



# TS #1: Collection and use of information to optimise waste management

**Final Conference 25 May 2022**

Phase 1: overview of the exchange of experience process  
and thematic seminars

Date: 14 – 15 May 2019

Location: Maribor, Slovenia

Organisers: Snaga

- Discussions were carried out under three (3) thematic blocks:
  1. Use of Data for the optimization of collection
  2. Use of Data for improvement in analysis and decision making
  3. Use of Data to provide feedback to citizens
- Additional experiences were brought by external experts invited by ACR+, the Advisory Partner of the project
- Site-visits to Snaga's installations:
  1. The automated sorting plant for communal waste and
  2. The three collection centres located in the city of Maribor.



# Use of Data for the optimization of collection

## 1. Route optimisation (by SNAGA)

### Objectives:

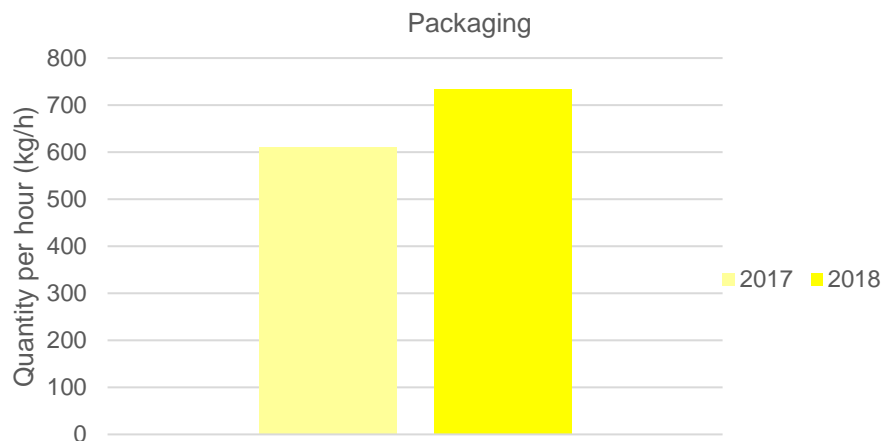
- Efficiently use of vehicles within eight working hours and supply different collection areas.
- Route optimisation system equipped with powerful optimisation algorithms which are tailored for better collection routes.

### Problems addressed:

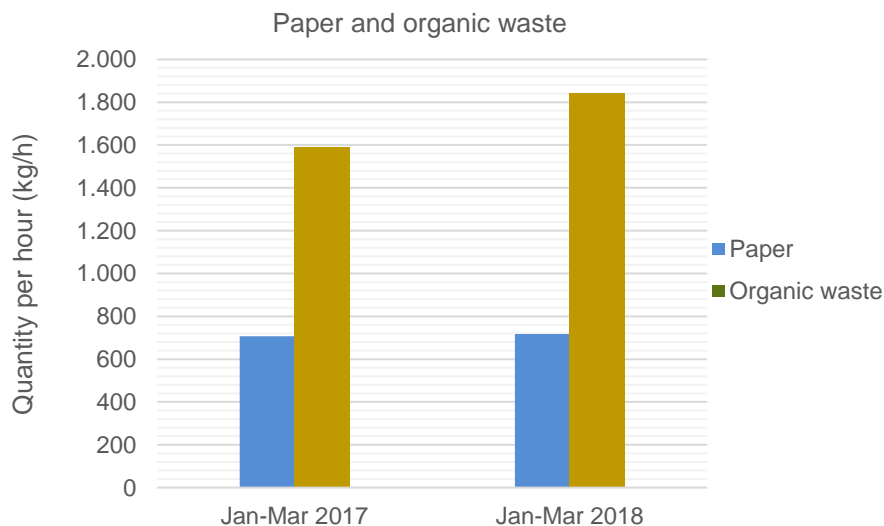
- Complex logistics related to waste collection
- Extreme dynamics in transport and
- Challenging service through different patterns.



