European Environment Agency

Municipal waste management in Italy

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Context
The Topic Centre has prepared this working paper for the European Environment Agency (EEA) under its 2012 work programme as a contribution to the EEA's work on waste implementation.

Contents

Highlights

- The separate collection rates of MSW are increasing in all the Italian Regions and for all waste fractions. In particular, Italy seems to be on the right path to reach the EU recycling target of 50 % for MSW by 2020. However, the cross-regional differences are huge: in 2010 the national 2008 separate collection target (45 %) has been achieved by 7 out of 20 Regions, so that Italy as a whole has not yet achieved the target;
- In spite of the increasing recycling rates for BMW, in 2010, the 2008 national BMW target, adopted to implement the Landfill Directive, has only been met by 10 out of 20 Regions. However, the 2006 BMW target of the Landfill Directive has been achieved by Italy as a whole, while the 2009 one has not;
- The landfill tax, introduced in 1996, has contributed to the diversion of waste from landfill. The effect, however, may have been limited because the tax, although increased on average since 2009, is still low and may not provide sufficient incentives to choose an alternative to landfilling;
- A new waste tariff, which is to be proportional to waste quantity and quality produced per floor area unit, became mandatory in 2010 (substituting the previous tax for households on solid municipal waste);
- The recovery of packaging waste is coordinated by the National Packaging Consortium. Italian legislation provided for more stringent packaging waste targets than the Community ones for plastic and wood, to be reached by 2008;
- A landfill ban for waste with a certain calorific value is applied since 2008.

1 Introduction

1.1 Objective

Based on historical MSW data for each country and EU targets linked to MSW in the Waste Framework Directive, the Landfill Directive and the Packaging Directive, the analysis undertaken includes:

- The historical performance on MSW management based on a set of indicators;
- Uncertainties that might explain differences between the countries' performance which are more linked to differences of what the reporting includes than differences in management performance;
- Relation of the indicators to the most important initiatives taken to improve MSW management in the country; and
- Assessment of the future possible trends and achieving of the future EU targets on MSW by 2020.

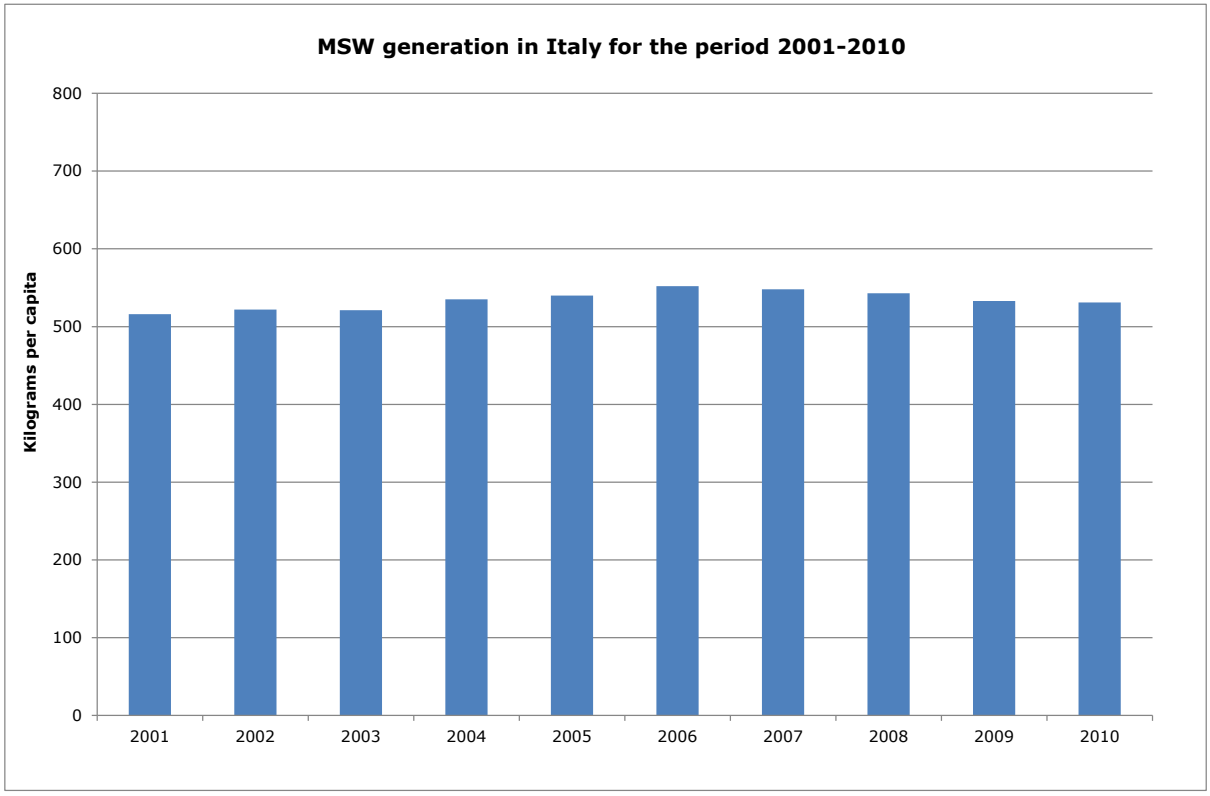
2 Italy's MSW management performance

The most important piece of Italian waste legislation was issued in 1997 (Legislative Decree 22/97). It shaped the national waste management system (defining the responsibilities of the actors involved), introduced targets about separate collection of municipal waste, established the National Packaging Consortium and provided for the progressive replacement of the old waste tax with a new waste tariff. The Decree was, then, abrogated by Legislative Decree 152/2006 which, however, included most of its provisions.

The generation of MSW topped in Italy in 2007, with 32.5 million tonnes and has since then decreased to 32 million tonnes in 2010 (Eurostat, 2012).

2.1 MSW Indicators

Figure 2.0 MSW generations per capita in Italy, 2001-2010



Source: Eurostat, 2012

Figure 2.0 shows the development of MSW generation per capita in Italy from 2001 to 2010 (the data for 2010 is a Eurostat estimate). There has been a slight increase in MSW generation per capita from 2001 to 2006 (from 516 kg/inhabitant to 552 kg/inhabitant), followed by a slight decrease in the second half of the decade (531 kg/inhabitant in 2010).

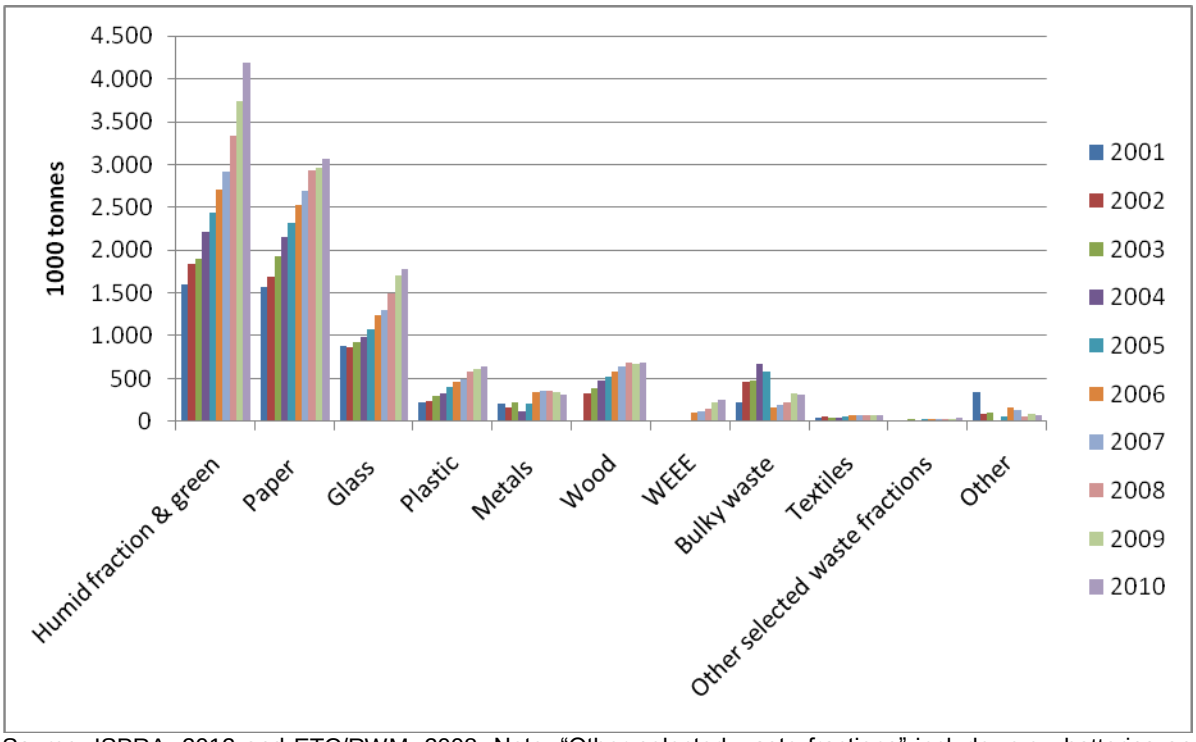
According to ISPRA (2012), which reports 32.5 million tonnes of MSW generation in 2010 and 532 kg/inhabitant, there are remarkable differences in per capita production across regions; in 2010, e.g., MSW generation ranged from 413 kg/inhabitant per year of Molise to 677 kg/inhabitant per year of Emilia Romagna.

