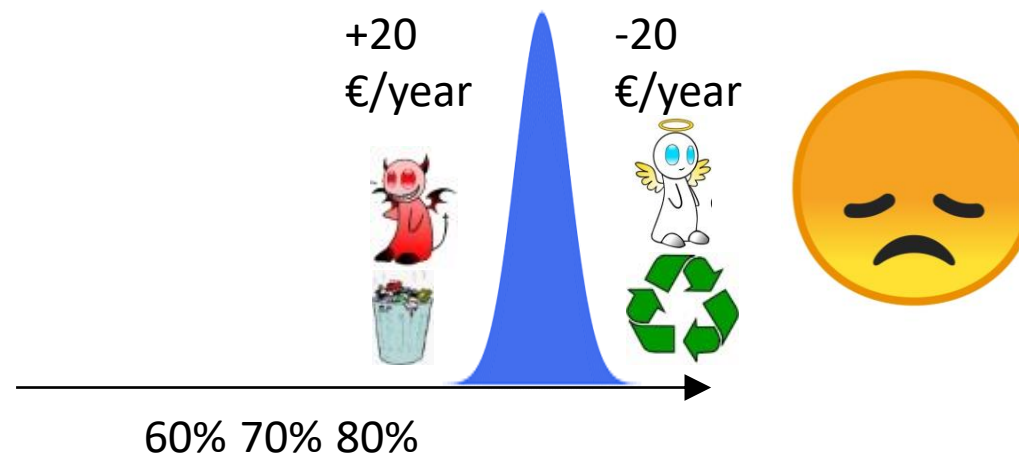
# PAYT and Perception of the costs



Incentive  
effect



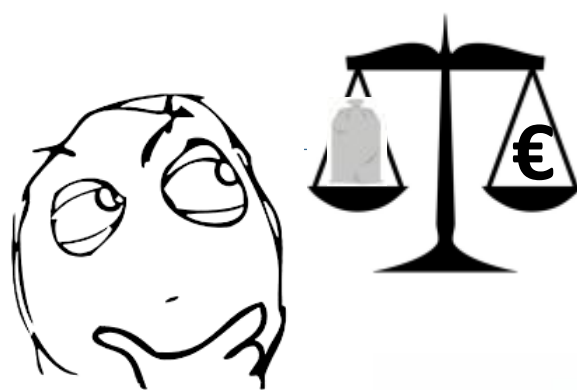
Evolution stage:



Advanced stage  
(with PAYT):