# Results Achieved:



- Time savings.....10 %
- Overall quantity collected..... 8 %
- **Quantity collected/hour..... 20%**



- Overall quantity collected:  
 Paper.....7 %  
 Organic waste.....18 %
- **Quantity collected/hour:**  
 Paper.....7%  
 Organic waste.....16%

# Use of Data for the optimization of collection

## 2. GreenPak iBins (by ERA)

### Objectives:

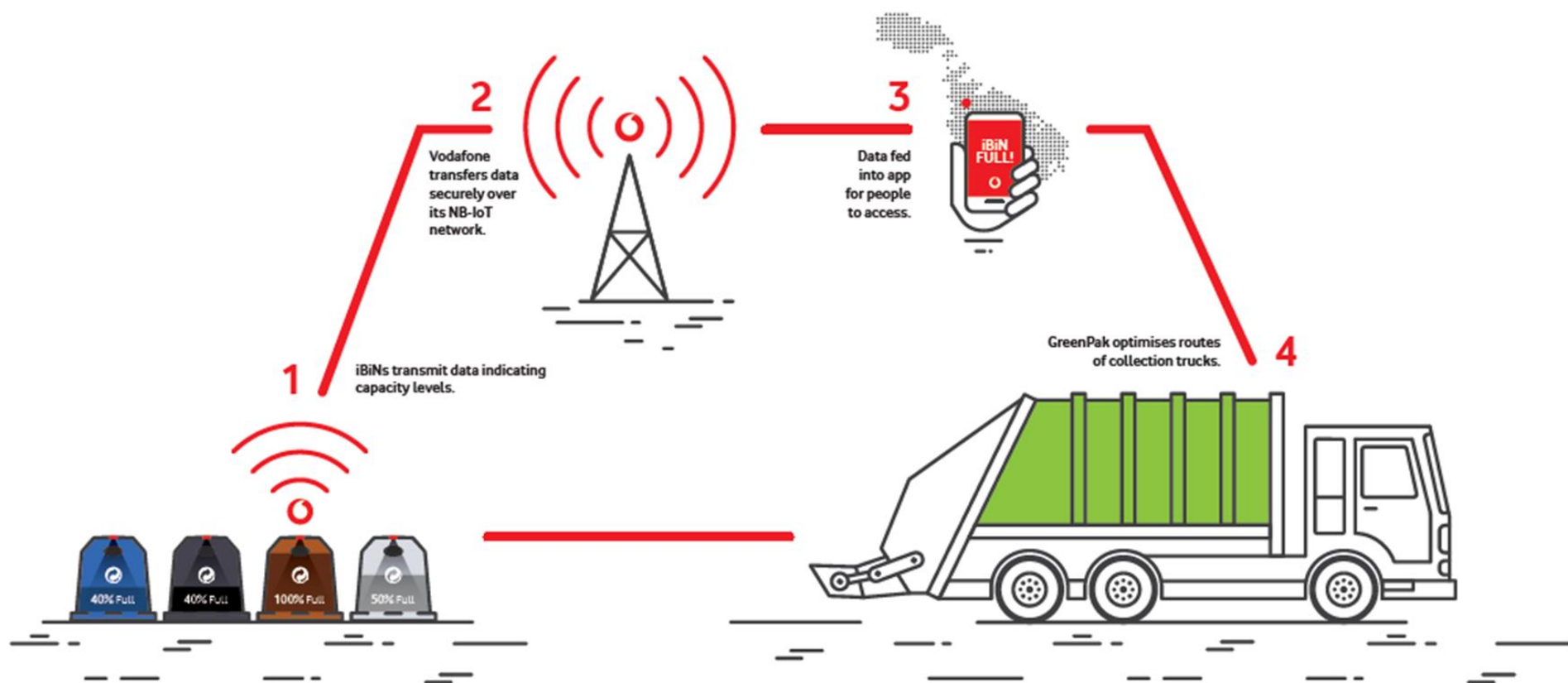
- To divert waste from landfill
- To increase yield and quality of collected packaging waste from street containers

### Problems addressed:

- Public frustration when recycling bins found full
- Better scheduling by providing emptying service according to recycling bins usage and not a fixed schedule
- Limited Data availability on public use and interaction
- Slow reaction time to adjust collection service following changes in public behaviour
- Aging waste management infrastructure







## Results Achieved:

- Public participation increased by 35%
- 168 tonnes of waste was diverted from landfill
- Improved planning operations
- Unnecessary Collection Trips reduced by 4%
- Improved Deployment - Focused on when and where service is needed
- Stakeholder Acceptance - Municipalities requested more iBiNs to be installed in their territory



