CGE Engineering

Recycling

Separate waste collection

Waste as a source of raw materials and energy

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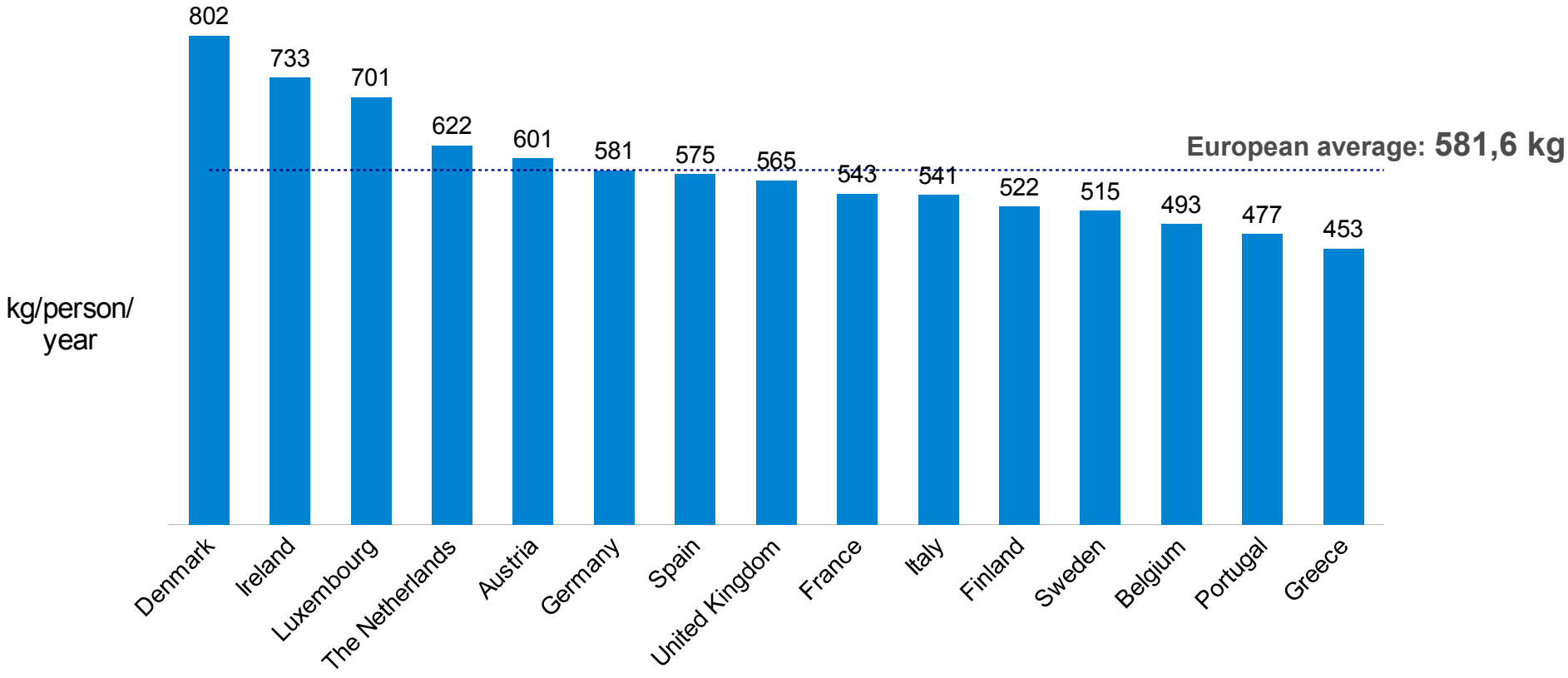
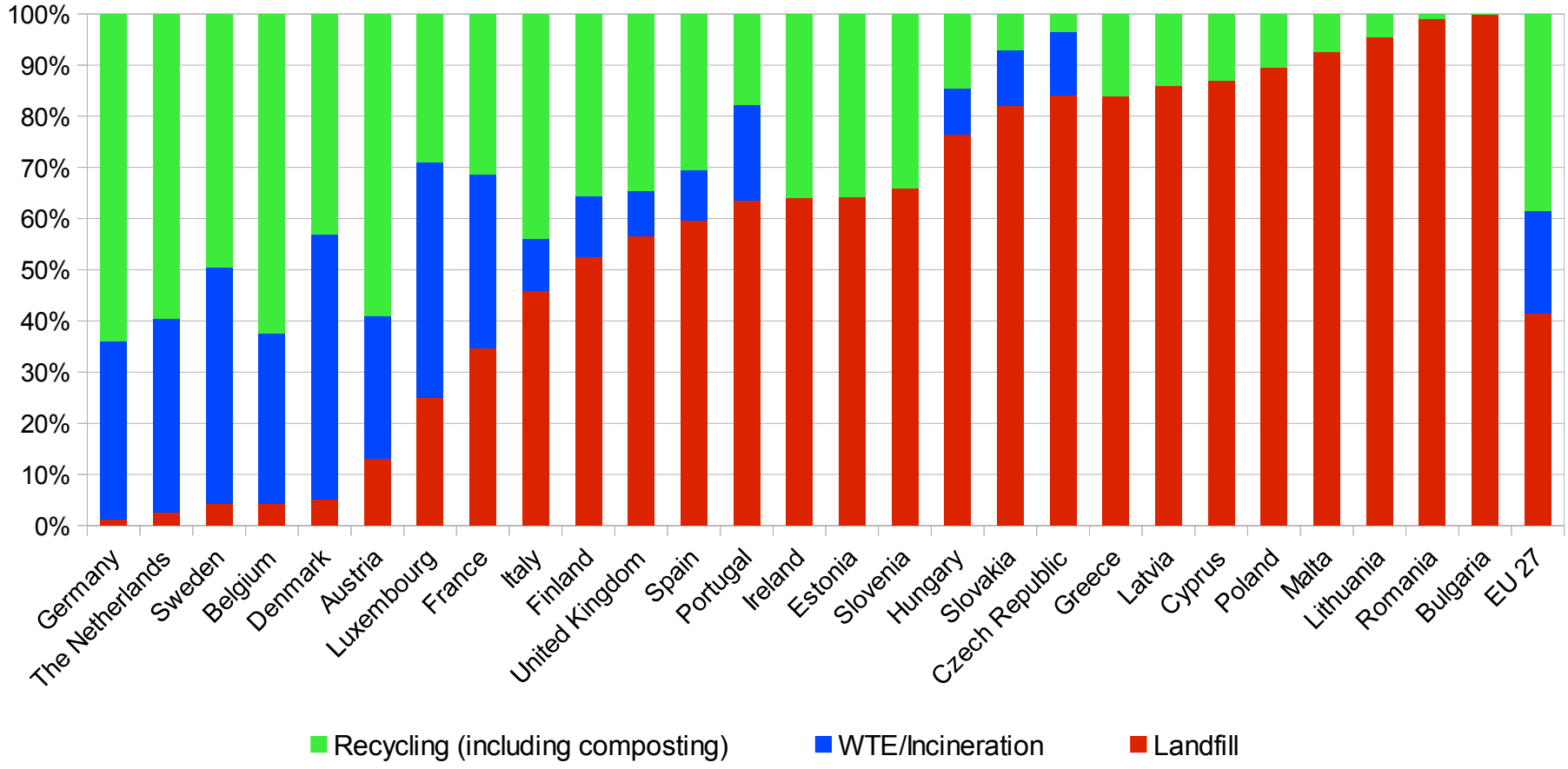
Waste production – EU15 Countries