# Low perception of PAYT

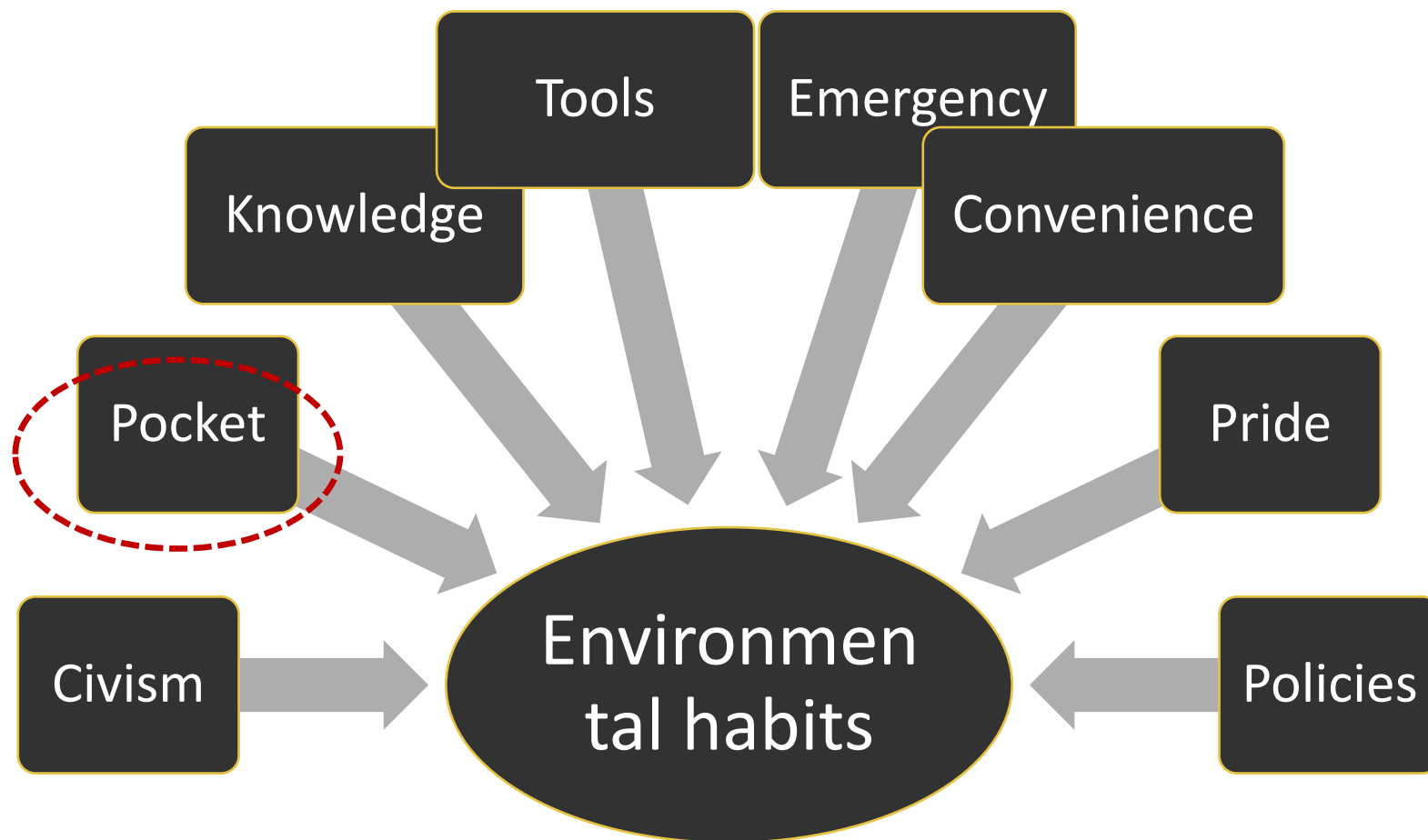
- Low perception of fairness if:
- It's possible to cheat the system
  - E.g. reward schemes on recyclables, without exact measurement
- There's still a high fixed part of the tax not related to waste generation
- Some PAYT schemes make no distinction between families with 1...5 members
- Collective bins for buildings



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# PAYT, one of the (many) tools



# KAYT = Know as you throw

(M. Giavini, 2017 + JRC BEMP report)