Italy has traditionally landfilled most of its MSW, even if the landfill rates have constantly decreased between 2001 and 2010 (Eurostat, 2012), a reduction from 67 % to 48 % related to MSW generated (and from 19.7 to 15.4 million tonnes in absolute terms). However, also in this regard, there are substantial differences among regions. In 2010, e.g., Lombardy landfilled 8 % of its generated municipal waste and separate collection represented about 48.5 % of the total produced amount, while Sicily landfilled 93 % of its generated municipal waste (ISPRA, 2012). In general, it can be underlined that regions that are able to couple high separate collection rates with an adequate capacity for MSW processing under different waste treatment options and a market for recycled materials usually show lower landfill levels.

The level of separate collection is increasing in all the Italian regions, but Italy as a whole, with 35 % of MSW separate collection in 2010, equal to 11.4 million tonnes, is still far from achieving the national separate collection targets, introduced by Legislative Decree 152/2006 (the 2008 target was 45 %).

Figure 2a illustrates, in absolute terms, the separate collection of different waste fractions at Italian level, between 2001 and 2010 (ETC/RWM, 2008 and ISPRA, 2012)[1]. It emerges that the separate collection of organic waste has increased by a factor of 2.6 in the 2001-2010 period and separate collection of biodegradable waste as a whole (organic waste, paper, wood, and textiles) represented on average, over the same period, 69 % of the total.

Figure 2a Separate collection of different waste fractions at national level, 2001-2010



Source: ISPRA, 2012 and ETC/RWM, 2008. Note: "Other selected waste fractions" include, e.g., batteries and accumulators, out-of-date medicines, paints, vegetable oils, etc.

Below other selected indicators are used to illustrate the development of MSW management in Italy.

2.1.1 The recycling of MSW from 2001 to 2010

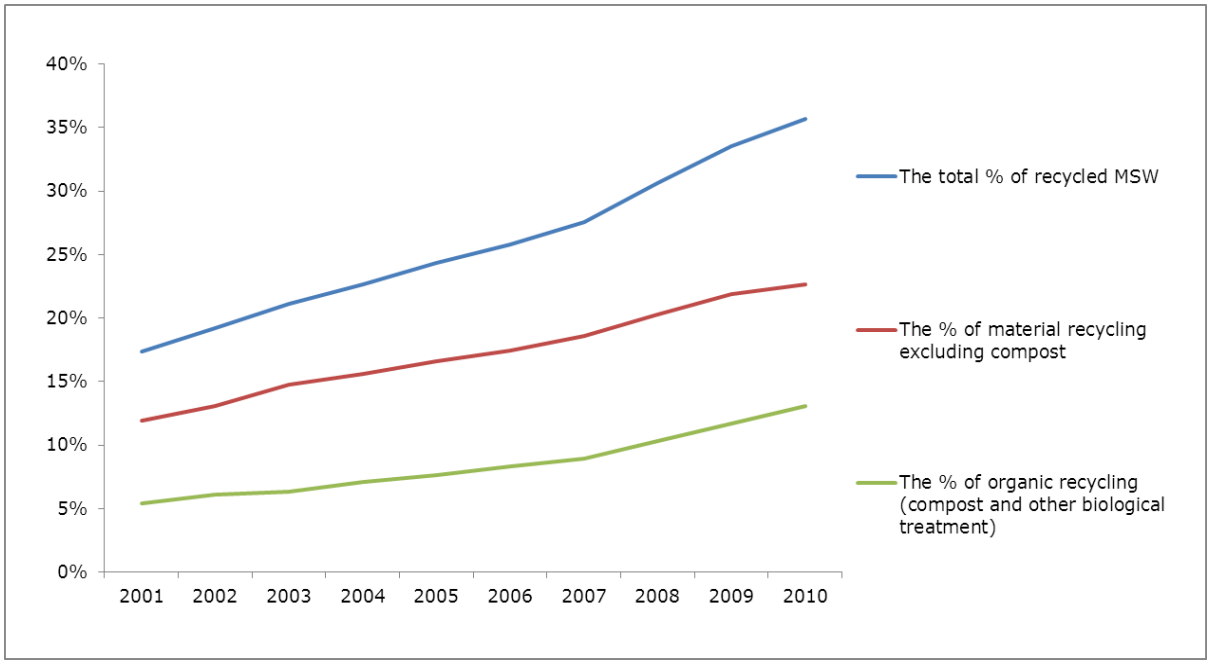
Figure 2.1, based on data from Eurostat (2012), ISPRA (2012), and ETC/RWM (2008)[2], shows the development of recycling of MSW in Italy related to total recycling, material recycling and organic recycling (compost and other biological treatment) in the 2001-2010 period. Because of a lack of data on actual recycling, the data on separate collection of municipal waste (namely total collection, material collection[3], and humid fraction & green collection) have been used as proxies of total recycling, material recycling and organic recycling and have been compared to data on MSW generation. Therefore, in this analysis, we refer to them as "total recycling (SC)", "material recycling (SC)" and "organic recycling (SC)", where SC stands for "separate collection" so that they can be distinguished from the data on the actual level of recycling. The latter, where available, are sometimes used in addition to the former, to provide for a more complete picture.

[1] These data are used in 2.1.1 to illustrate total recycling (SC), material recycling (SC) and organic recycling (SC).
[2] Data on MSW generation (2001-2010) are provided by EUROSTAT (2012). Data on total recycling, material recycling and organic recycling are provided by ETC/RWM (2008) and ISPRA (2012) with reference to the 2001-2005 and 2006-2010 periods respectively.
[3] Material collection has been calculated as the difference between total collection and humid fraction & green collection.

Both material recycling (SC) and organic recycling (SC) have increased between 2001 and 2010, passing from 12 % to 23 % and from 5 % to 13 % respectively. These trends are reflected in the figures related to total recycling (SC).

According to ISPRA (2012), the percentages of municipal waste material recycling and organic recycling, relative to municipal waste generation, for the year 2010 are slightly lower than the abovementioned ones (19 % for material recycling and 12 % for biological treatments). However, according to ISPRA (2012), total recycling increased in 2010 by 6 % compared to 2009, while the increase was about 2 %, based on the data related to separate collection.

Figure 2.1 Recycling of MSW in Italy



Source: Eurostat, 2012, ISPRA 2012, and ETC/RWM, 2008. The percentages are calculated as % of generated MSW