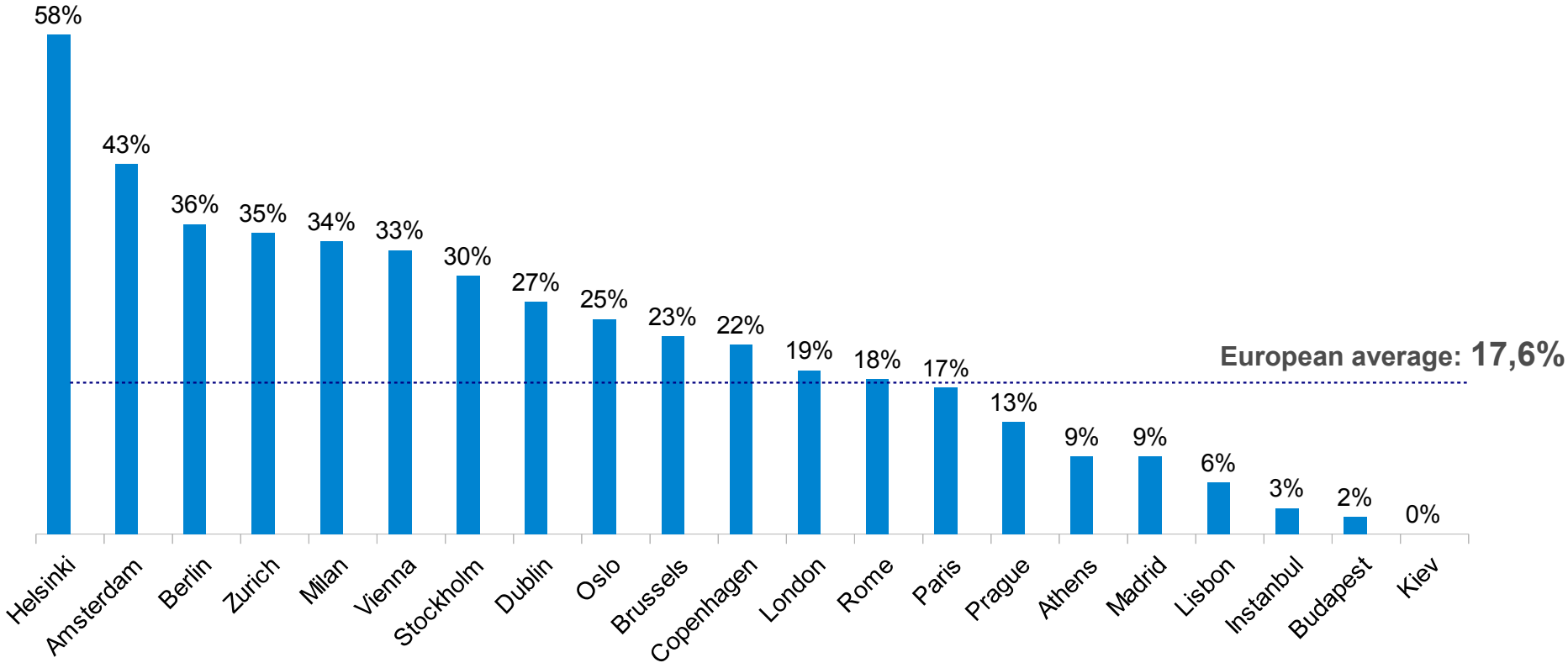
Source: EEA/Eurostat – year 2008

Municipal solid waste disposal in EU27 Countries



Source: EEA/Eurostat – year 2008

% recycling in European main cities



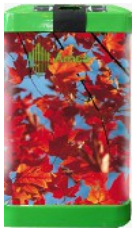
Source: Siemens Green Cities Index – year 2008

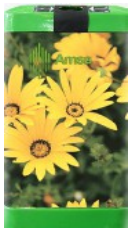
Separate waste collection and energy recovery

Integrated waste collection system

Waste door-to-door collection across the entire city by the use of:

- *Dumpsters* (paper and glass)
- *Garbage bags* (organic waste, plastics and metals, residual waste)
- *Bulky waste withdrawal* directly at home (on demand)
- *Collecting facilities* for bulky and hazardous waste
- *Street containers* for paper and glass
- *Street bins*