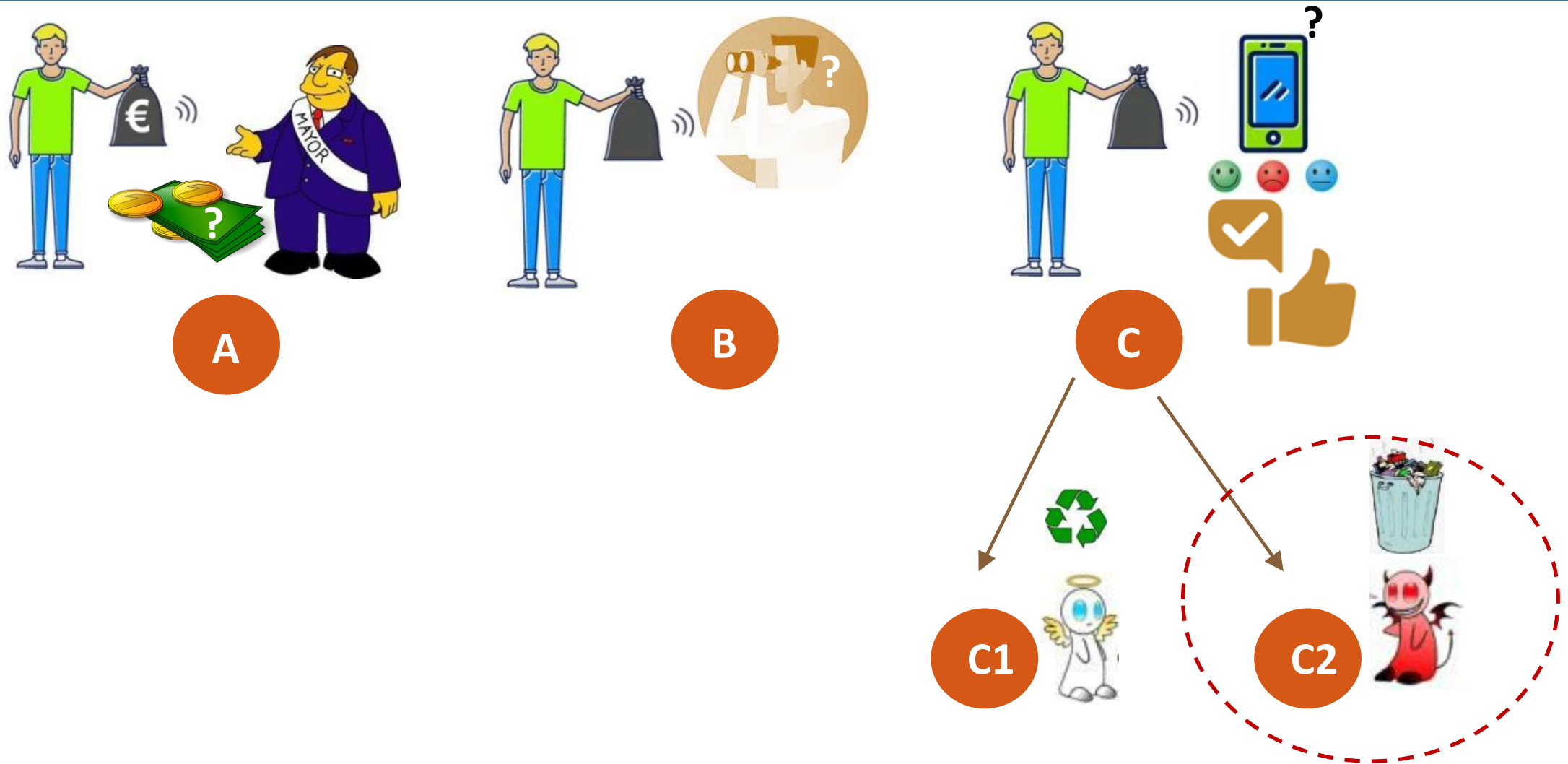
- PAYT usually provides info **once per year (invoice)**
  - **Many don't realize**
- KAYT = Give individual, detailed, frequent feedbacks
  - Citizens feel **monitored** and improve their habits accordingly
  - real time data access
  - Specific and **individual sensitization campaigns**
  - Don't give only negative feedbacks



JRC SCIENCE FOR POLICY REPORT

Best Environmental Management  
Practices for the Waste  
Management Sector

# PAYT or KAYT = KNOW AS YOU THROW



# KAYT» + «big brother»: results

- Cremona: baseline **72%** separate collection
- «Control», 3 months: use of standard bags. Random individual controls.
- Result: **88%** separate collection.



SPERIMENTAZIONE  
MISURAZIONE  
RACCOLTA del SECCO  
quartieri BOSCHETTO e MIGLIARO



■ Il mio sacco è numerato, quello del mio vicino no: perché?

Perché nell'ambito di questa sperimentazione è stato scelto di attuare un conteggio puntuale dei sacchi esposti di un campione di utenze. La tua utenza rientra in questo campione.