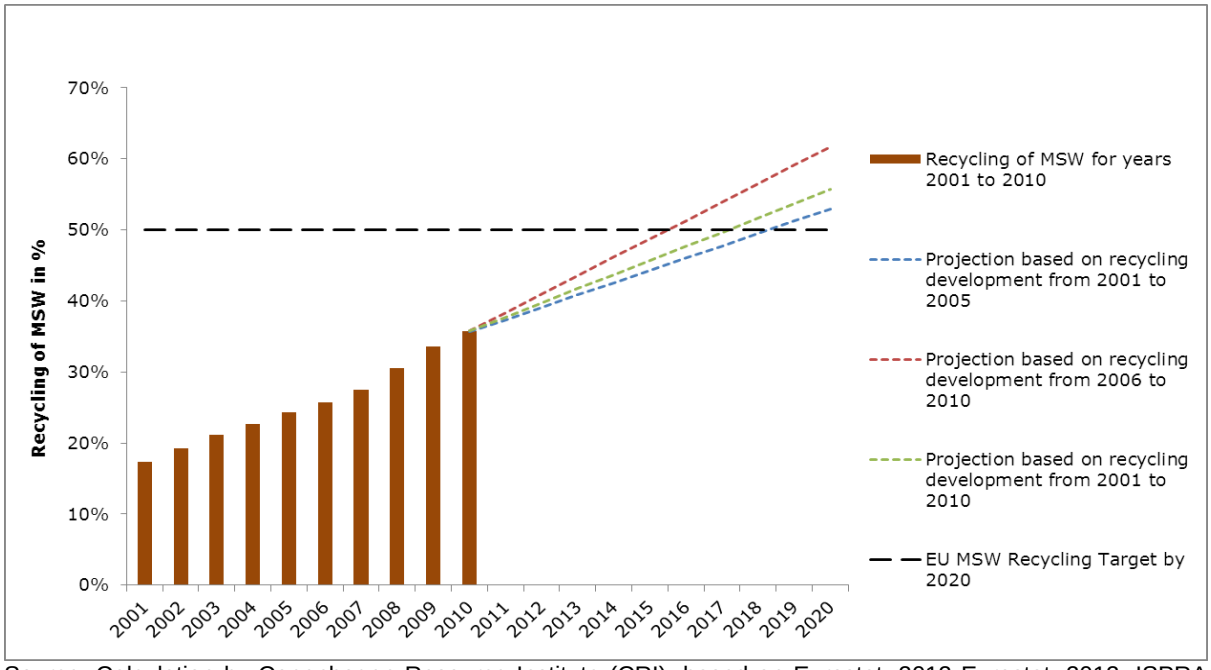
2.1.2 The yearly increase rate of recycling of MSW

In order to assess the prospects for Italy to meet the 50 % recycling target as set out in the Waste Framework Directive, three scenarios have been calculated. The scenarios assume that recycling in the period 2010 to 2020 develops, based on a linear regression, with the increase rates of recycling in the periods 2001-2005, 2006-2010 and 2001-2010.

Figure 2.2 shows that Italy would be able to reach the recycling target of 50 % by 2020, set by Directive 2008/98/EC (Art. 11 par. 2a[4]), even if the increase of recycling follows the 2001-2010 overall trend (intermediate scenario) or the 2001-2005 trend (worst scenario). The target would be achieved in 2016, 2017 and 2019, according to the best, intermediate and worst scenarios respectively.

[4] By 2020, the preparing for reuse, and the recycling, of waste materials such as at least paper, metal, plastic and glass from households and possibly from other origins as far as these waste streams are similar to waste from households, shall be increased to a minimum of overall 50 % by weight. According to Commission Decision 2011/753/EU, Member States can choose between four different calculation methods to report compliance with this target. One of these methods is to calculate the recycling rate of MSW as reported to Eurostat.

Figure 2.2 Future recycling of MSW in Italy



Source: Calculation by Copenhagen Resource Institute (CRI), based on Eurostat, 2012 Eurostat, 2012, ISPRA 2012, and ETC/RWM, 2008

Please note that these three scenarios are very simplistic and do not take into account any planned policy measures. In addition, they are based on one calculation methodology for recycling of municipal waste (MSW recycled/MSW generated, using data reported to Eurostat) whereas countries may choose to use another methodology to calculate compliance with the 50 % recycling target of the Waste Framework Directive. The scenarios in Figure 2.2 should therefore be interpreted only as to give some rough indications and assessment of the risk of missing the target.

2.1.3 Landfilling of biodegradable municipal waste

According to the EU Landfill Directive (1999/31/EC), Member States shall reduce the amount of biodegradable municipal waste (BMW) landfilled to 75 % of the total amount of BMW generated in 1995 by 2006; to 50 % by 2009; and to 35 % by 2016.

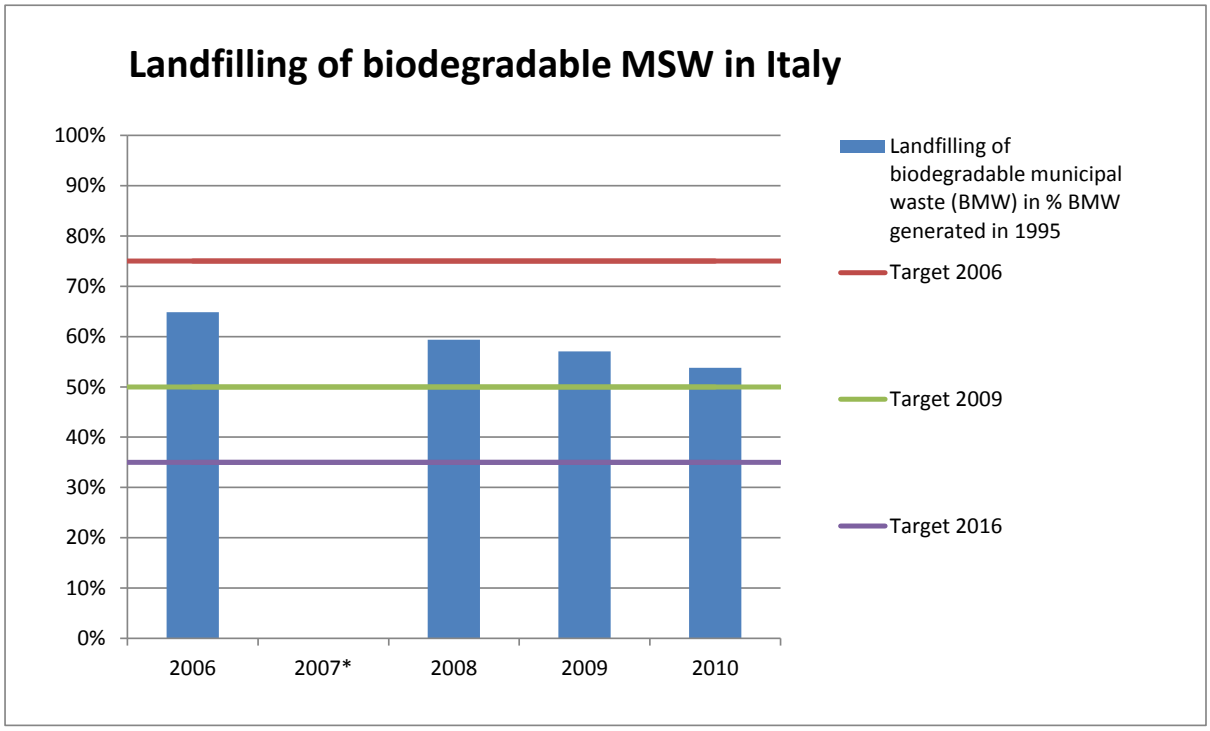
Although Italy, which landfilled 82 % of its BMW in 1995, could have got a 4-year derogation period from the above-mentioned targets, it decided not to request a derogation. Moreover, instead of transposing the percentage-based targets set out in the Landfill Directive, Italy adopted targets based on the quantity (kilograms) of BMW produced per capita, which shall be reached at ATO level (Optimal Management Areas) or provincial level (if the ATO is not yet delimited). That decision was based on two core reasons: the lack of reliable data on the quantity of biodegradable municipal waste landfilled in 1995 and the need to implement improved monitoring at the local level (EEA, 2009).

Targets have been defined for 2008, 2011 and 2018, since Italy transposed the Landfill Directive into national law in January 2003, i.e. 18 months after the deadline. As such the targets follow the intervals of the Directive with a delay of two years.

Figure 2.3 shows that the 2006 target of the EU Landfill Directive has been met, while the 2009 one has not. In fact, in 2009 Italy landfilled 57 % of BMW produced in 1995 and 54 % in 2010.

According to ISPRA (2012), in 2010, the 2008 national target had been met by 10 out of 20 Regions (Piemonte, Lombardy, Veneto, Friuli Venezia Giulia, Trentino Alto Adige, Emilia Romagna, Tuscany, Campania, Calabria, and Sardinia) and the 2011 target by 5 Regions (Lombardy, Veneto, Friuli Venezia Giulia, Trentino Alto Adige, and Emilia Romagna).