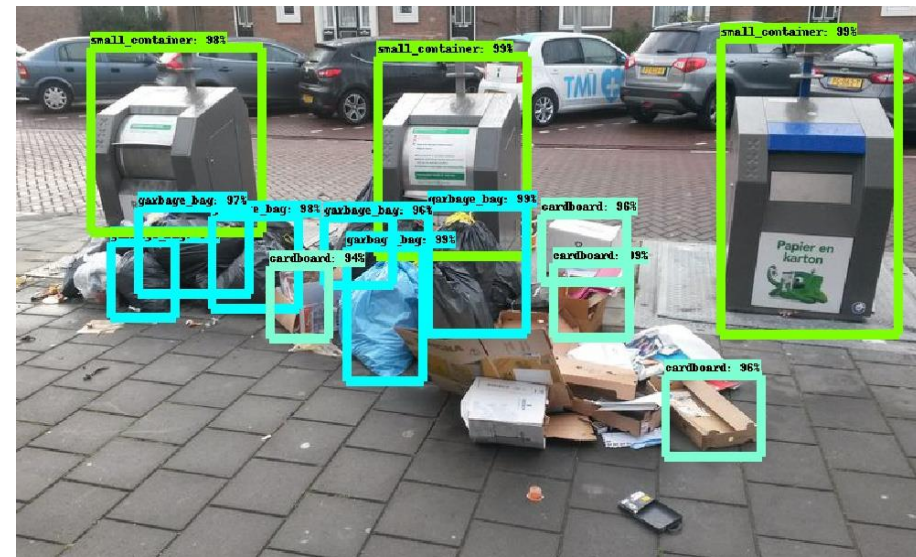
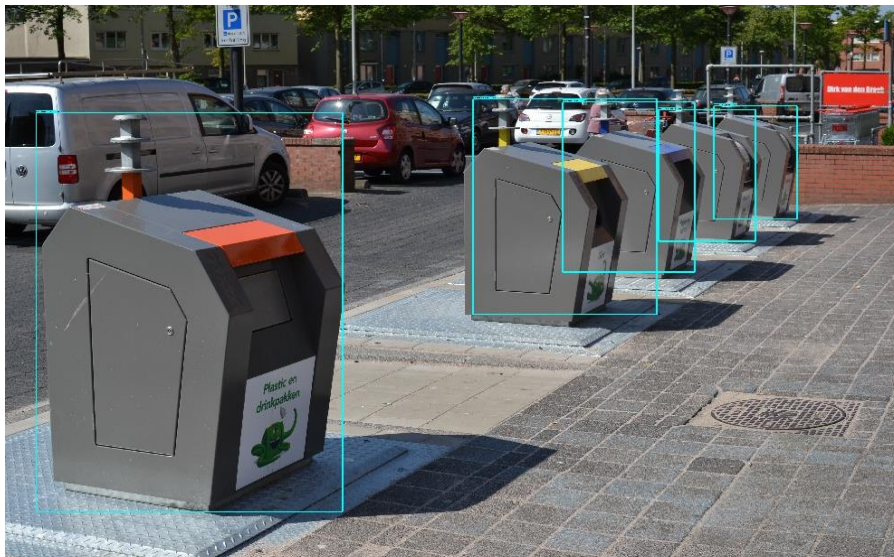


# Use of Data for the optimization of collection

## 3. Information-based collection (by City of Amsterdam)

### Main Objective:

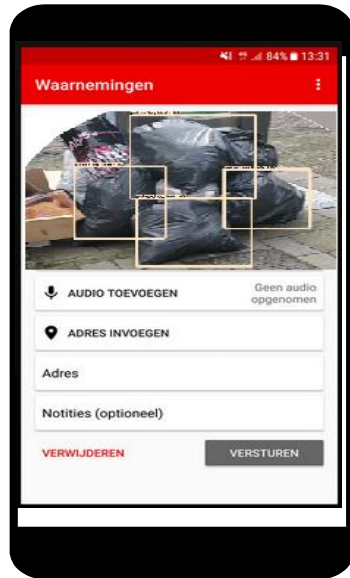
- To explore possibilities of object detection



Why is this required?

# Report

Based on images



# Label

Classify the report

Type of item	Quantity of item	Size of item	Accuracy
<input checked="" type="checkbox"/> Garbage_bag_closed	5	> 0,1 m3	< 98 %
<input type="checkbox"/> Garbage_bag_ripped			
<input type="checkbox"/> Cardboard_closed			
<input type="checkbox"/> Cardboard_open			
<input type="checkbox"/> Cardboard_pieces			
<input type="checkbox"/> Garden_waste			
<input checked="" type="checkbox"/> Wood	1	> 0,1 m3	< 97 %
<input type="checkbox"/> Matresses			
<input type="checkbox"/> Appliances			
<input type="checkbox"/> Big_undefined			
<input type="checkbox"/> Small_undefined			

# Divide

choose the right execution service



- To be responsive towards littering (e.g. around waste containers) and
- To optimise the logistics for operational services involved in collecting waste (waste department and law enforcement).

