



Amsa

GRUPPO a2a

SEPARATE WASTE COLLECTION AND CIRCULAR ECONOMY



AMSA AND THE INTEGRATED WASTE CYCLE IN MILAN

Girona, FEBRUARY 6, 2017

A2A GROUP – THE LARGEST ITALIAN MULTIUTILITY



A2A today

We are top ranking in **energy, environment, heat** and **network** sectors
Leader in the **environmental services** and **district heating**.

Innovation, quality and efficiency in services, **sustainability, transparency, respect** and listening to people, are **our values**.

We are engaged on a path of **ongoing integration of territories**, research and investments in new technologies for creating values, grabbing opportunities that will open up in green economy and the smart city

4921

Million €
Turnover

1048

Million €
EBITDA

215

Million €
EBITA

0.041

€ per share
Dividend

«ENVIRONMENT» BUSINESS UNIT - A2A GROUP (2015)

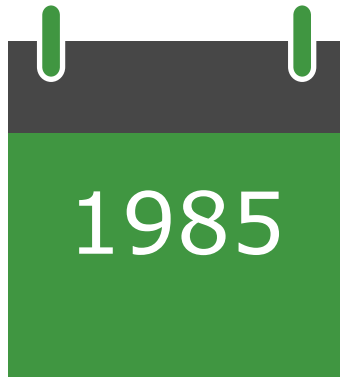
2.6 million inhabitants

1.27 million t of collected
waste

2.7 million t of treated
waste

AMSA AND A2A GROUP

Evolution



Municipality of Milan

AMSA is 100% owned by the Municipality of Milan



A2A Group

AMSA Joins A2A Group



A2A Environment

AMSA is included in the "Environment" Business Unit