Figure 2.3 Landfilling of biodegradable MSW in Italy



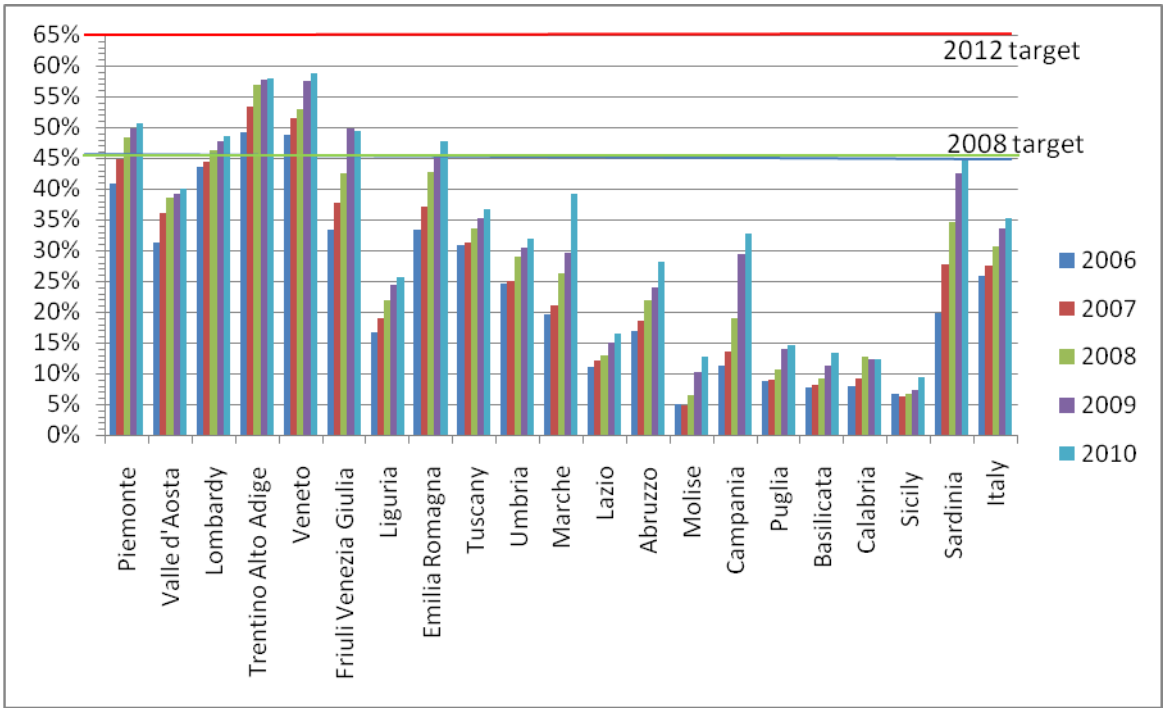
Source: EC, 2012 and Italy, 2012. * Data is missing

2.1.4 Regional differences of MSW recycling from 2001 to 2010

Figures 2.4a 2.4b, and 2.4c show regional differences in the development of MSW recycling during the last few years.

Figure 2.4a shows the rate of separate collection of municipal waste (or MSW total recycling SC) in Italian Regions from 2006 to 2010 and the actual national separate collection targets, introduced by Legislative Decree 152/2006 (ISPRA 2012). The higher separate collection rates have been achieved by some regions of the north (Veneto, Trentino Alto Adige and Piemonte) in 2010; in the south, Sardinia is characterised by a very positive performance, thanks to the spread of separate collection systems (including kerbside schemes) and a high level of organic recycling (23 % in 2010; Arpas, 2010).

Figure 2.4a Separate collection of municipal waste in Italian Regions (2006-2010) and separate collection national targets related to municipal waste generation



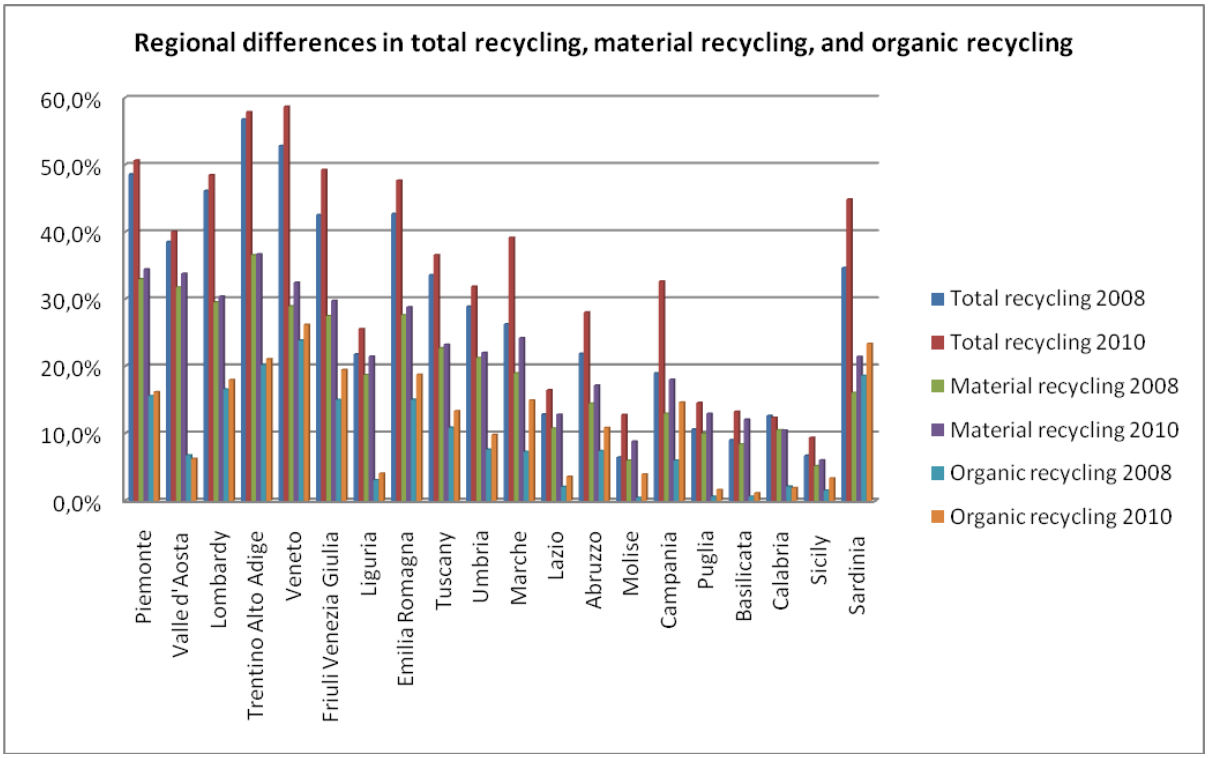
Source: ISPRA, 2012

Figure 2.4b shows regional differences in the development of MSW recycling in 2008 and 2010, with reference to total recycling (SC), material recycling (SC) and organic recycling (SC). Figure 2.4c, instead, shows regional differences among the main components of material recycling (SC), namely the recycling of paper, glass, plastic and wood, in the same years.

In 2010, total recycling (SC) ranged from 9 % in Sicily to 59 % in Veneto, material recycling (SC) from 6 % in Sicily to 37 % in Trentino Alto Adige and organic recycling (SC) from 1 % in Basilicata to 26 % in Veneto. The highest increases in 2010 total recycling (SC) rates, compared to 2008, can be found in Campania (+14 percentage points), Marche (+13 percentage points) and Sardinia (+10 percentage points). This highlights that there is still extensive room for improvement of recycling in the central and southern regions.