# Use of Data for the optimization of collection

## 4. Fleet management platform and databased (by Region of Crete & Municipality of Heraklion)



### Main Objectives:

- To use IT technologies to reduce the waste collection footprint in the regional unit of Chania in Crete
- To develop appropriate environmental assessment, implementation and monitoring activities related to different waste collection methodologies and the respective benefits to improve current waste management practices.
- To increase awareness of new waste collection methodologies, by provide training and disseminate information for the active participation of local stakeholders.

# Use of Data for the optimization of collection

## 5. Waste Collection with weighing (by EMULSA)

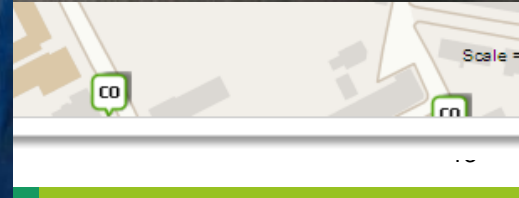
### Objectives:

- To get data to improve waste collection system
- Reduce overweight risk
- Optimize collector capacity

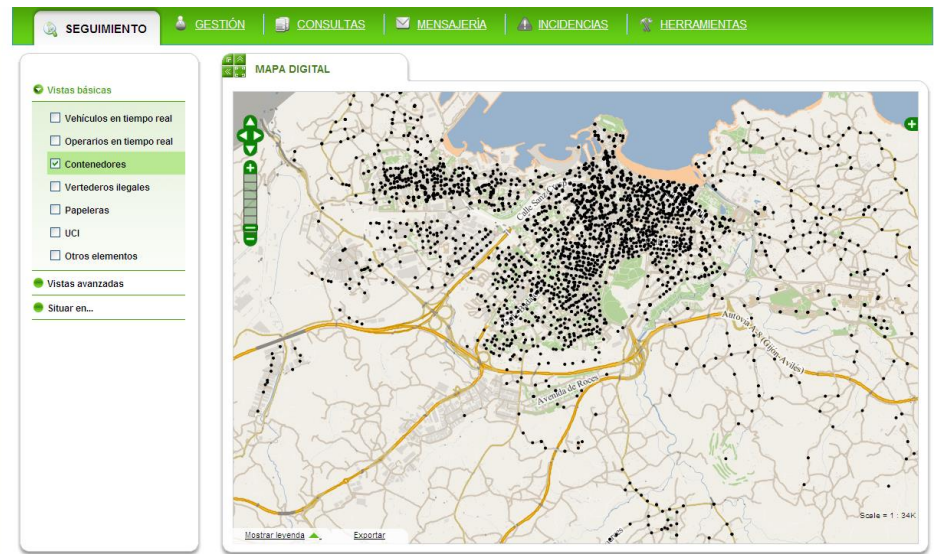
### Problems addressed:

- No control/data (containers collected, weight....etc)
- Overweight (Security) / Underused (Optimization)
- Driver's dependence
- Extra time and resources to get data when needed





- Increase in knowledge amongst stakeholders + acceptance
- Containers emptied/washed more frequently- reduce overweight
- Regular weighing of each container- more tracability
- Route optimisation
- Reduced irregular manoeuvres