EXPO 2015

AMSA designs services tailored to the needs of the Exhibition site

SERVED AREA AND CRITICAL ISSUES

Amsa key numbers



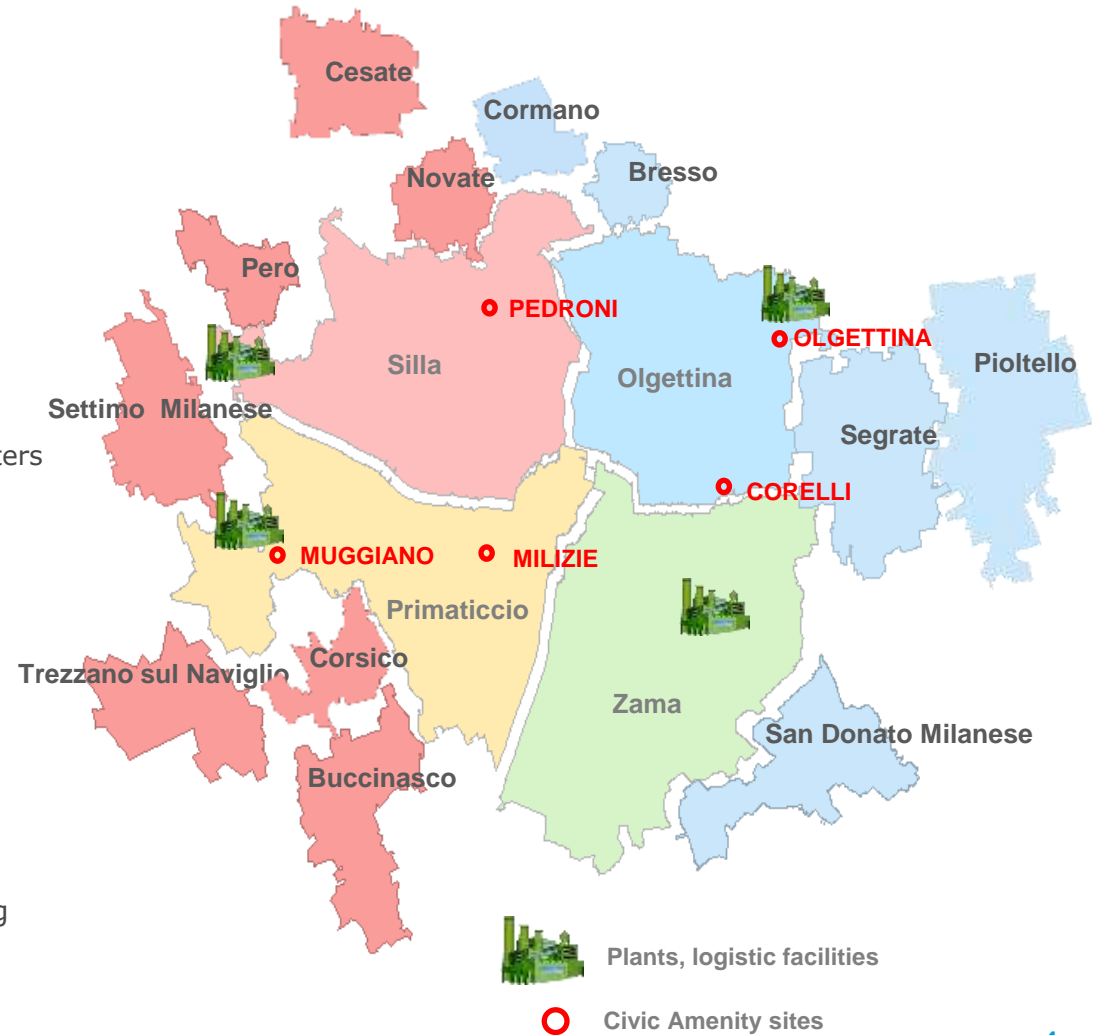
The City of Milan

- ✓ **1.3 million** inhabitants
- ✓ **2,200 t/day** MSW
- ✓ **182 Km²** area
- ✓ **2,000 Km** of streets
- ✓ **12** surrounding municipalities served (260,000 residents)
- ✓ **3,200** employees
- ✓ **1,400** vehicles
- ✓ **55,000** collection points
- ✓ **5** civic amenity sites and **2** mobile Eco centers
- ✓ **170** bring banks for paper and glass



Critical issues

- ✓ **High** population density
 - 7,200 inh./Km²
- ✓ **Streets and traffic**
 - Lack of space
 - Rush hour traffic and illegal parking
- ✓ **Commuting**
 - 700,000 commuters every day



WASTE COLLECTION AND STREET CLEANING

Delivered services in Milan

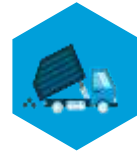


Waste collection

Waste collection 668,158 t/year 2015

53% Separate Collection

- ✓ **352,292 t** Total recyclables
 - **81,100 t** Paper and cardboard
 - **43,199 t** Plastic and metals
 - **65,298 t** Glass
 - **134,636 t** Organic
 - **28,059 t** Other
- ✓ **315,866 t** Residual waste