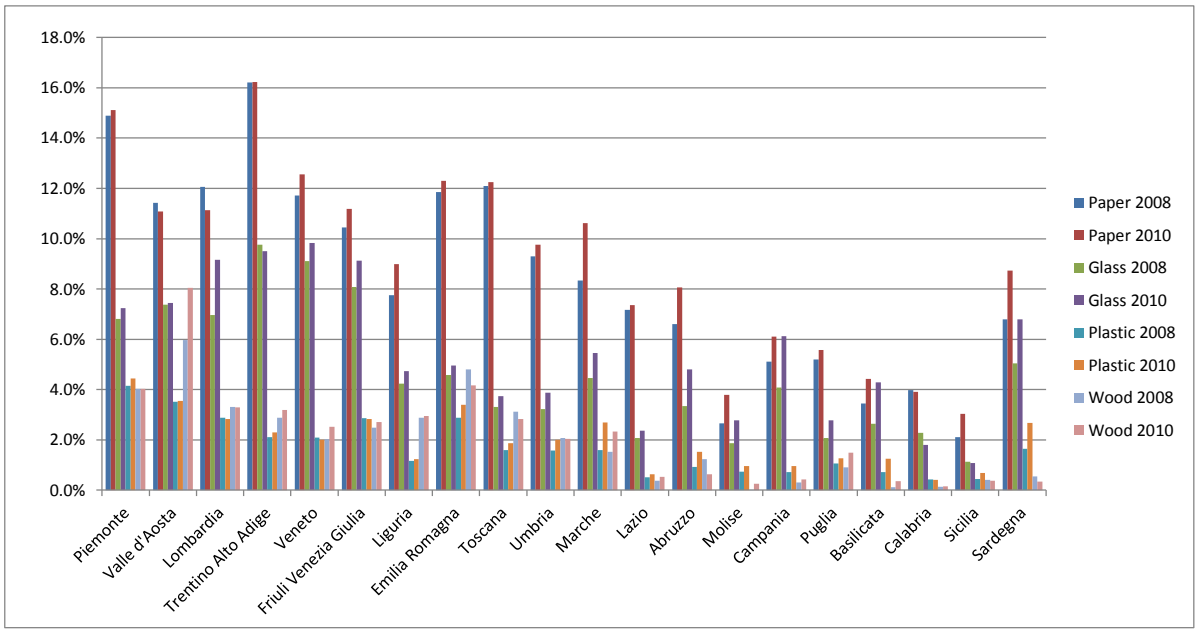
With regard to material recycling (SC), in 2010, the recycling of paper ranged from 3 % in Sicily to 16 % in Trentino Alto Adige, while the higher and the lower glass recycling rates can be found in Veneto (10 %) and Sicily (1 %) respectively.

Figure 2.4b Regional differences in MSW total recycling, material recycling and organic recycling related to municipal waste generation (2008 and 2010)



Source: CRI calculations based on ISPRA 2010 and 2012

Figure 2.4c Regional differences in material recycling of MSW: paper, glass, plastic, and wood related to municipal waste generation (2008 and 2010)



Source: CRI calculations based on ISPRA 2010 and 2012

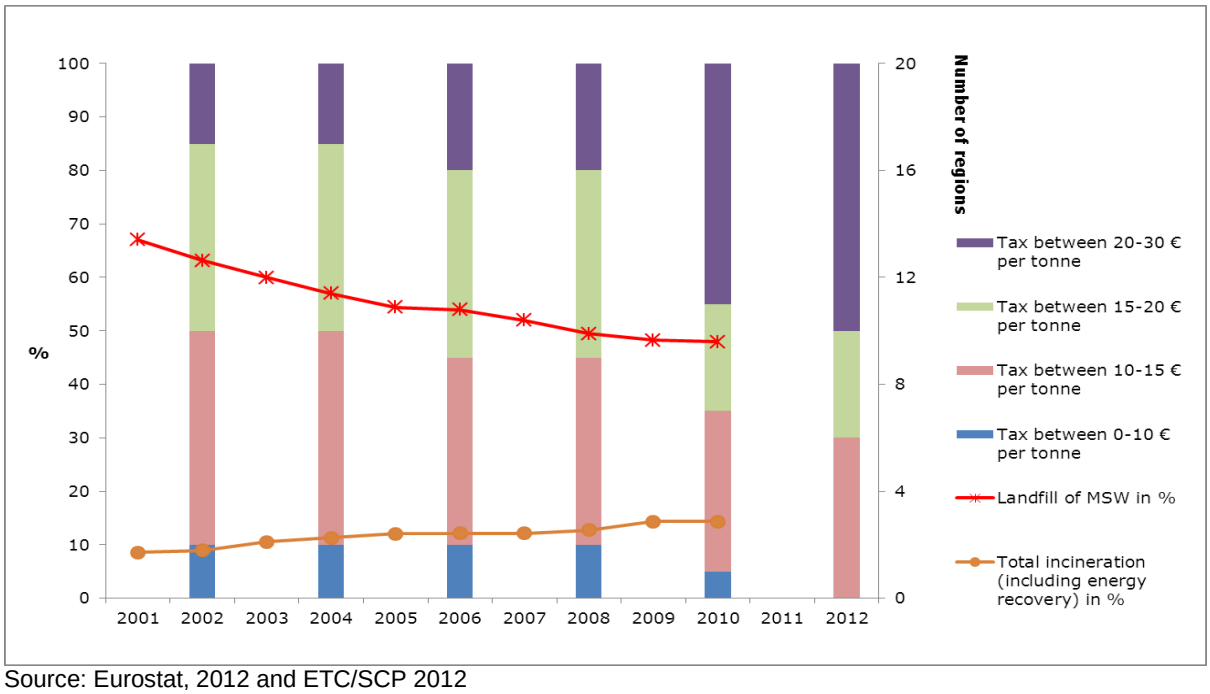
2.1.5 The relation between landfill tax level and recycling level of MSW

In Italy the landfill tax was introduced in 1996, based on Law 549/1995. The Law, which defines the upper and the lower level of the tax, is applied at a regional level. The tax is directly paid to the regions by landfill operators.

The heterogeneity in the tax levels applied by regions is quite high, ranging, as an average between 1998 and 2008, from EUR 5.2 per tonne in Campania to EUR 25.8 per tonne in Piemonte (ETC/SCP, 2012).

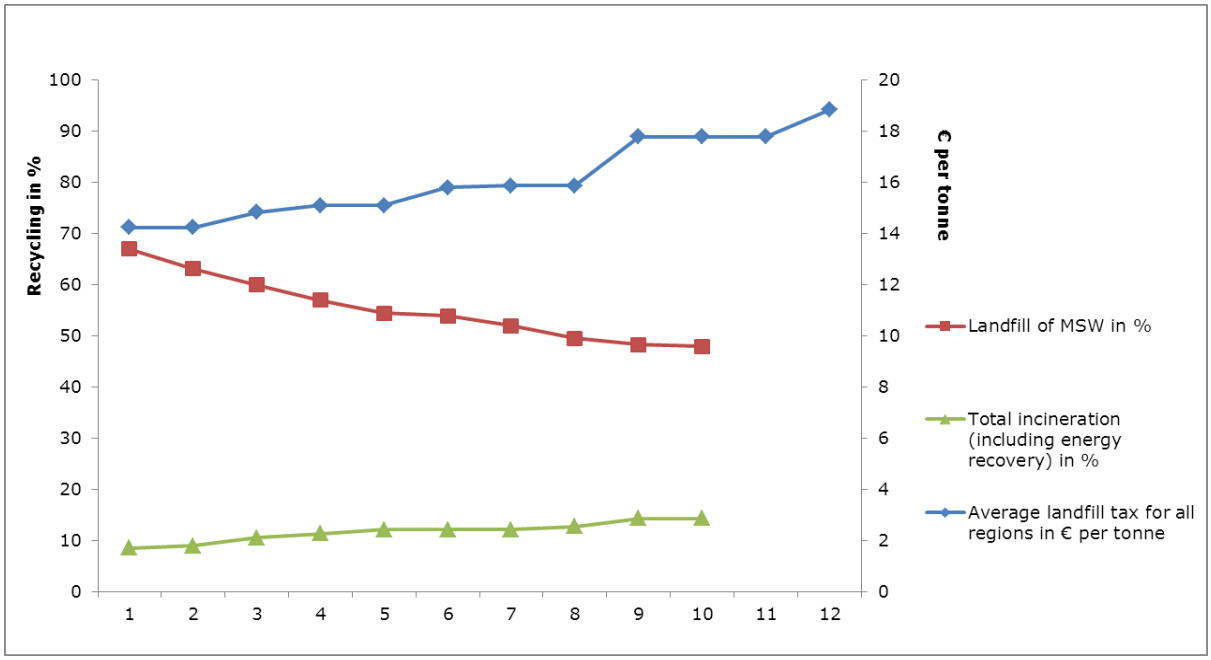
The average landfill tax for all the regions increased from EUR 14.24 per tonne in 2001 to EUR 18.84 per tonne in 2012 (Figures 2.5b and 2.6b). The number of regions applying the higher tax level (between EUR 20-30 per tonne) from 2008 to 2012 passed from 4 to 10, while, in the same period, the number of regions applying the lower tax level (between EUR 0-10 per tonne) decreased from 2 to 0 (Figures 2.5a and 2.6a). However, the actual average level of the tax is among the lowest compared with western European countries.