Recycling chain of paper and cardboard

Paper+cardboard joint collection

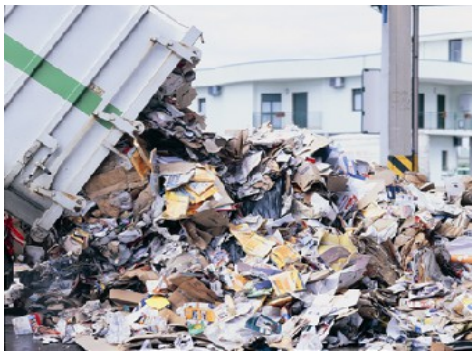
Paper mill:
- pulping
- purification
- reworking

Paper pulp

Collection facilities

Selection platform

Recycling chain of paper and cardboard



Recycling chain of plastics and metals

Plastics+metals joint collection

Selection platform

Consortium for recovery

Transit Point

Plastics collection and recycling

- Separated polymers by mechanical and chemical recycling:

PET	SYNTHETIC FIBRES
PVC	CABLES AND PIPES FOR THE BUILDING INDUSTRY
PE	CONTAINERS FOR CLEANSINGS

- Mixed polymers from residual materials:

TOOLS FOR PLAYGROUND AND GYMNASTICS; ARTICLES FOR STREET FURNITURE: BENCHES, PLANTERS, FENCES, ROAD SIGNS.

Plastics collection and recycling

Aluminium recycling

Recycling chain of glass

GLASS COLLECTION

Glass sorting plant

Glass scrap foundry-ready production

GLASS FOUNDRY

Transit Point

Recycling chain of glass

Milan: an example of excellence

Basics:

- 1.3 million inhabitants
- 7,200 inhabitants/km^2
- 700,000 commuters
- 182 km^2 city area
- 4,000 km city roads

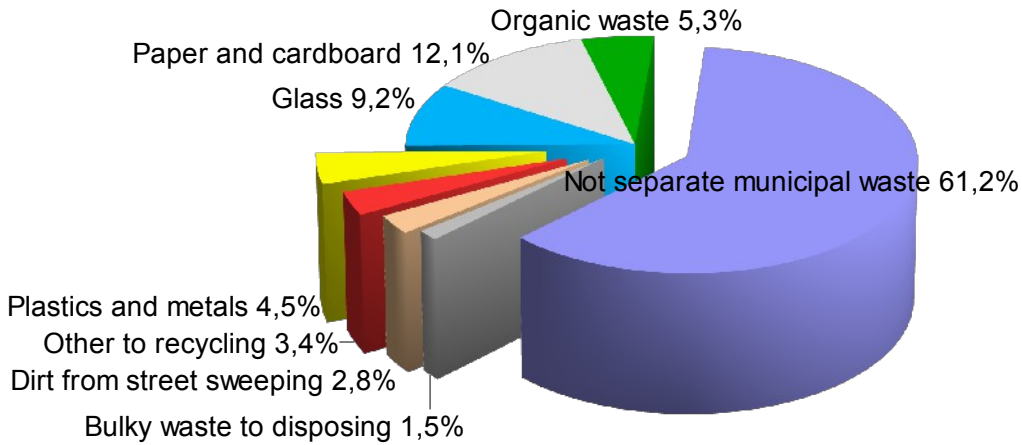
Critical points:

- High production of waste: 2,200 ton/day
- Lack of space
- Traffic during rush hours and hampering parked cars