# Use of Data for the optimization of collection

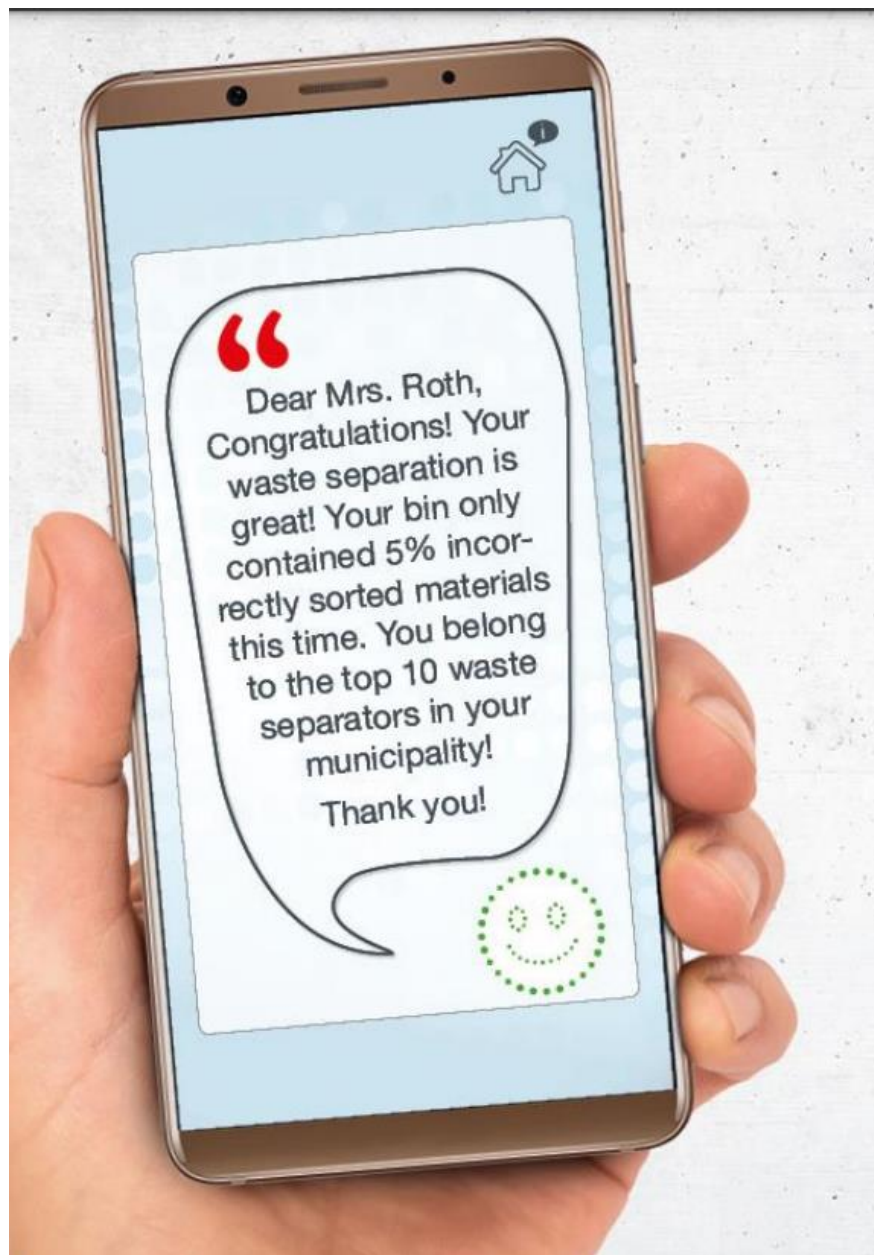
## 6. Digitalisation waste collection (by SAUBERMACHER)

### Objectives:

- To focus on waste intelligence and identify misthrows in waste.
- To raise awareness about waste disposal and separation.

### Technology:

- The reusable materials scanner integrated into the refuse collection vehicle and uses Artificial Intelligence (AI).
- Using a communications platform, clients and residents can have direct feedback on the quality of their separation, reducing misthrows and lowering disposal costs.