Street cleaning

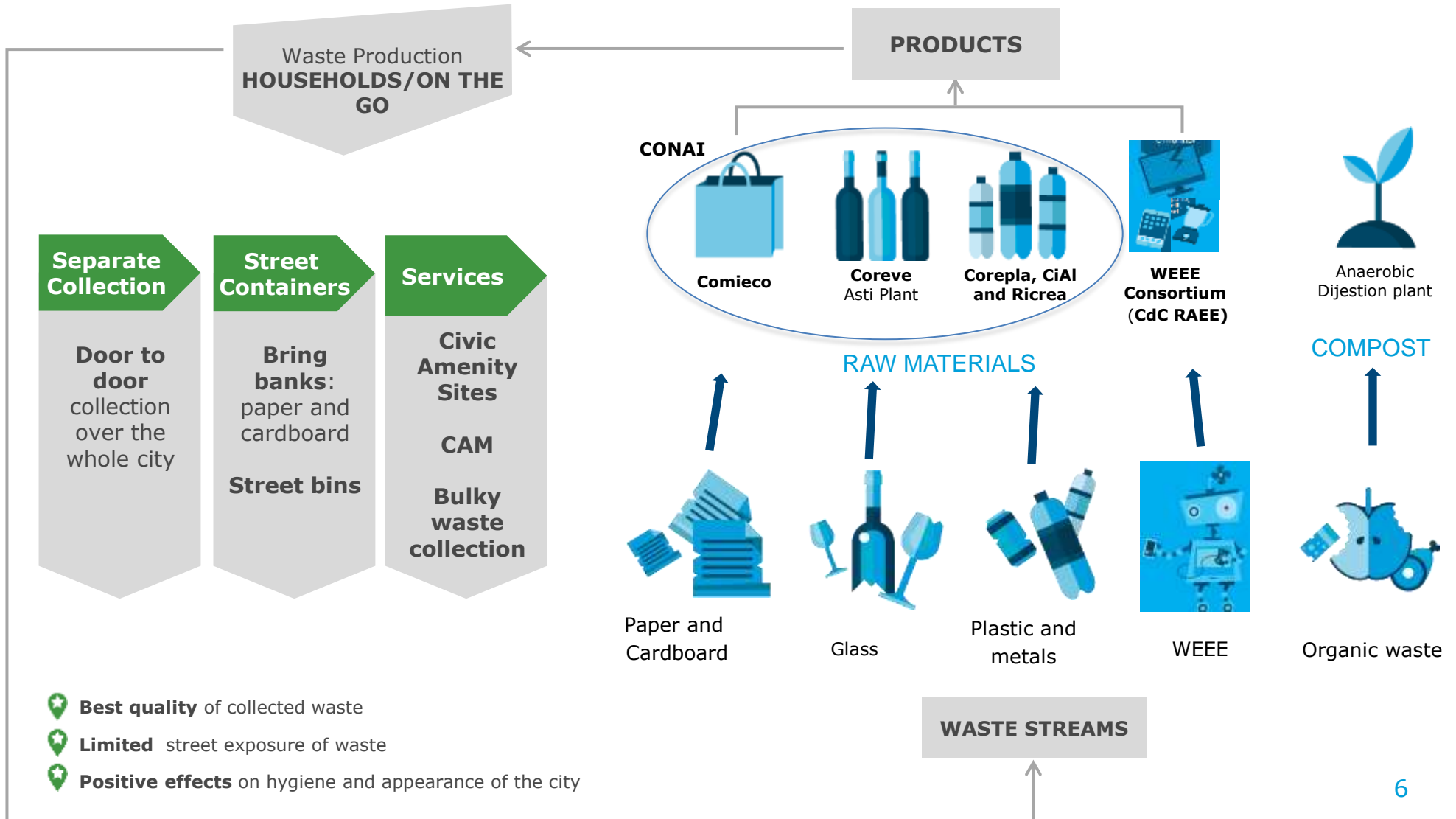
- ✓ **2,185 Km** of streets to clean (**4.370 Km** for both sides of the road)
- ✓ **2,800** parks and gardens
- ✓ **23,200** street bins
- ✓ **94** open street markets weekly
- ✓ **Other services:** cleaning embankments, street and sidewalk weeding, drain wells, emergency management and major events, graffiti removal, mobile toilets, winter services, disinfestation, etc...



