MUNICIPAL SOLID WASTE MANAGEMENT IN MILAN

SEPARATE WASTE COLLECTION IN THE CONTEXT OF A CIRCULAR ECONOMY IN EUROPE

Bruxelles, January 29th, 2016
AMSA KEY NUMBERS

AMSA manages **collection, transportation and disposal of waste, as well as cleansing services** in the city of Milan.

- **Milano and 12 municipalities** as main clients
- ~2.3 million people served (800,000 city users included)
- ~786,500 t of MSW collected in 2015
- 500,000 km of swept roads per year
- ~1,400 waste collection and street sweeping vehicles (30% CNG fueled)
- **ISO 9001, ISO 14001** and **OHSAS 18001** certifications
The «MILAN MODEL» IN MSW MANAGEMENT
Organizational and technological choices for the efficiency in collection

Collection and treatment

- Orientation towards **increasingly domestic collection system** and integration with other modes (amenity sites and CAM – mobile amenity site)
  - Introduction of household organic waste collection
- Waste treatment based on **handling of recyclable materials** and on the **recovery of energy from residual fraction** (Zero landfill)

Environmental sustainability

- **Reducing vehicle emissions** (methane fleet> 30%)
- **Reducing impact on traffic** (diversification in services scheduling)

Goals of service quantity and quality

Service efficiency
MILAN INTEGRATED WASTE MANAGEMENT SYSTEM:
Separate waste collection and recovery of energy and heat

Typical parameters of an integrated waste management system:

- Separate collection rate - Maximizing separate waste collection geared to the actual recovery of materials
- WtE - Recovery of energy and heat through thermal treatment of NON recyclable waste
- Zero landfill (since 1997)
THE «MILAN MODEL» IN MSW MANAGEMENT
Separate waste collection, an example of circular economy

From production to collection

Waste production
HOUSEHOLD
ON THE GO

From collection to creation of valuable waste

PRODUCT

From creation of valuable waste to product

Compost

Secondary raw material

- Paper and cardboard
  Quantity 2015
  81,100 t

- Glass
  Quantity 2015
  65,298 t

- Plastics and light metals
  Quantity 2015
  43,199 t

- Organic
  Quantity 2015
  135,822 t

Amenity sites
CAM (Mobile amenity site)
Bulky waste collection service on the street, free of charge at home, by paying

- Bring banks for paper and glass
- Street bins

Best quality of collected waste
Limited street exposure of waste
Positive effects on hygiene and appearance of the city

Door to door collection over the whole city

bins (paper, glass and organic) bags (light metals, plastic, residual waste)

Sent to platforms and recycling treatment plants in agreement with Comieco
Sent to recycling treatment plants in agreement with Coreve (a2a Ambiente Asti plant)
Separated by material in pre-sorting plants and sent to recycling plants in agreement with Corepla, CIAl and Ricrea
Sent to anaerobic digestion plant in Montello

This information was prepared by A2A Ambiente and it is not to be relied on by any 3rd party without A2A Ambiente’s prior written consent.
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 brought on the street in specific days and times set by Amsa
- All pick-up services are carried out between **5:30 am** and **11:20 am** from Mon to Fri, between **6:50 am** and **11:40 am** on Sat (Sun services only for commercial users)
- The city center (highest traffic area) is served before **8:15 am**
# WASTE SEPARATE COLLECTION IN MILAN

## Garbage pick up frequencies

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear bag</td>
<td>Twice a week</td>
</tr>
<tr>
<td>Yellow bag</td>
<td>Once a week</td>
</tr>
<tr>
<td>Cardboard</td>
<td>Twice a week</td>
</tr>
<tr>
<td>White containers</td>
<td>Once a week</td>
</tr>
<tr>
<td>Green container</td>
<td>Once a week</td>
</tr>
<tr>
<td>Brown container</td>
<td>Twice a week for domestic waste</td>
</tr>
<tr>
<td></td>
<td>Every day for commercial waste</td>
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</tbody>
</table>
## WASTE SEPARATE COLLECTION IN MILAN
### Integrated plan for waste collection 2012-2014

### BEFORE
- Milano is the **second largest city in Italy** with 1.3 million inhabitants, over 7,000 inh./km² and over 80% of families live in high rise buildings.
- In **2011**, Milan had **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
Action plan in 2 phases:

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 SERVICE IN MILAN
Household organic collection

Operative plan

- **Door to door waste bins collection**
- Sizing of a new collection system and construction of a theoretical optimal model based on key elements (weights, users, routes, productivity, ...)
- Activities coordinated with the Municipality of Milan
- **Delivery of kits to households** with:
  - Informative leaflets and cards
  - Compostable bags and 10lt bins as initial equipment (sponsored, free for citizens)

Quality analysis

- Compostable waste fraction consists of **kitchen waste**, with a negligible presence of paper, cardboard and green waste
- **Main contaminants**: plastic bags used improperly as containers (90% of NC fraction)

4 step implementation program

1° step
November 2012
Rate=36,5%

2° step
June 2013
Rate=41,4%

3° step
December 2013
Rate=43,4%

4° step
June 2014
Rate=50,2%
OPERATIVE PLAN TO OPTIMIZE COLLECTION SERVICE IN MILAN

Households kit

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 formation 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.

Wheeled bin

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

Note: bins are given free loan to citizens.
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, to optimize the use of the vehicles and to reduce logistics costs.
COMMUNICATION TOOLS TO OPTIMIZE COLLECTION SERVICE

- **Customer Center** (24/7)
- **Web-site** [www.amsa.it](http://www.amsa.it)
  - possibility of downloading communication material in 8 languages (English, Spanish, French, Arabic, Chinese, Ukrainian, Romanian and Sinhalese)
  - search engine to control roads and paths reached by service
- **App** PULIamo for all mobile operating systems
- **Publications and information materials** (brochures, leaflets, audio / video, etc.)
- **Media relations** (press releases, interviews in newspapers and the trade press)
- **Passive advertising** (campaigns with billboards, commercials,...)
- **School Project** with educational tours for students (from elementary to high school)
- **Guided tours** of departments and facilities
**RECALL ACTIONS AND SPECIFIC TARGETS CAMPAIGN**

**Information campaign on quality**

- 180,000 guides in 10 languages: Italian, English, Spanish, French, Arabic, Chinese, Ukrainian, Romanian and Sinhalese and Tagalog
- One to one distribution, foreigners among people of the same Nation

**Ethnic campaign for separate collection in Milan**
RESULTS
Separate collection rate trend in Milan

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
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<tbody>
<tr>
<td>TOTAL MSW</td>
<td>666.418</td>
<td>649.838</td>
<td>665.641</td>
<td>668.158</td>
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~53%
RESULTS
Separate collection rate in Milan

TREND OF SEPARATE COLLECTION RATE IN MILAN (1993-2015)

- Household organic collection
- Energy recovery

Projection to 2016

Energy recovery:
- 37%
- 43%
- 50%
- 53%

Energy recovery projection to 2016:
CONCLUSIONS

**Door to door collection system** allows to be more efficient in order to achieve a better quality of all recyclable fractions and to minimize the residual solid waste fraction.

**Door to door collection service** has been designed taking into account needs of user comfort and, most of all, hygiene.

Residential organic waste collection has exceeded expectations leading Milan to break the **50% recycling in 2014**.

The case of Milan shows that it is possible to implement **household organic separated waste collection system in densely populated metropolitan cities with excellent quantitative results and high standard service**.

The “Milan model” in MSW management with the collection and recycling of waste (dry and wet fractions) contributes virtuously to the implementation of an innovative system of circular economy.