# Use of Data for improvement in analysis and decision making

## 1. DataWarehouse (by the City of Antwerp)

### Objectives:

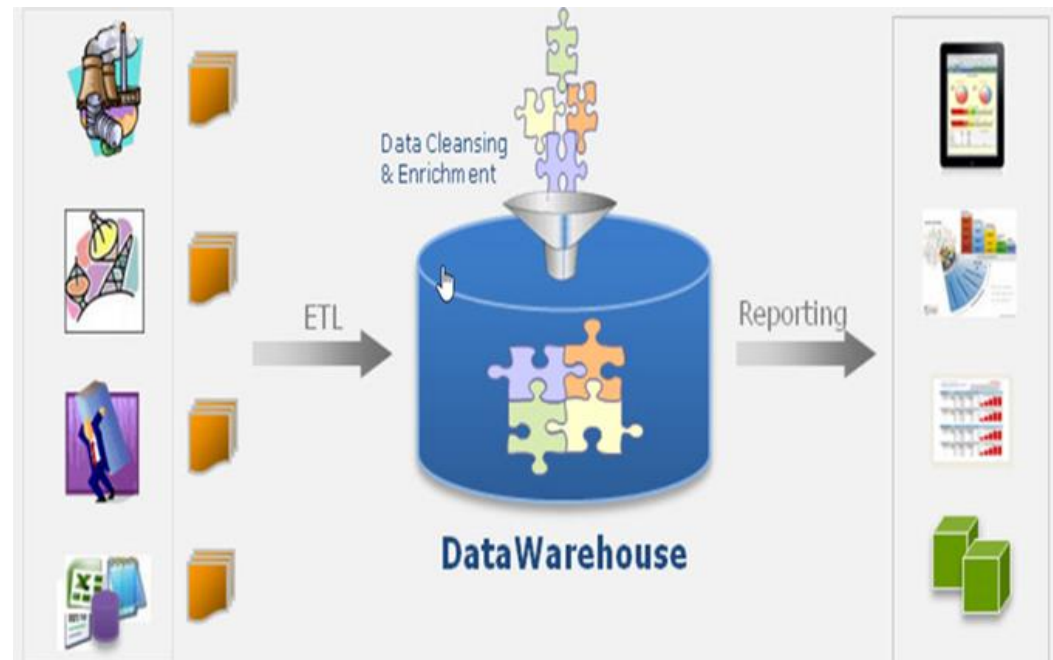
- To increase insights in waste prevention, collection and behaviour
- To disclose waste management data to stakeholders
- To increase transparency
- To connect with all types of data- using Internet Of Things (IOT) and Geographical Information Systems (GIS)
- To improve financial flows

### Problems addressed:

- No possibility to make reports across different data sets
- Huge data sets – limited xls-capacity
- No data transparency – no global view
- Lack of structure and guidelines
- Old fashioned data collection – e.g. Handwritten notes

## Results Achieved:

- Platform with several different nodes
- Enriched data from different sources
- Dashboard on different themes that previously weren't possible
- Stakeholders acceptance - Administration & policy makers satisfied
- Quicker response time with one single data source
- Many researcher requests - surcharge reporting
- Adapting routes (safety & insurance)



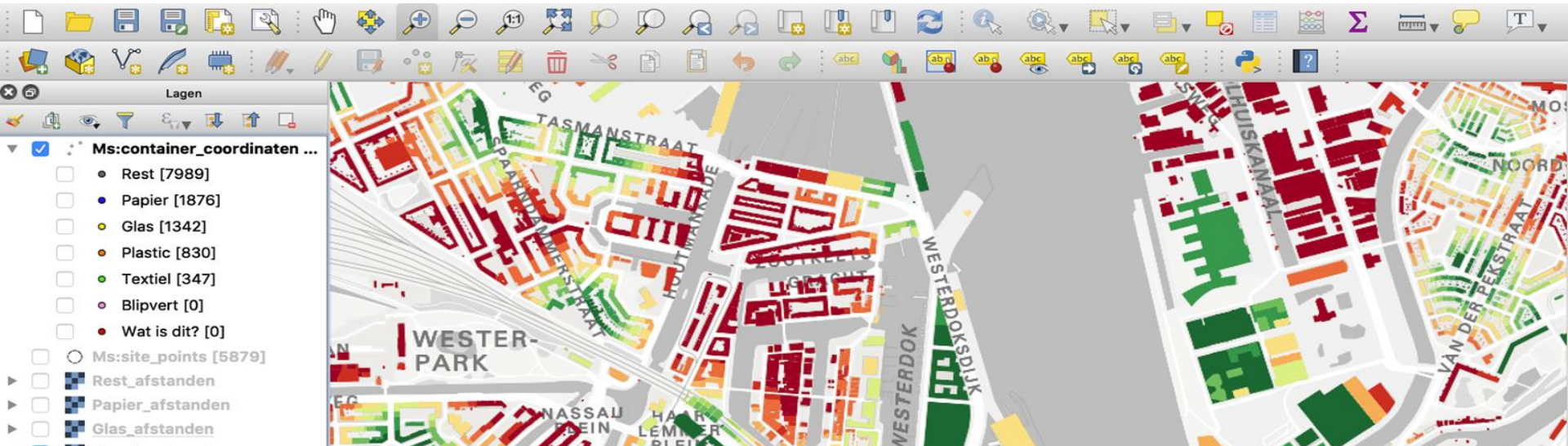


# Use of Data for improvement in analysis and decision making

## 2. Sharing data on waste and resources with the public (by the City of Amsterdam)

### Objectives:

- To empowering locals - more transparent and accessible
- To foster economic development – e.g. Geospatial data can be used to improve private sector business models.
- To provide more digital commodity