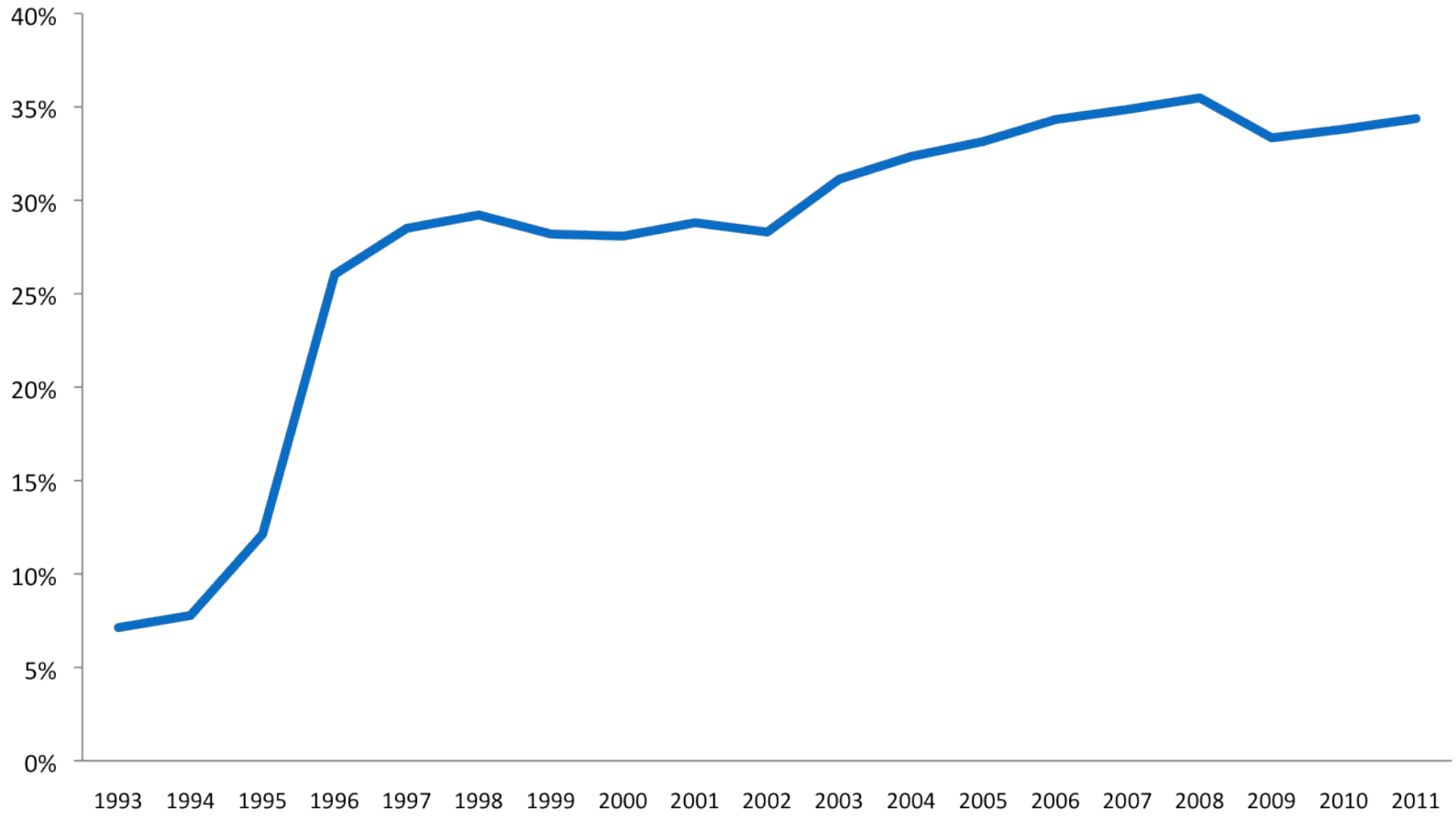
Municipal solid waste collection in Milan

Collected waste	ton/year	% municipal solid waste
Organic waste	36,400	5.30%
Paper and cardboard	82,800	12.10%
Glass	63,800	9.20%
Plastics and metals	31,300	4.50%
Wood	5,800	0.80%
Textile	2,800	0.40%
Metals (from collecting facilities)	1,600	0.20%
Batteries	700	0.10%
Electronic waste	3,600	0.60%
Bulky waste to recycling	8,800	1.30%
Total separate waste collection	237,600	34.50%
Dirt from street sweeping	19,200	2.80%
Bulky waste to disposing	11,000	1.50%
Not separate municipal waste	423,700	61.20%
Total not separate waste collection	453,900	65.50%
TOTAL	**691,500**	**100.00%**