Figure 2.5a Development of landfilling and incineration of MSW and landfill tax in Italy. Distribution of taxes across the regions of Italy



Source: Eurostat, 2012 and ETC/SCP 2012

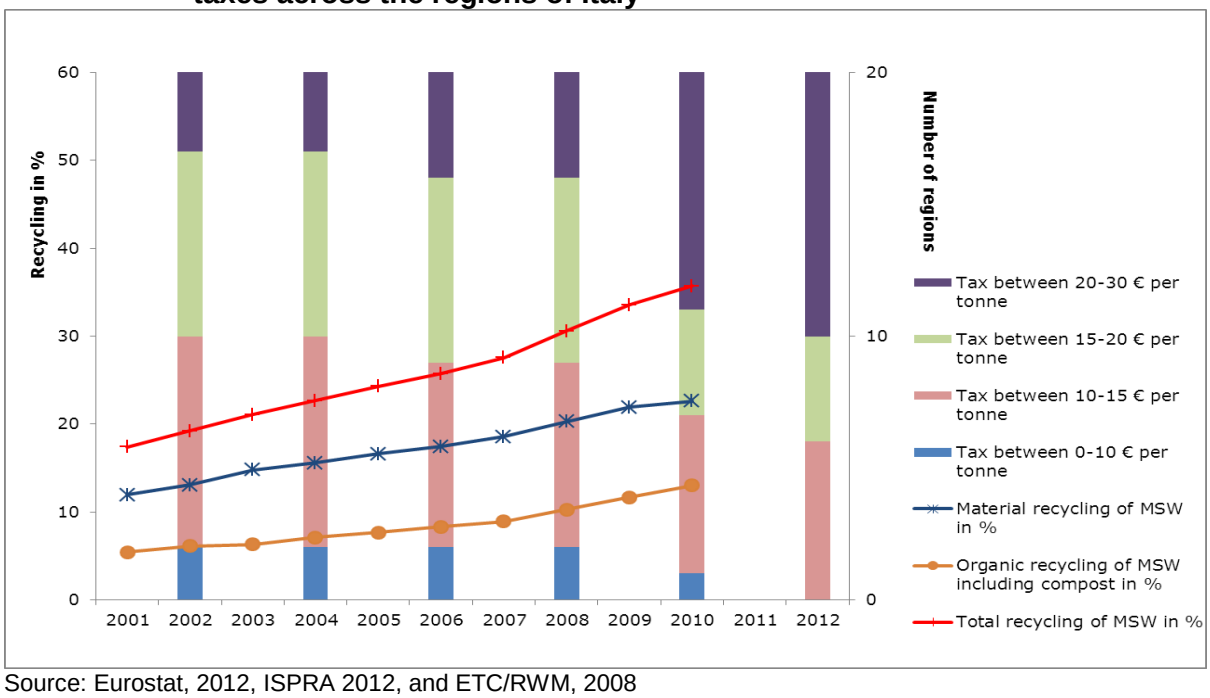
Figure 2.5b Development of landfilling and incineration of MSW and landfill tax in Italy. Average level of tax of all Regions of Italy



Source: Eurostat, 2012 and ETC/SCP 2012

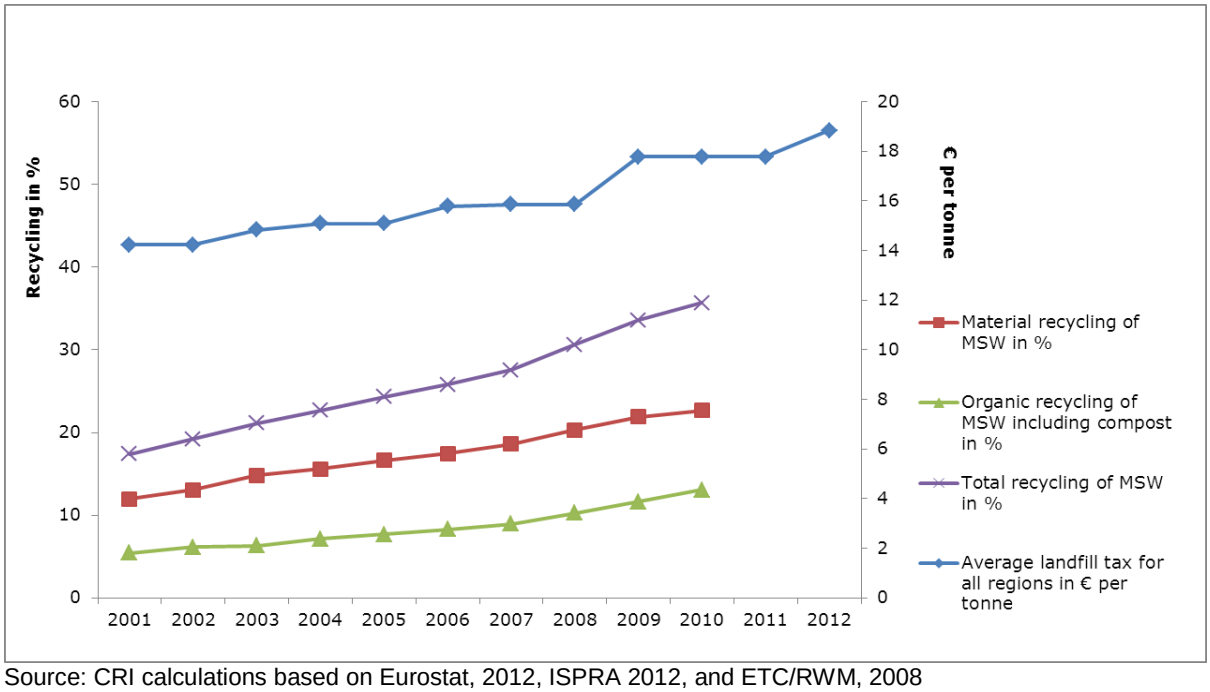
The increase of the landfill tax coupled with the stabilisation of the generation of municipal waste since 2007 and higher separate collection rates produced a strong reduction in the amount of disposable waste and a significant increase in total incineration (Figure 2.5a and 2.5b). It is also reflected in the positive trend of both material recycling (SC) and organic recycling (SC) (Figure 2.6a and 2.6b).

Figure 2.6a Development of MSW recycling and landfill tax in Italy. Distribution of taxes across the regions of Italy



Source: Eurostat, 2012, ISPRA 2012, and ETC/RWM, 2008

Figure 2.6b Development of MSW recycling and landfill tax in Italy. Average level of tax of all regions of Italy



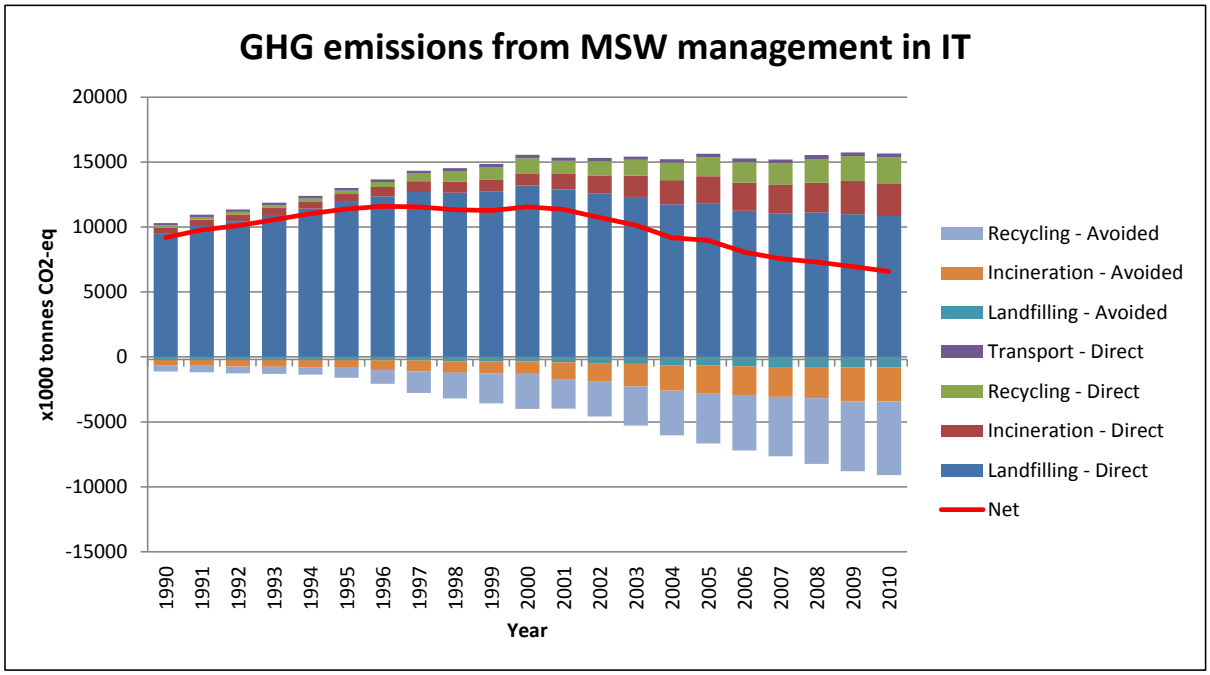
Source: CRI calculations based on Eurostat, 2012, ISPRA 2012, and ETC/RWM, 2008

2.1.6 Environmental benefits of better MSW management

Figure 2.7 shows the development of GHG emissions from MSW management, calculated using a life-cycle approach. The graph shows the direct emissions, the avoided emissions and the net emissions of the MSW management.