# Results Achieved:

14:43 Za 4 mei

data.amsterdam.nl

100%

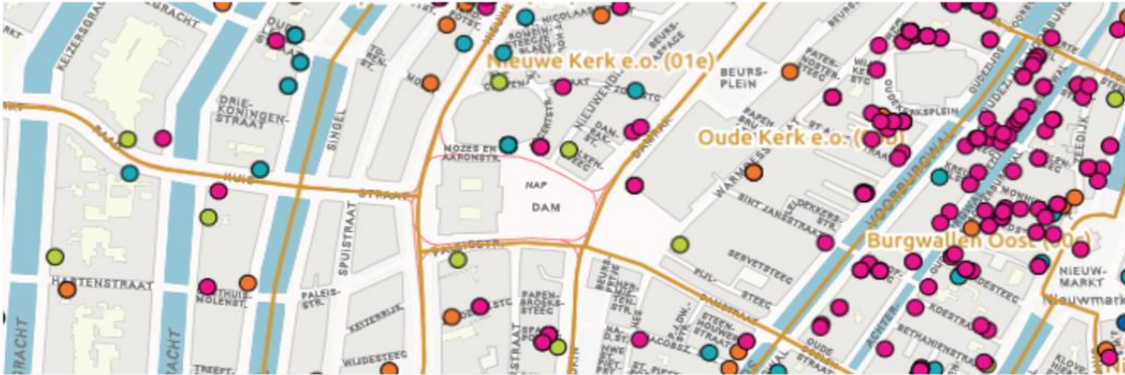
Gemeente Amsterdam

City Data

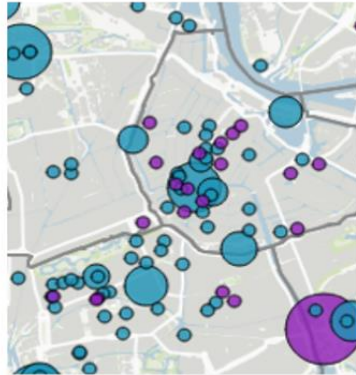
Contact

Zoek data op adres, postcode, kadastrale aanduiding,


Inloggen Feedback Help





Data op de kaart





Meer op Maps Am...


 Verkeer en infrastructuur


 Toerisme en cultuur


 Geografie


 Bevolking


 Openbare ruimte en groen


 Stedelijke ontwikkeling


 Zorg en welzijn

 Energie

 Adressentabel

 Handelsregister-tabel

 Kadaster-tabel



20



# Use of Data for improvement in analysis and decision making

## 3. Civic Amenity Site access control (by EMULSA)

### Objectives:

- To improve data on waste deposit – including type of waste and quantity.
- To improve control of CA sites- reduce abuse of sites.

### Problems addressed:

- No control of CA sites
- No Data (e.g. users number, frequencies, waste typology, user typology....etc..)



## Results Achieved:

- New Data (e.g. Users typology, schedule access, frequency, quantities per user... etc)
- Avoided Irregularities
- Stakeholders acceptance
- Reliable System
- More traceability



# Use of Data to provide feedback to citizens

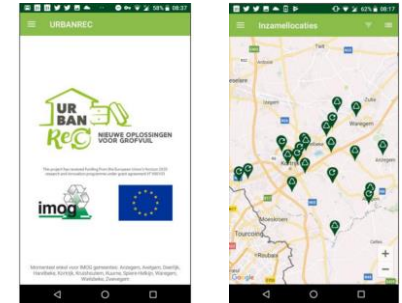
## 1. Citizen Reuse app (by IMOG)

### Objectives:

- To increase re-use and recycling of bulky items
- To fill gap between re-use center, citizens and waste management organisations
- To create another way of communication with citizens
- To create education and awareness
- To create easy link for citizens to services from waste management organisations and re-use-centers

### Problems addressed:

- Bulky items from households often becoming waste, while still good enough for re-use



# Use of Data to provide feedback to citizens

## 2. Civic Amenity Site “Customer Portal” (by IMOG)

### Objectives:

- To increase the amount of bulky waste suitable for recycling
- To develop innovative data collection system on recycling patterns
- To collection of data at civic amenity site
- To educate and raise awareness
- To assist in revising waste/recycling policies