THE INTEGRATED WASTE CYCLE IN MILAN



Circular economy of waste

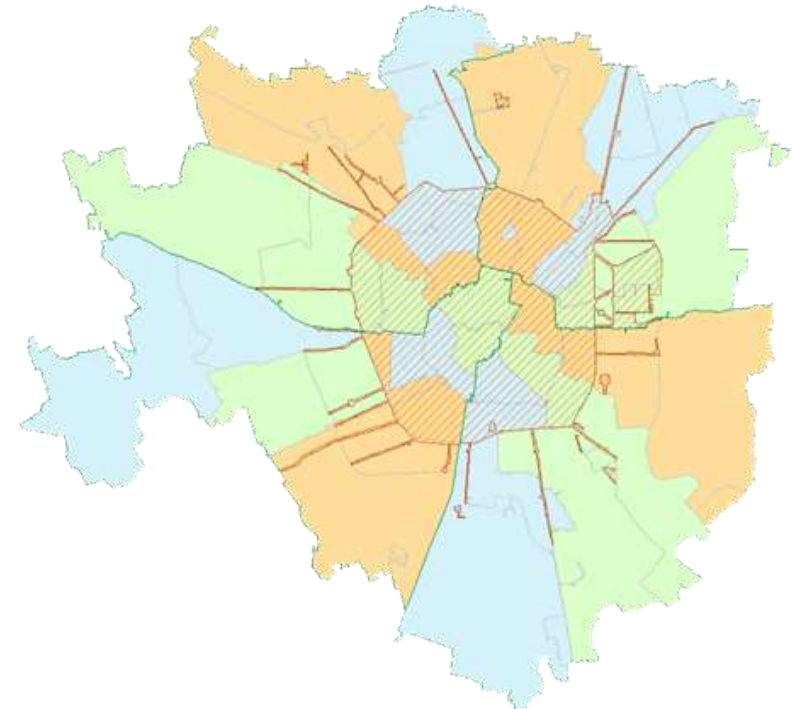


WASTE SEPARATE COLLECTION IN MILAN





Times and methods

- ★ **Door to door collection** over the whole city with:
 - bins (paper, glass and organic)
 - bags (light metals, plastic, residual waste)
- ★ **55,000 collection points**
- ★ Residual and organic waste collection twice a week
- ★ **Waste storage** in private premises within buildings
- ★ **Waste bins and bags are brought on the street** by the citizens on **specific days and at times** set by Amsa
- ★ All pick-up services are carried out between **5:30 am and 12:00 am from Mon to Fri, between 6:50 and 12:00 on Sat (Sun services only for commercial users)**
- ★ The city center (highest traffic area) is served before **8:00 am**



Weekly schedule

Residual waste

-  Monday/Thursday
-  Tuesday/Friday
-  Wednesday/Saturday
-  City Center

WASTE SEPARATE COLLECTION IN MILAN

Time schedule for every waste fraction



Clear bag (residual waste)

Twice a week



Yellow bag (plastic and metals)

Once a week



Cardboard

Twice a week for commercial waste



White containers (paper)

Once a week



Green container (glass)

Once a week



Brown container (organic)

Twice a week for domestic waste

Every day for commercial waste



Separate waste collection in Milan

SEPARATE WASTE COLLECTION IN MILAN

Integrated plan for organic waste collection 2012-2014



BEFORE

- ▶ Milan is the **second largest city in Italy** and over **80% of families live in high rise buildings**
- ▶ In **2011**, Milan had a **35% separate collection rate**, mainly dry recyclables collected with door to door system
- ▶ Only organic waste **from commercial activities** as restaurants, supermarkets, hotels, schools **was collected separately** and composted