As a result, the environmental profile of waste treatment options, the net emissions, can either have a positive trend that is harmful to the environment, or negative trend that is favourable to the environment: in particular, the trend of the curve is negative when the avoided emissions are higher (in absolute terms) than the direct emissions, while it is positive when the direct emissions are higher (in absolute terms) than the avoided emissions.

Figure 2.7 GHG emissions from MSW management in Italy[5]



Results presented in this figure should not be used for the compilation of GHG reporting (national inventory report of the IPCC) or compared with IPCC figures, as the methodology employed here relies on life-cycle thinking and, by definition, differs from the IPCC methodology.

In Italy, the direct emissions from landfilling had been increasing until 2000 and from that point on they began to decrease, showing an inverted bell U-shaped trend. The direct emissions from landfilling continue to be high for all years, because landfilled MSW continue to emit considerable amounts of greenhouse gases (Figure 2.7).

However, thanks to the increase of avoided emissions from recycling and incineration, the net emission show an improvement in the environmental trend. Indeed, after 1997, greenhouse gas emissions tend to be lower than before. This negative trend has a positive impact on the environment that is also likely to increase in the future.

[5] All the GHG emissions (positive values) represent the direct operating emissions for each waste management option. These direct operating emissions have been calculated with the use of the IPCC methodology for landfills and landfills and life cycle modelling for the other technologies (recycling, bio-treatment and transport).

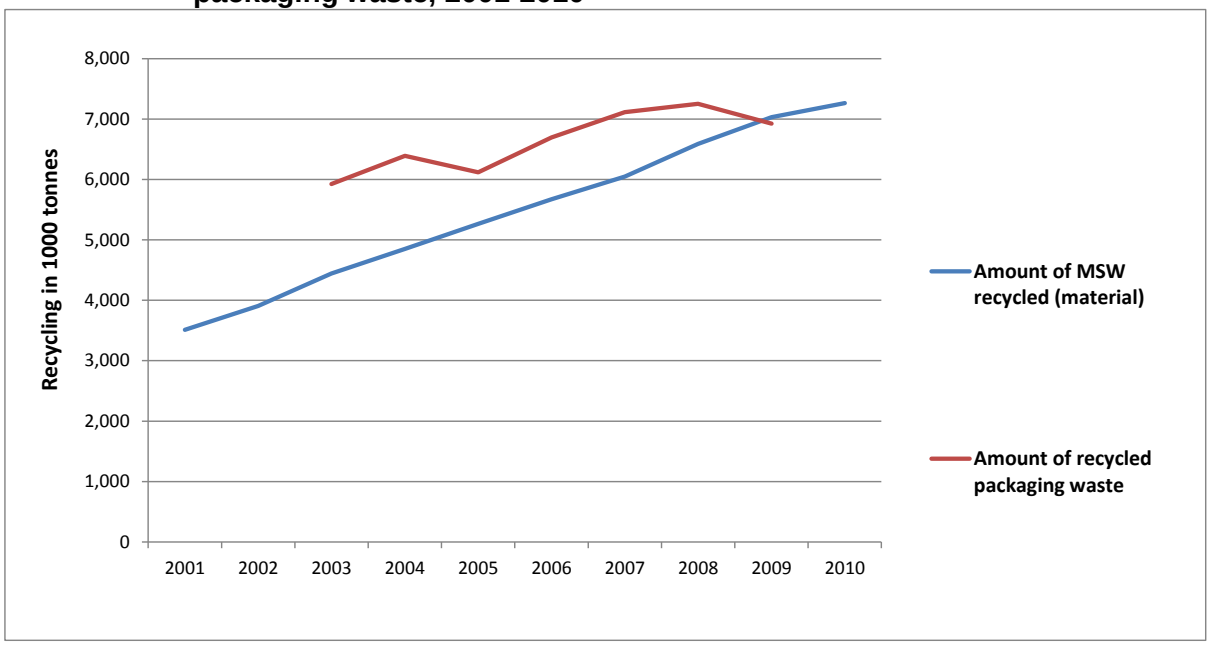
For the indirect avoided emissions (negative values), the calculations integrate the benefits associated with the recovery of energy (heat and electricity generated by incinerators, electricity generated by the combustion of landfill gas or methane from anaerobic digestion). Other avoided emissions include the benefits of recycling of food and garden waste, paper, glass, metals, plastics, textiles and wood in the municipal solid waste. Recycling is here assumed to include material recycling and bio-treatment. Avoided emissions of bio-treatment include fertilizer substitution. All processes generating electricity are assumed to substitute average electricity mix of Italy in 2002. Processes generating heat are assumed to substitute average heat mix for the EU25 in 2002. The electricity mix and heat mix are assumed to remain constant throughout the whole time series. The complete methodology is available from Bakas et al, ETC/SCP (2011). The compositions of the MSW disposed in landfills, incinerated or recycled respectively are based on Bakas et al., ETC/SCP (2011). In an Eionet consultation process, initiated by the EEA in 2012, Italy updated the compositions of the landfilled, incinerated and recycled MSW for 2010.

2.2 Uncertainties in the reporting

Some uncertainties or differences included in the reporting of MSW can result in different recycling levels. In particular, there is a difference between what fractions of packaging waste countries include in their municipal waste recycling figures.

Figure 2.8 shows that the difference between the amounts of recycled packaging waste (Eurostat, 2012) and the ones of MSW subject to material recycling (SC) strongly decreased in 2008, compared to the two previous years and for the first time in 2009, the amount of MSW materially recycled (SC) was higher than the amount of recycled packaging waste.

Figure 2.8 A comparison between material recycling of MSW and recycled packaging waste, 2001-2010



Source: Eurostat, 2012, ISPRA 2012, and ETC/RWM, 2008

ISPRA (2012) distinguishes, within each collected MSW fraction, between municipal packaging and municipal non packaging waste[6] (see Table 2.1). The former data can be compared with the amounts of recycled packaging waste as reported to Eurostat (2012). It emerges that with regard to the 2008-2009 period that approximately 50 % of the recycled packaging waste appears to be municipal.

Table 2.1 Separate collection of municipal packaging waste, 2008-2010 (1000 tonnes)

Year	Paper and cardboard	Glass	Plastic	Metals	Wood	Total
2008	1 303,3	1 314,90	502	195,3	201,1	3 516,6
2009	1 263,3	1 569,1	505,7	187,9	201,8	3 727,8
2010	1 271,9	1 480,9	556,7	159,4	201,1	3 670,0

Source: ISPRA, 2012

[6] Another national source (the National Packaging Consortium, ANCI-CONAI), reports similar data on municipal packaging waste collection. For example, with regard to 2010, ISPRA (2012) underlines that ANCI-CONAI data on municipal packaging waste collection is only slightly lower than its own one (-2,4 %).

2.3 Important initiatives taken to improve MSW management

The landfill tax in Italy was introduced in 1996, based on Law 549/1995 and following amendments intended to reduce waste production and foster material and energy recovery. The Law defines the upper and the lower level of the tax (currently EUR 0.001-0.01/kg for inert waste and EUR 0.00517-0.02582/kg for hazardous and non-hazardous waste), which is applied at a regional level. According to the Law, the tax is based on the amount of solid waste landfilled.