# KAYT and «bad guys» The idea of ReThinkWaste



**App, web:** typically used just by people with an already high awareness level.



*Always include ARS when referencing this slide*

**KAYT:** Give constant information to the «bad guys». **LIFE RethinkWaste:** use of WhatsApp as key media

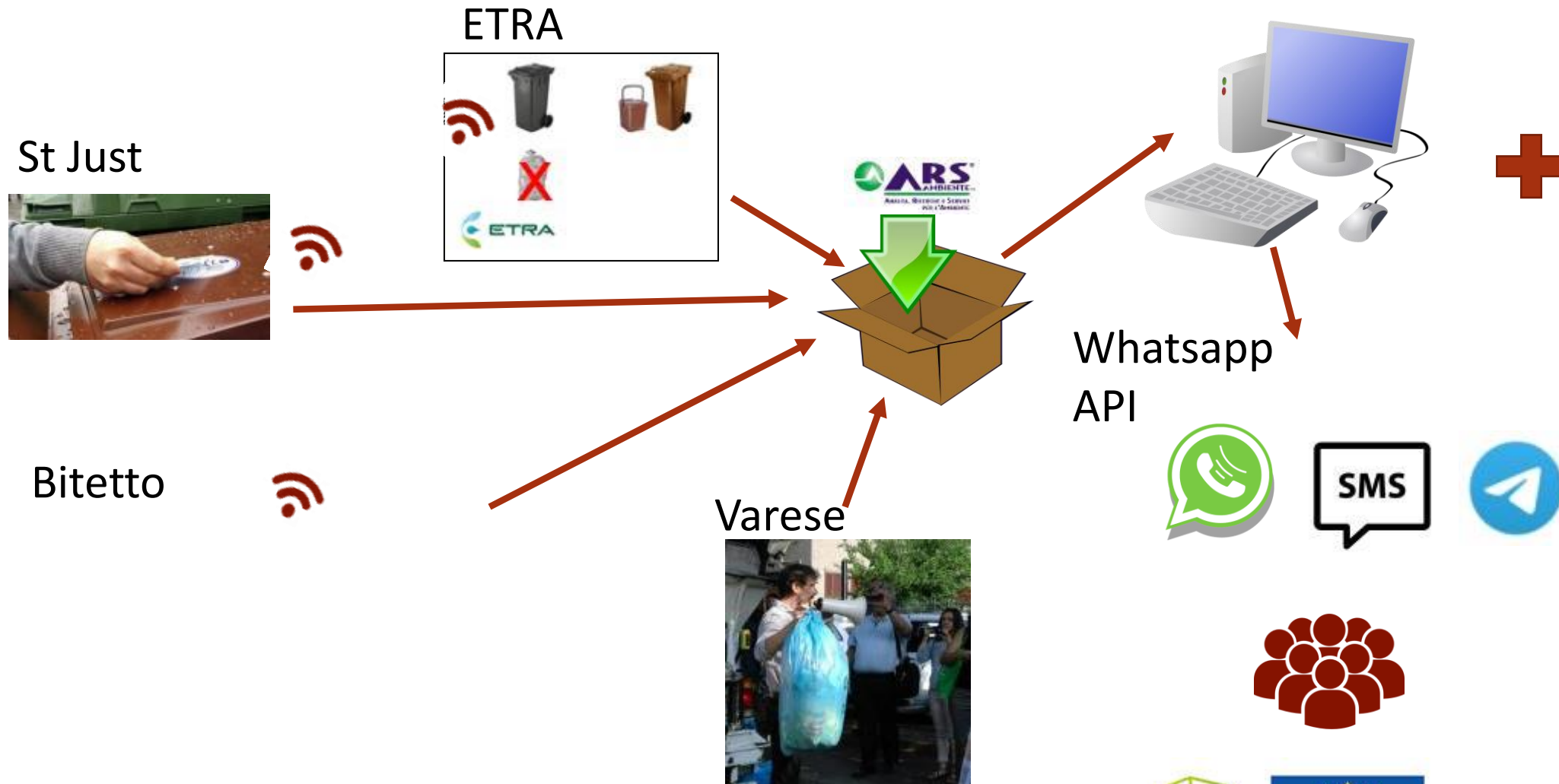


RETHINK  
WASTE



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# LIFE RethinkWaste: WhatsApp platform