Year 2011



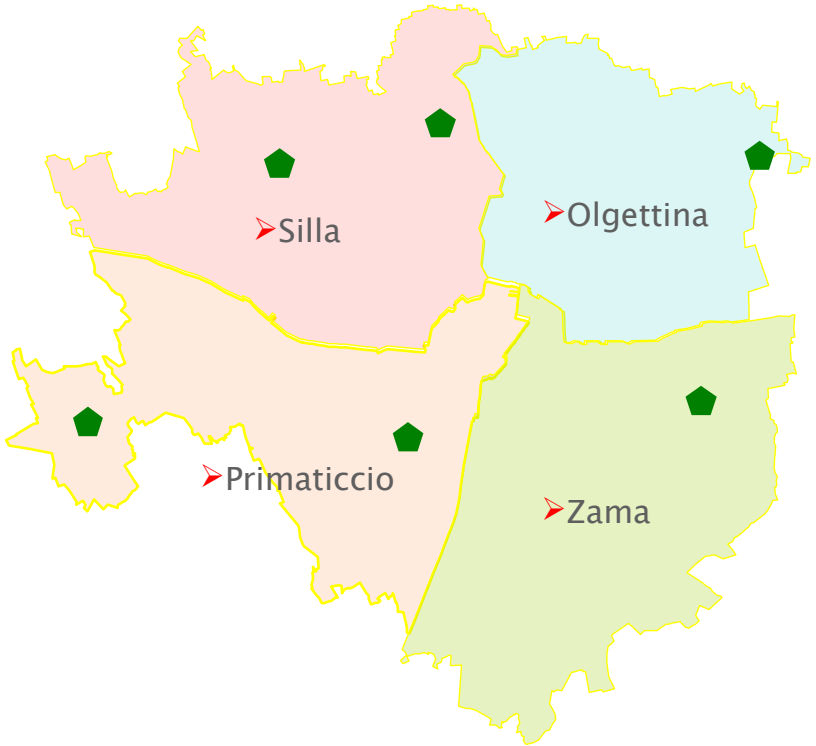
Milan: separate waste collection rate



Source: A2A S.p.a. Milan

The six collecting facilities of Milan

Collection points mainly intended for the disposal of bulky and hazardous waste



What can be disposed in the collecting facilities of Milan

- Hazardous waste (tires, paints, car batteries, toners, fluorescent tubes, common batteries, etc.)
- Bulky waste
- Electronic waste (televisions, computers, refrigerators, air conditioners, energy-saving bulbs, etc.)
- Metals (iron, steel, aluminium, etc.)
- Wood and chipboard
- Paper and cardboard
- Inert materials
- Frying oils, used oils and greases

Glass processing facility of Milan

The plant processes the collected glass eliminating other materials in order to meet the quality standards required by the *Consortium*:

- small pieces of glass (< 15mm): max 5%
- Ceramic: max 0.2%
- Other materials: max 1%

The *Consortium* finally enters the so obtained raw material onto the market.

Glass processing facility of Milan

Productivity: 80,000 t / year

Sorting tasks include:

- Separation of ferrous and non-magnetic materials
- Automatic detection of ceramic
- Manual sorting (to separate coarse ceramic, plastics and cellulosic and inert materials)
- Aeraulic separation of lightweight plastics
- Separation of small pieces of glass
- Glass sorting according to the quality standards required by the *Consortium*

Bulky waste processing facility

Productivity: 30,000 t / year

Handles bulky waste collected from home and disposed in the collecting facilities

Selection tasks:

- Mechanical and manual sorting of incoming material
- Chopping and sifting

Sorted materials sent to recycling:

- Wood
- Ferrous metals
- Aluminium

The remaining material is intended to energy recovery *(Waste to Energy)*