The national framework law on waste was issued in 1997 (Legislative Decree 22/97), transposing three of the main EU directives on waste: the European Waste Framework Directive, the Directive on Hazardous Waste and the Directive on Packaging and Packaging Waste. The Decree introduced the following innovations:

- It defined the responsibilities among the actors of the national waste management system. In particular, regions hold the responsibility for drawing up waste management plans to promote waste reduction (with regard both to hazardousness and quantity), and municipalities within optimal management areas (ATO, which are generally represented by provinces) organise municipal waste collection and management;
- It set the following targets for separate collection of municipal waste to be achieved at ATO level (percentages are related to municipal waste generation);
    - 15 % by 1999;
    - 25 % by 2001;
    - 35 % by 2003;
- With regard to packaging waste, the Decree established the National Packaging Consortium (CONAI), with the aim to coordinate the activities of six material consortia for the recovery of aluminium, glass, paper, plastic, steel and wood. The Decree (and its following amendments) provided for more stringent packaging waste targets than the Community ones for plastic (26 % instead of 22.5 % stipulated in the Directive) and for wood (35 % instead of 15 % stipulated in the Directive) to be reached by 2008;
- The Decree radically modified the tax for households on solid municipal waste generation (based on the floor area of the building), to be gradually replaced by the waste tariff. The tariff is not compulsory, but it can be enforced voluntarily by the municipality. The structure of the tariff includes: a quota to be determined in relation to the essential components of the cost of the service and a quota proportional to the quantity of waste produced by each subject, the standard of service offered by the municipality and the size of the costs of waste management.

Legislative Decree 36/2003 transposed the Landfill Directive. It required Regions to elaborate and approve a proper programme for reducing the amount of biodegradable waste going to landfills, integrating the regional waste management plan, in order to achieve specific targets at ATO level (Optimal Management Areas) or provincial level (if the ATO is not yet delimited). The targets to be reached are the following:

- Before 27 March 2008: landfill of biodegradable municipal waste must be reduced to below 173 kg per inhabitant per year;
- Before 27 March 2011: landfill of biodegradable municipal waste must be reduced to below 115 kg per inhabitant per year; and
- Before 27 March 2018: landfill of biodegradable municipal waste must be reduced to below 81 kg per inhabitant per year.

The same Decree also introduced a landfill ban for waste with a calorific value exceeding 13 megajoules per tonne with effect from the beginning of 2007. This deadline was then shifted to the end of 2008.

Legislative Decree 152/2006 abrogated Legislative Decree 22/97, including, however, all its main provisions. The most important innovations shaped by the Decree and its amendments are the following:

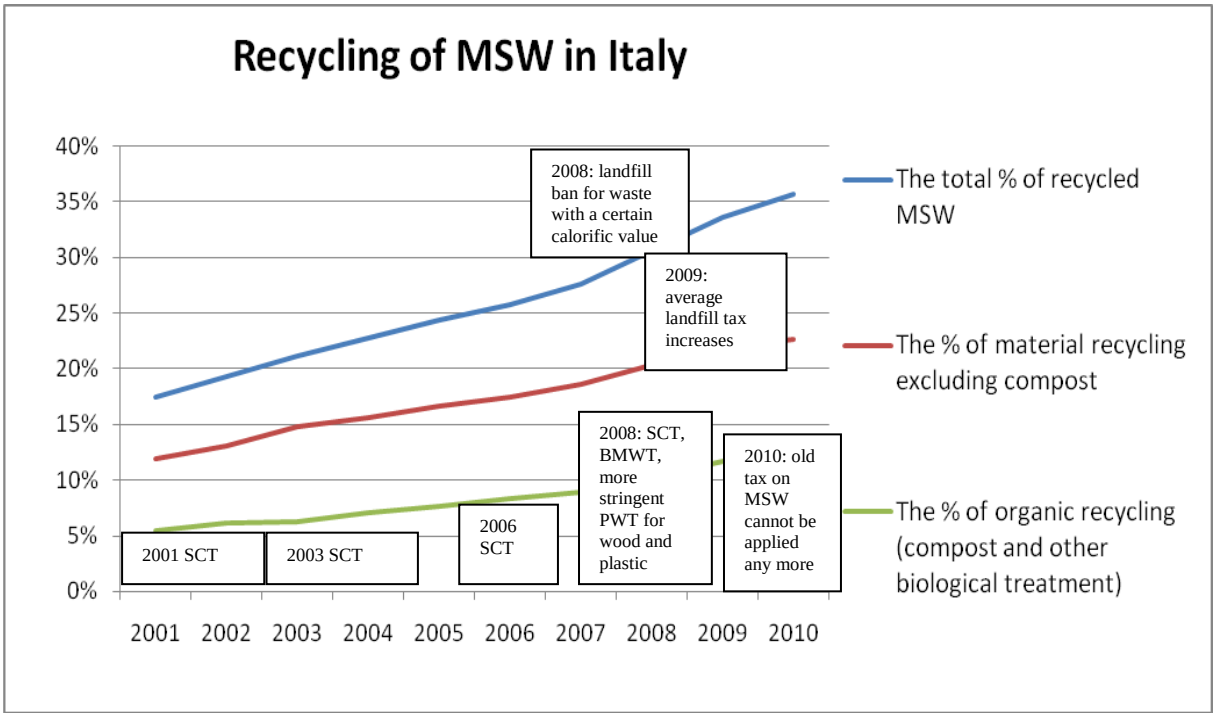
- With regard to the separate collection of municipal waste, the Decree set three new targets to be achieved at ATO level: 35 % by 2006; 45 % 2008, and 65 % by 2012. If an ATO does not achieve the targets, it shall pay a financial penalty consisting in a cumulative addition of 20 % on the special tax on the price paid for the final disposal of waste, to be divided among the municipalities whose bad performances failed to obtain the result. In 2006 the following intermediate targets were also defined: 40 % by 2007, 50 % by 2009, and 60 % by 2011; and
- The waste tariff introduced by legislative Decree 22/97 was substituted by a new one. The new waste tariff shall be proportional to waste quantity and quality produced per floor area unit, in relation to uses and different typologies of activities. The old tax on solid municipal waste could no longer be applied from 2010.

At the regional level, the landfill tax level is strongly heterogeneous also among the most virtuous regions characterized by high recycling and low landfill rates. For example, in 2010, Veneto (59 % separate collection and 19 % landfilling; ISPRA 2012) applied a landfill tax of EUR 25.8 per tonne (ETC/SCP, 2012), while Lombardy (48 % separate collection and 8 % landfilling, ISPRA 2012) applied a landfill tax of EUR 10.5 per tonne (ETC/SCP, 2012).

Virtuous regions generally provide for separate collection of humid fractions & green, often based on kerbside schemes. In Veneto, between 2001 and 2010, the number of municipalities which separately collected the humid fractions & green went from 390 to 534 (over a total of 581) and the number of municipalities which separately collected the humid fractions & green based on kerbside schemes went from 281 to 449 (ARPAV, 2010).

Some regions have also introduced measures aimed at fostering specific recycling operations. In Emilia-Romagna, e.g., which in 2010 reached 19 % organic recycling, farmers receive subsidies of EUR 150-180 per hectare, in order to promote the use of compost (EEA, 2009).

Figure 2.9 Recycling of MSW in Italy and important policy initiatives



Note: SCT: separate collection target; BMWT: biodegradable municipal waste target; PWT: packaging waste target

2.4 Future possible trends

As we have already seen, Italy seems to be on the right path to reach the EU recycling target of 50 % for MSW by 2020 if the progress in the past can be maintained in the next decade. In this regard, the most positive projection is the one based on the trend related to the total recycling (SC) of the last five years (2006-2010). The target would also be achieved within the related deadline regardless of which trend (2001-2010 or 2001-2005) is assumed.

In order to foster the achievement of the above-mentioned target, it is important to strengthen separate collection and increase the recycling rates of MSW especially in the southern and central regions. In 2010, in Lombardy total recycling was 45 % of generated municipal waste, in Veneto 63 %, and in Friuli Venezia Giulia 39 % (ISPRA 2012). On the contrary, in the same year, Sicily landfilled 93 % of its generated municipal waste, Molise 84 % and Basilicata 83 % (ISPRA, 2012). The outstanding results reached for separate collection by some southern regions (e.g. Sardinia with 45 % of MSW separate collection in 2010; ISPRA 2012) and large cities (e.g. Salerno with 55 % of MSW separate collection in 2010; ISPRA, 2012) need to be extended.

The landfill tax has contributed to the diversion of waste from landfill. The effect, however, may have been limited because the tax, although it has slightly increased on average since 2009, is still low compared to other European countries and may not provide sufficient incentives to choose an alternative to landfilling. The increase of the tax, foreseen by Decree 152/2006 in cases where ATO do not meet the targets on separate collection could foster waste management solutions other than landfilling.

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