ACTION PLAN

1. Introduction in 2012 of the **transparent bag** to replace the black bag **for residual waste collection**

2. Introduction in 2012 of the **households food waste collection**

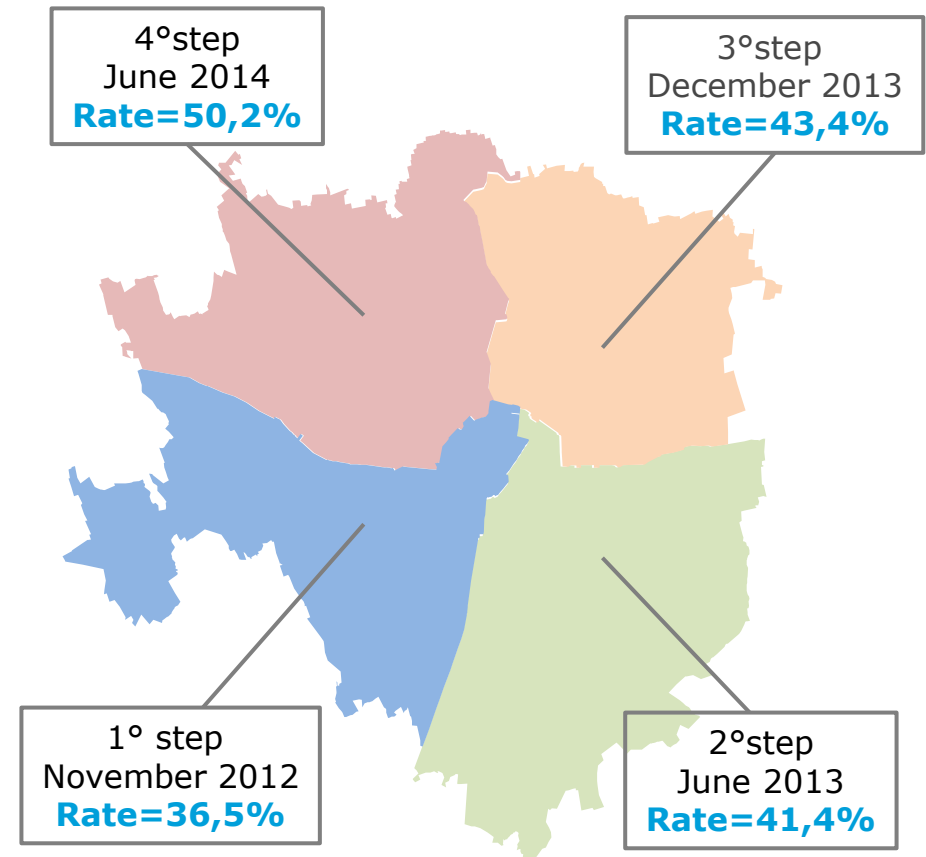
OPERATIVE PLAN TO OPTIMIZE COLLECTION

Household organic collection

4 step implementation program

OPERATIVE PLAN

- **Door to door collection**
- Sizing of a **new collection system** (weights, users, routes, productivity, ...)
- Activities coordinated with the Municipality of Milan
- **Delivery of kits to households** with:
 - ✓ leaflets and cards
 - ✓ compostable bags and 10lt bins as initial equipment (sponsored, free for citizens)



OPERATIVE PLAN TO OPTIMIZE COLLECTION

Households kit



WHEELED BIN

120 lt. wheeled bin at the curbside. Standard equipment for every building. Also available a **smaller 35 lt. bin** on request



VENTILATED KITCHEN BIN

The small **kitchen bin** has a **special airy structure** to ensure optimal oxygenation of the bag and its content **and thus minimizing** the inconvenience related to the creation of **odors and liquids.**

25 COMPOSTABLE BAGS

Bags made of **bioplastics** have **properties** and **characteristics** of use **very similar to traditional plastics**, but at the same time, they are **biodegradable** and **compostable** according to the European standard EN 13432



Note: bins are given free loan to citizens

OPERATIVE PLAN TO OPTIMIZE COLLECTION

What should the citizen do?

Step 1

Food scraps are thrown in the kitchen bin with certified compostable bags (available in stores or reusable shopping bags)



Step 2

Compostable bags need to be carried to the 120 lt. wheeled bin located in the courtyard



Step 3

Wheeled bins are carried in the streets at scheduled times for pickup by Amsa's trucks



OPERATIVE PLAN TO OPTIMIZE COLLECTION SERVICE



Logistics of collection and transport



Household bins



Collection



Visual inspections of waste



Loading operations



Transfer to treatment plant

OPERATIVE PLAN TO OPTIMIZE COLLECTION SERVICE



Quantitative results (2015)

100 kg

Quantity per capita

100 kg/inh./year is the quantity per capita of food waste that we collect.