# Waste checking and automated feedback via WhatsApp



# Use case: Varese

- We collect mobile numbers of volunteers (letter from the municipality)
- Opting in, immediate discount
- 12 months trial with:
  - Pictures of waste outside your building, sent back via whatsapp to users with comments
  - Meetings in buildings to explain better separation
    - Those participating to meetings will get more bonuses
  - Separation rate improvement estimated for each building



Always include ARS when referencing  
this slide



# KAYT messaging costs

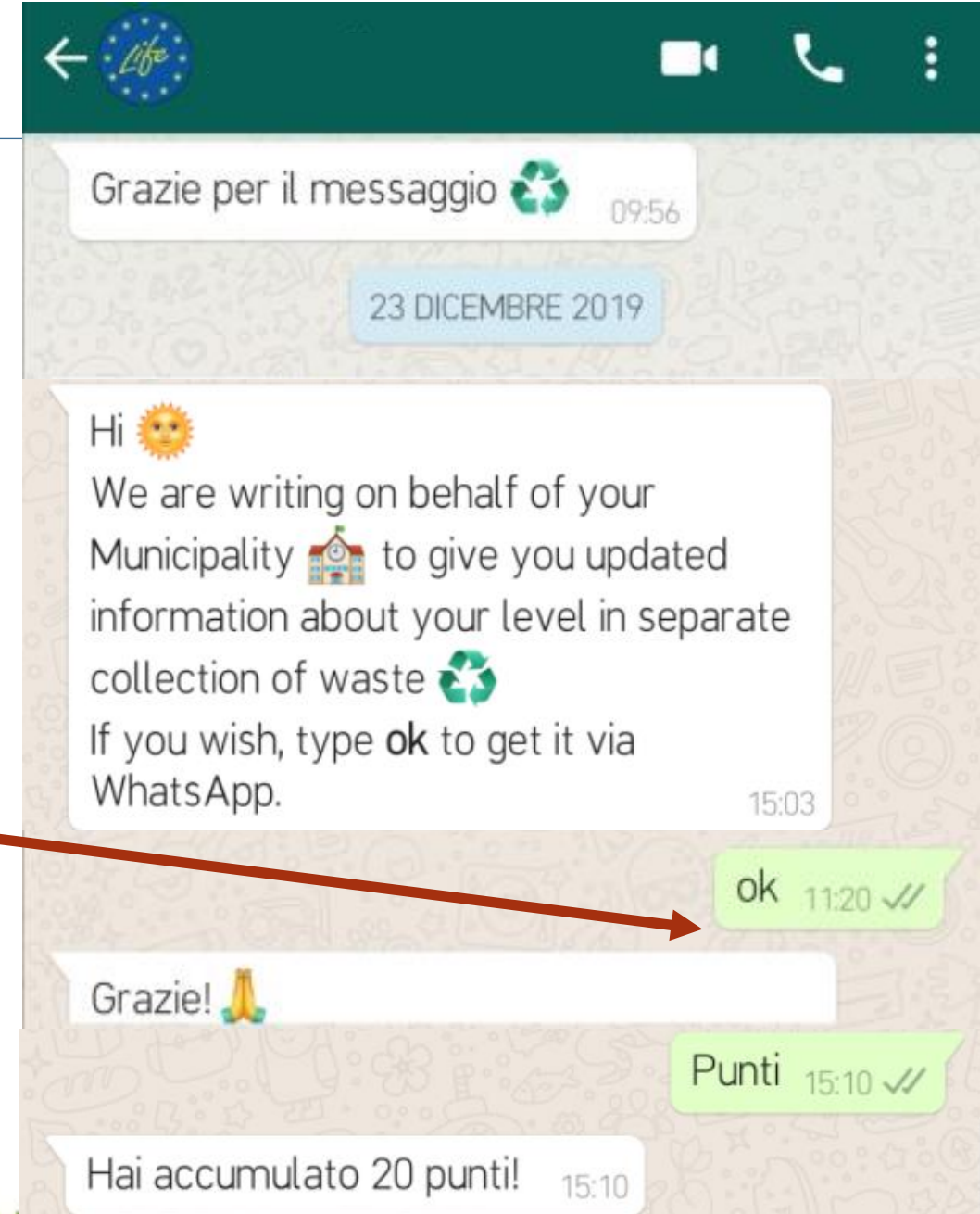
- Street trainers / monitoring
- Messaging fees
  - WhatsApp API: high monthly fee, limits to templates
  - Telegram: free, more interactive, less users
  - SMS: old stile, some elderly users? no pictures
- Rewarding / prizes to have citizens opt-in