### Problems addressed:

- Aprox. 16 % of waste at CAS was mixed bulky waste- difficult to recycle
- Importance of avoiding waste
- Importance of good sorting

# Use of Data to provide feedback to citizens

## 3. Datacenter (by LIPOR)

### Objectives:

- To create statistical reporting
- To improve decision making process
- To provide on-time information

### Problems addressed:

- Traditional approach of data collection

#### TRADICIONAL APPROACH

Total weight collected from one (or more) circuits for each flow



Global Collection Profile by Zone



#### DATACENTER

Total weight collected from one (or more) circuits for each flow



Global Collection Profile by Zone

Individual Collection Profile for each client



# Use of Data to provide feedback to citizens

## 4. Citizen Reuse app (by EMULSA)

### Objectives:

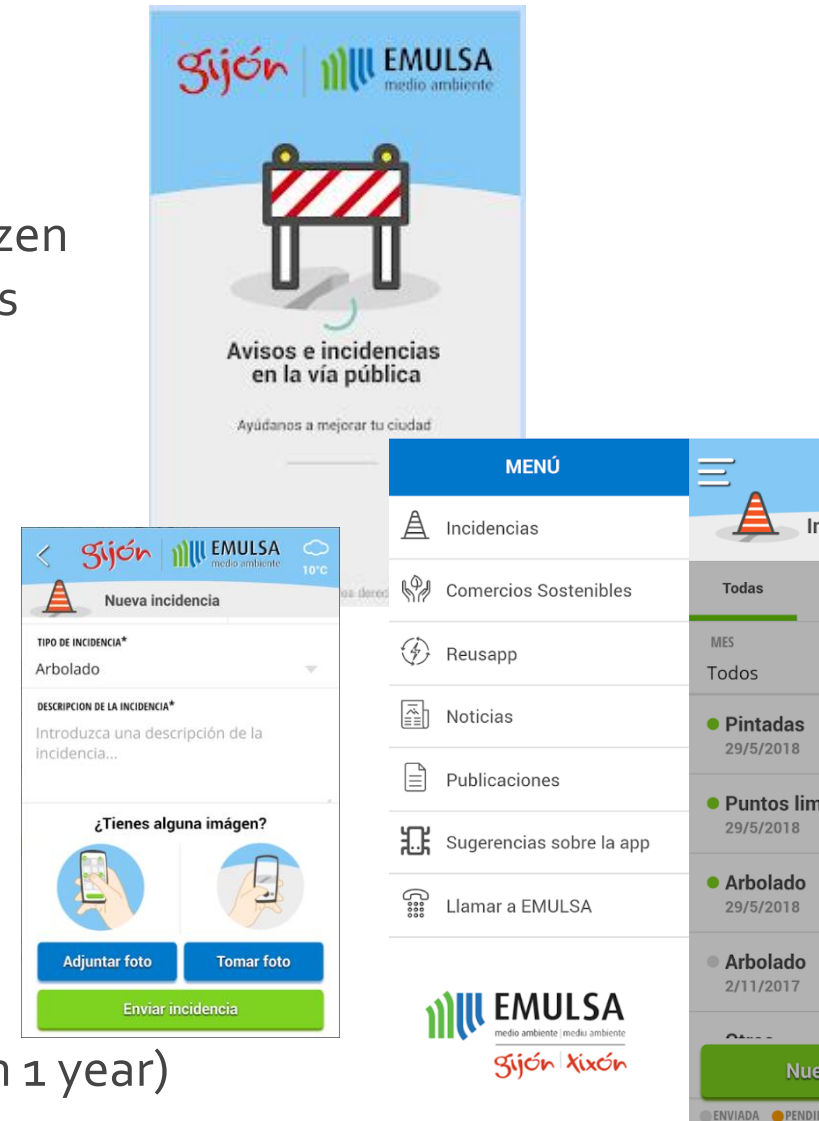
- To improve information channel with citizen
- To reduce time to resolution of incidences
- To increase reuse percentage
- To promote Circular Economy

### Problems addressed:

- Objects in good condition to Recycling
- Habitual Robberies
- Miscommunication with citizens

### Results Achieved:

- 1,500 Active Users
- 2,206 incidences reported via app
- 758 items exchanged – 2.700 kg (less than 1 year)





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European Union  
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Thank you!

Questions welcome



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