This result is the highest across all major European cities

30 %

Commercial waste

About 30% comes from commercial activities and schools while the majority is residential

135,000 t

Overall quantity

About 135,000 t/year of food waste are now being collected separately and sent to AD for organic recycling saving 8,760 t of CO₂/year**

* Data does not include green waste which are collected separately in Civic Amenity Sites.

** Calculated by CIC, the Italian Composting and Biogas Consortium based on the Defra (UK) calculation tool, 2011

OPERATIVE PLAN TO OPTIMIZE COLLECTION

Quality of the organic fraction



Composition analysis performed with the collaboration of **CIC** (Italian Composting and Biogas Consortium)



Samples taken from the brown bin show **good quality** with Non Compostable Material (**NCM%**) at **5%** on average



The compostable materials is composed almost exclusively of **food waste** with a negligible presence of **paper, cardboard and garden waste (<3%)**



Plastic is the main contaminant in particular **plastic bags, solid plastic** and, where present, **diapers**



ORGANIC COLLECTION IN OPEN MARKETS

Trial introduction

Objective

- ❖ **Increasing** organic waste separation
- ❖ **Improving cleaning conditions** of the stands after-sales to allow reduced cleaning operations
- ❖ **Re-use of extra-market workers** in additional cleaning activities

Trial organization

- Implementation **in 15 markets** with a duration of at least six months (still on going)
- **Biocompostable bags according to UNI EN 13432:2002 (approx 70 l.)** located in each market stand
- Distribution of **steel perches for biocompostable bags and bag holder rings** for the stands.

