

# Food waste recycling

Milan, Italy 

## Milan's citywide food waste collecting and recycling service

The City of Milan started the door to door collection of organic (food) waste in some city areas in 2012. After 1.5 years, the service has been extended to all households in the city. Food waste is collected in special biodegradable bags and transferred to an anaerobic digestion plant which generates biogas and compost. Thanks to the high involvement of citizens, the current recycling rate of food waste in Milan is already above the EU target of 50% by 2020. That is why Milan is currently considered the international leader in organic waste collection and recycling. Also, in 2014, the City of Milan has pledged to develop its overall Food Policy on a five year term [4].

### Country/ City Profile

	Country		City	
	Population (2014)	61.34 million [6]	Population (2014)	1,350,680 (city) [9] 7,585,200 (metropolitan) [11]
	Land area (km <sup>2</sup> )	301,340 [7]	Land area (km <sup>2</sup> )	181.76 (city) [10] n/a (metropolitan)
	GDP per capita (2014, current international \$, at purchasing power parity)	34,706 [8]	GDP per capita (2014, US\$, at purchasing power parity)	n/a (city) 41,147 (metropolitan) [11]
	Region	South Europe	Region	Inland
City's physical geography	Location	<ul style="list-style-type: none"> <li>✓ Located near the foothills of the Alps and the three lakes - Como, Maggiore, Lugano</li> <li>✓ Surrounded by rivers Ticino, Adda and Po</li> <li>✓ Relatively low altitude (~120 m) (urban heat islands)</li> </ul>		
	Climate	<ul style="list-style-type: none"> <li>✓ Temperate, moderate continental (average annual temperature: 13 C°)</li> <li>✓ 1,013 mm/year annual rainfall</li> </ul>		

### Initiating context

In 2000, the City of Milan implemented an integrated waste management system based on the maximization of separated waste collection for recycling plants and the recovery of energy and heat through thermal treatment of non-recyclable waste. Thanks to commitment of its citizens, a large proportion of all household waste production was already being separated before the projects implementation. There was also already a well-established system for door to door collection of paper, cardboard, plastics, metals and glass in place. Still, it was not enough to reach European and Italian recycling goals (the EU recycling target is 50% by 2020, but Italy has a more ambitious goal). To improve its results, Milan decided to introduce transparent bags instead of black bags (to allow separation of plastic, paper or glass still present in residual waste) and extend food waste collection to households (before it was collected and recycled only from commercial entities) [4].

### Project description

The main purpose of the separate collection of organic waste is to redirect this material from incineration and send it to an anaerobic digestion plant with energy recovery (biogas) and production of good quality soil additives. In Milan, this process is led by a regional operator of waste called AMSA. In the introduction phase, AMSA distributed equipment required for food waste collection which consisted of 120 and 35 litre bins, 10 litre ventilated kitchen bins (to minimize the formation of liquids and odours), biodegradable bags and brochures [1]. Now AMSA collects the waste all over the city with non-compacting methane or biodiesel powered trucks. Food waste is then brought into two transfer stations and transported with packer trucks to the anaerobic digestion and composting plant of

Montelo [3]. Food waste collection frequency is twice a week at households and daily at schools and large subjects like restaurants. Organic waste collection and treatment is considered to be quite expensive in general, but the revenues from the production of energy from biogas are reducing these costs.

### Implementation process

Door-to-door organic waste collection started in November 2012 in 1/4 of the city. By June 2014 the remainder of the city was served. The first step towards the implementation was to investigate conditions in each district which included verification of common spaces available for the installation of bins and contacting building managers or owners. The second step was to distribute all the bins [4]. The third step was to stimulate and inform citizens on the proper use of the service. During this step several communication models were used. Letters signed by the Mayor and AMSA's president were sent to families, building managers and presidents of Area City Councils [2]. A special mobile-telephone application, Puliamo, was developed to provide the information and service contacts. Moreover, a website was launched with leaflets translated in nine languages. Also, the introduction of the service was followed by extensive advertising in the newspapers, on billboards and TV, offering guided tours of waste management facilities and educational modules in schools [4].

The City of Milan coordinated many activities in setting up the new food waste collection system. To develop the functional system, it was necessary to have information such as the number of inhabitants or households and determine some key elements like distances, loads or productivity. Also, the food waste compositions were regularly analysed in collaboration with Parco di Monza Agronomy School [4]. After some operational tests, in the field, the system was optimized.

### Projects implementation details [4]

<b>Process</b>	The project was gradually implemented in four areas of Milan. The implementation process was preceded by the investigation of possible spaces for bin installation. In parallel a communication campaign which prepared citizens for the new system of organic waste collection was introduced.
<b>Financing</b>	The project is financed by the City of Milan.
<b>Leadership</b>	City of Milan with regional waste operator AMSA.
<b>Involved stakeholders</b>	<p><b>Operators</b></p> <ul style="list-style-type: none"> <li>✓ AMSA - company part of A2A group- Milan's waste operator (main implementing institution)</li> <li>✓ 9 Area City Councils(implementing institution)</li> <li>✓ Parco di Monza Agronomy School (implementing institution)</li> <li>✓ CIC - Italian composters consortium (implementing institution)</li> <li>✓ City residents</li> <li>✓ Commercial and public entities</li> </ul>

### Results

The introduction of transparent plastic bags for residual waste and the food waste recycling system in the whole city have risen the overall recycling rate from 35% in 2011 to 50% in 2014 [2]. The amount of organic waste recycled per capita is 90 kg/year and the rate of non-compostable waste in the collected organic waste is 4%. The collection of organic waste and the process of anaerobic digestion and composting have resulted in the reduction of 8,760 tonnes CO<sub>2</sub> per year in 2014. The production of high quality compost is used for soil remediation in agriculture, while the production of biogas is reducing use of fossil fuels. Furthermore, the environmental awareness of the citizens has risen which encourages further development of environmental protection projects. Finally, the development of the organic waste collection system and the biogas treatment system has created new green jobs [5].

### Lessons learned

This case proves that it is possible to successfully implement separate waste collection and recycling in large, densely populated areas. The waste collection system in Milan has exceeded expected results, both quantitatively and qualitatively [2]. One of the key elements for achievement of effective implementation was thorough resource planning and proper communication to citizens [4]. To accomplish further recycling targets, the City of Milan will

need to expand its sorting and recycling plants and develop some projects related to waste prevention (e.g. distribution of food leftovers from restaurants to charities) [2].

## References

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## Author/ Contact

© JOANNEUM RESEARCH - LIFE: Centre for Climate, Energy & Society



Leonhardstraße 59  
8010 Graz, AUSTRIA  
Tel. +43 316 876 6700  
life@joanneum.at

<http://www.joanneum.at/en/life/>



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Lomnicka 2  
10 000 Zagreb, CROATIA  
Tel. +385 1 23 61 666  
zoran.kordic@undp.org

<http://www.hr.undp.org/>