LIFE Rethinkwaste goal: check if one-shot 12 months costs ensure long lasting results

# WhatsApp Business API

- An official mobile phone number is dedicated to the project
- From the platform, only **TEMPLATES**, pre-approved by WhatsApp, are allowed to be sent to users
  - If the user answers, then a «window» of 24 hours is open to interact with any kind of message
- Users can always write messages to the platform asking for info
  - Upon receipt of a message, the 24 windows opens
  - Possibility to set up autoreplies



# WhatsApp HSM: Highly Structured Messages

- **5 key things about HSM.** They are
- **Proactive & Reusable** (common notifications business may want to sent to users automatically)
- **Highly Structured** (the name doesn't lie, they have to comply with very strict structure guidelines)
- **Subject to Approval** (before they go live, the templates need to be submitted to and pre-approved by WhatsApp team)
- **Subject to User Opt-In** (although there is no limit to the number of HSM you can send at once, you can only send them to users who previously agreed to be contacted)
- **Personalized Through Variables** (template messages, although automated, allow for a level of personalization using simple variables)
- **(Optionally) Multi-Lingual** (the templates allow you to pre-design the same message in multiple languages to connect with users in different countries)



# WhatsApp HSM: it's very tricky....

Bon dia ☀️  
Des del projecte LIFE Rethinkwaste 🏠 us animem a participar responnent a la següent pregunta sobre la recollida selectiva de residus. ♻️  
**Sabeu on s'han de posar els tovallons de paper o paper de cuina bruts amb restes de menjar, oli de cuina...?**  
**1** paper/cartró  
**2** orgànica  
**3** resta  
**4** envasos lleugers  
**5** vidre  
Només heu de respondre amb el número correcte. Moltes gràcies per participar!  
  
Si rebeu aquest missatge és perquè heu acceptat les clàusules de privacitat del projecte LIFE RETHINKWASTE que podeu trobar a la pàgina web: [www.rethinkwaste.eu](http://www.rethinkwaste.eu). Recordeu que en qualsevol moment us podeu donar de baixa escrivint la paraula BAIXA

15:3

Bon dia ☀️  
Des del projecte LIFE Rethinkwaste 🏠 us animem a participar responnent a la següent pregunta sobre la recollida selectiva de residus. ♻️  
Sabeu on s'han de posar els tovallons de paper o paper de cuina bruts amb restes de menjar, oli de cuina...?  
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REJECTED

Buongiorno ☀️  
Scriviamo per conto del Comune 🏠  
per fornire informazioni aggiornate sul suo livello di raccolta differenziata dei rifiuti ♻️  
Se lo desidera, risponda **ok** per riceverle via WhatsApp.

09:21

Buongiorno ☀️  
Scriviamo per conto del Comune 🏠  
per fornire informazioni aggiornate sul suo livello di raccolta differenziata dei rifiuti ♻️  
Se lo desidera, risponda ok per riceverle via WhatsApp.