PERCH



BAG HOLDER RING

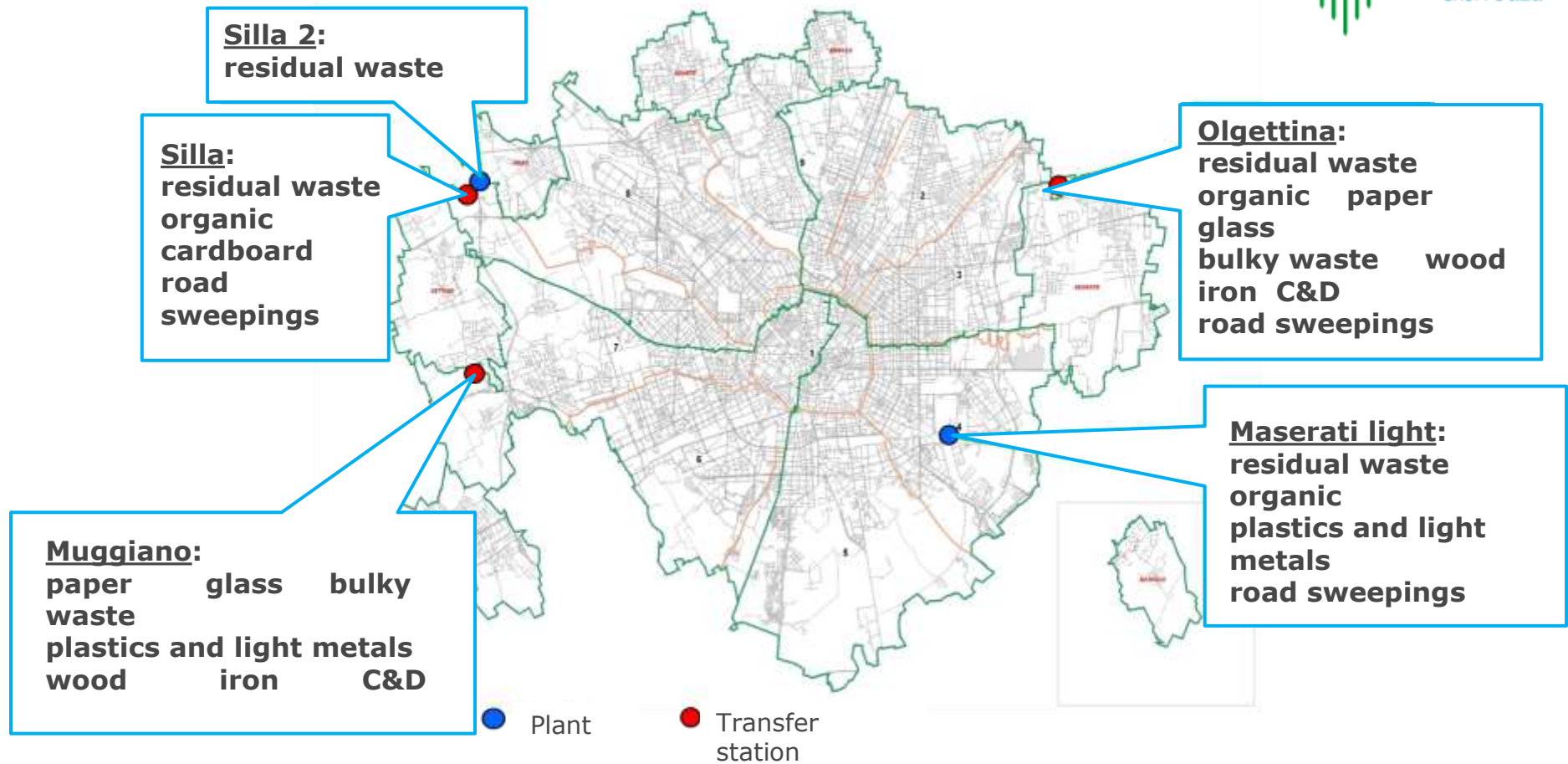


Results

During the first half of testing, good levels of the organic waste collection were recorded (**16% on average**), due to the information campaign and continuous monitoring of the stands.

LOGISTICS AND DISPOSAL

Transfer stations and plants



AMSA has optimized its collected waste **transport system** to treatment centers, taking into account the criticality of a city like Milan (traffic, road conditions, different vehicles for collection, etc.) with a **network of transfer stations**: this system of **second level logistics** allows to reduce transfer times, in order to optimize the use of the vehicles and to reduce logistics costs.

INNOVATIVE TECHNOLOGIES

“Smart” technologies for a smart city



SMART BINS

Patented technology solution for real time monitoring of containers active in Milan.
By December 2017 is expected the placement of 300 smart bins (for a total of 15,000 containers by 2018)



SWEEPY JET®

Sweepy Jet is a patented equipment for cleaning the streets and sidewalks without moving the parked cars



CENTRAL CONTROL ROOM

- ✓ **Monitoring** information
- ✓ **Detecting** critical issues in the area and share them with the Operating Units and Third Companies
- ✓ **Supporting** the operating units in the management of events
- ✓ **interacting** with local Institutions
- ✓ **Providing** an overview of all the delivered services in the area



FUTURE PLANTS

The **development plan** for the next three years include: **2 installations** for the selection of multi-material (plastic and metal packaging) and **2 anaerobic digestion plants** for the organic fraction of municipal waste

EXPO 2015



At the **Expo 2015 Exhibition site** Amsa was able to reach the goal of 70% of recycling

BENEFITS OF ORGANIC WASTE COLLECTION

An example of circular economy

Milan with the plan for organic waste separate collection was able to:

★ Reach european goals for waste recycling and getting close to italian goals (65%)

- Over **50% Recycling**
- **Recovering residual waste as energy and heat**
- Recovering the organic fraction of the MSW with **100 kg/inh.*year**