APPROVED



# WhatsApp HSM: it's very tricky....

Bon dia{{1}} El teu codi d'usuari és {{2}}. _Pots donar-te de baixa escrivint BAIXA_	APPROVED
Buenos días{{1}} Tu código de usuario es {{2}}. _Puedes darte de baja escribiendo BAJA_	APPROVED
Buongiorno{{1}} Il tuo codice utente è {{2}}. _Puoi disiscriverti scrivendo CANCELLAMI_	APPROVED
Good morning{{1}} Your user code is {{2}}. _You can opt out writing UNSUBSCRIBE_	APPROVED

# ReThinkWaste: Rewarding system for citizens

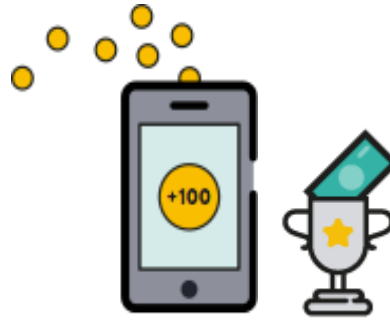


Subscribe yourself to the project, by signing GDPR or sending a SMS/whatsapp



Code:  
aj6t

Receive the confirmation and a unique code for identification



Participate and gain points!



Retire your voucher by the eco-coach



Use your voucher at the shops network

# How to gain points



Subscribe and gain «entry» points



Speak with eco-coaches in the garbage room



Answer some questions about waste in your WhatsApp



Become yourself a coach



Invite friends of the same neighborhood



Participate to informative events about waste



Participate and win block scale contest



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# KAYT: the case of Bergamo



# Bergamo

- 120,000 inhabitants
- Door to door
- Separate collection  $\approx$  65-70%
- Citizens are used to have yearly individual delivery of standard bags (transparent) for residual waste
- Willingness to introduce PAYT in the future
- Approved in 2019 a pioneer project based on KAYT
  - Beginning mid 2020
  - Based on the use of a standard bag with unique code
  - Vending machines with KAYT element: **display**



L'ECO DI BERGAMO  
SABATO 16 MARZO 2019

## Rifiuti, sacchi con codici a barre «Così differenziata più incisiva»

**La novità.** Da ottobre, per identificare i cittadini che li hanno riempiti  
Ciaga: nelle città che li usano raccolta incentivata di 2-3 punti percentuali

# Bergamo

- Innovative Know As You Throw through **vending machines** delivering individual bags with barcode
- When getting a roll of bag, the users will get information on a large screen about their **individual performance** compared to the city average of the same group of users.



<http://www.arsambiente.it/a-bergaomo-introdotto-il-sistema-kayt/>

# Vending machines

- Machines will have a 7-10" bright display
- Access through social security card
- Users will be presented KAYT information before getting the roll of bags
- The standard roll will have just 10 bags of 40 liters
  - This is to ensure frequent access to vending machines receiving informative messages – e.g. 2-3 times/year



# KAYT in Bergamo: draft example - display

1

## Good morning Mr Smith!

### Are you doing it right?



In the last 6 months you picked: 3 rolls (30 bags)

Households like yours (4 people) in Bergamo picked as an average: 2,2 rolls (22 bags)

You can do better! Please separate properly.



next



# CONCLUSION

- PAYT is a key instrument widely promoted in EU, interest is raising
  - The **effectiveness** of the schemes and its **perception** is related to many boundary conditions that have to be carefully evaluated before implementing it
  - **The quality of recyclable fractions** shall be the focus of any collection /payment schemes for the future EU recycling targets
- Having a high baseline, citizens' perception of PAYT as a “fair tax” was actually limited.
  - Mathematical limit: not possible to further increase the price of residual waste (risk of littering)
  - Charging other fractions to increase the variable part (light packaging, food waste) requires additional costs and higher effort from citizens on prevention
  - Invest in communication and feedbacks (“Know As You Throw”)
- Economics: Technology and implementation costs may be higher than overall benefits, if high baseline
- Use of **big data for information (KAYT) / nudging** is key and may allow to achieve good results together with / as an alternative to PAYT



# Thanks

Michele Giavini

[giavini@arsambiente.it](mailto:giavini@arsambiente.it)