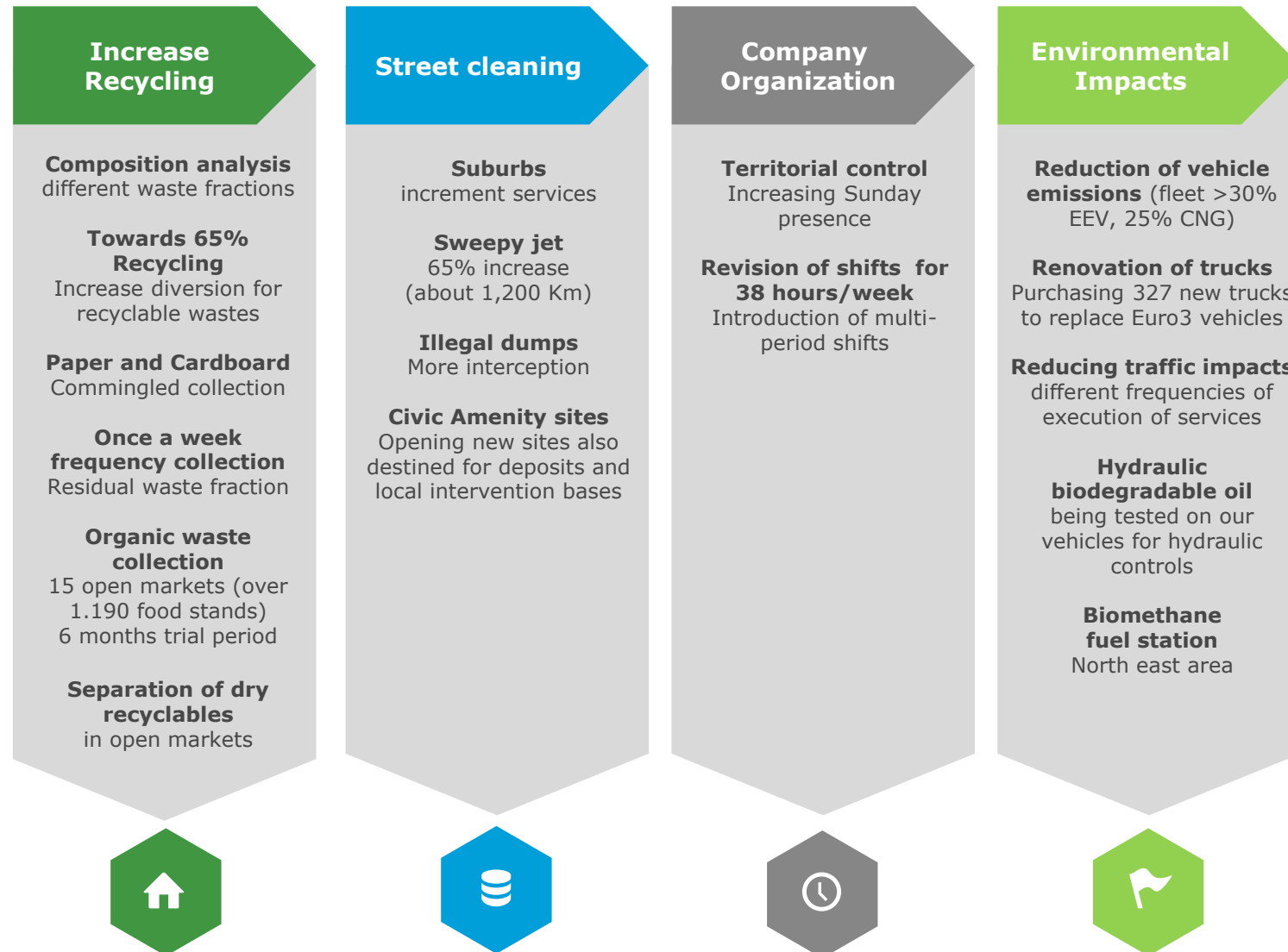
★ Contribute to circular economy:

- **New employment** opportunities
- **Developing innovation** (eg. the recovery of waste sweepings) and the use of new materials and new products such as biocompostable bags)



ENVIRONMENTAL SUSTAINABILITY

Amsa strategy towards 2020





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THANK YOU FOR YOUR ATTENTION

