

**Evaluation of effectiveness of  
waste policies related to the  
Landfill Directive  
Italy**

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### **Notes from the authors**

Except where otherwise indicated, the source of the data reported in this document is the Rapporto Rifiuti 2006 (APAT 2007)

### **Context**

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# 1. Introduction to Italy

Italy is one of the largest countries in southern Europe. With the total land area of 301,336 km<sup>2</sup>, Italy covers 7.7% of the total European landmass.

According to figure released in February 2007, Italy has a population of 59.2 million which makes it the fourth most populated country in the EU27, after Germany, France and United Kingdom. The average population density of the country is 196 persons/km<sup>2</sup> but some regions, like Lombardia and Capania, it is as high as 400 persons/km<sup>2</sup>.

The country is divided into 20 regions with a total of 110 provinces and 8,101 municipalities. Agriculture and forest land constitutes almost two thirds of the country's area (APAT, 2006).

The national GDP in 2006 reached 1,790,895 million dollars, making Italy the seventh largest economy in the world according to the International Monetary Fund.

Some of the main demographic and geographic features of Italy are shown in Table 1.1.

**Table 1.1. Main territorial and demographic features of Italy**

Largest extension (km)	1 200
Surface area (km <sup>2</sup> )	301 336
Regions	20
Provinces	107
Municipalities	8 101
Resident population	59 206 382
Resident foreigners	2 670 514
Households	23 600 370
Persons per family	2.5
Population density (persons/ km <sup>2</sup> )	196

Source: APAT, 2006.

The first national framework law on waste was issued in 1997 (Decree n. 22 of 5 February 1997) transposing three of the main EU directives on waste, namely the European Waste Framework Directive 75/442/EEC, as modified by Directive 91/156/EEC, the Directive on Hazardous Waste 91/689/EC and the Directive on Packaging and Packaging Waste 94/62/EC.

The decree 22/97 outlined the criteria for the development of the waste management system in accordance with EU waste hierarchy - waste prevention, recycling, material and energy recovery from waste - ensuring safe disposal as the last alternative.

The decree 22/97 implemented the integrated waste management policy set by the European Waste Strategy. It initialized reform in the waste management sector in Italy by establishing minimum targets for separate collection, and promoting clean technologies Ecolabel and EMAS certification system. This decree facilitated the creation of integrated networks of waste recovery and disposal facilities in Italy. The decree also encouraged voluntary agreements between public administrators and economic operators to facilitate opportunities for waste recycling.

No national waste management plan has been elaborated. Instead, waste management plans have been developed at regional and provincial level. These plans have a strategic function in fulfilling the national criteria, set by decree 22/97.

The decree required self-sufficiency for the management, treatment and disposal of the waste generated in each region. Specially, it promoted the determination of Ambito Territoriale Ottimale<sup>1</sup> (ATO). These are functional areas that generally correspond to province territory, consisting of cluster of municipalities.

The regional authorities have the responsibility to issue waste regulation that fulfil the national legal requirements. Regions have a task of defining waste management plan to integrate waste collection, treatment and disposal within ATOs. They are required to meet the targets on separate collection set by decree 22/97.

Based on the criteria prescribed by the decree 22/97 (now included in the decree 152/06), each region has developed a waste management plan. Each regional plan includes a series of strategic guidelines for the promotion of separate collection. The plan identifies the various forms of waste streams which must be collected separately. It also includes financial plans to support separate collection. Furthermore, each region must design a programme to reduce the amount of biodegradable waste ending up in landfill. Regions are also responsible for granting permits for the construction and operation of waste management, treatment and disposal facilities and the approval of new waste management plants, including plants for hazardous waste, and for the authorization of the modification to existing plants.

Each province must develop an individual waste management plan as mentioned in the regional plan. It must also coordinate among the municipalities for appropriate waste management approach. Provinces can also design tools to promote separate collection schemes.

Besides regulating municipal waste, each municipality needs to direct the rules on the waste collection, urban hygiene and pay-as-you-throw scheme.

On the 3<sup>rd</sup> April 2006, decree 22/97 was amended by decree 152/06, which regulates the Italian environmental framework. The regulations concerning waste topics are included in part 4 (Parte Quarta) of the decree 152/06. The Italian government is currently making amendments to this decree.

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<sup>1</sup> Optimal management areas

## 2. Lessons learnt

Indiscriminate disposal of un-segregated and untreated waste in landfill sites was quite common ten year ago. Implementation of waste legislation during the last decade has ensured massive improvement in waste disposal- although with relevant discrepancies among the regions.

To enhance organic waste recovery, it is important to prioritize the development of separate collection management systems, especially in central and southern Italy. From the experiences in northern Italy, the door-to-door collection scheme and separate collection of the biodegradable fraction has proven crucial for the integrated waste management system. At present, it is not mandatory to separate biodegradable from the municipal waste yet the practise has proven to play an important role, especially in order to achieve the 40% recovery target set for end 2007, as dictated by 296/06 .

Awareness campaigns that propagate the best experiences of waste management can help minimise not-in-my-backyard (NIMBY) syndrome, which commonly affects waste management planning. When implemented correctly, an integrated waste management system based on waste separation at source, assisted by a network of recycling and recovery facilities, has proven to be effective and convenient in different contexts throughout Italy.

# 3. Understanding the overall strategy for diversion of waste from landfill

## 3.1. Objectives

### Municipal waste and biodegradable municipal waste (BMW)

Landfill Directive 1999/31/EC was transposed into an Italian legislation with the Legislative Decree n.36 of 13<sup>th</sup> January 2003.

Decree 36/03 sets a biodegradable municipal waste (BMW) landfill target to be achieved at ATO level, or at provincial level for those provinces not part of an ATO. The targets for reduction of BMW are shown in Table 3.1. These targets are based on the amount of biodegradable municipal waste per capita with possible seasonal population<sup>2</sup> fluctuation taken into consideration. In the year following the introduction of decree 36/03, every region had to develop and approve a specific programme to reduce the transfer of biodegradable waste to landfill, which was later integrated into the Regional Waste Management Plan.

To facilitate the development of the regional programmes, a national strategy for the reduction of biodegradable waste to landfills was issued in December 2003, acting as a guideline. This strategy identified the waste typologies for biowaste; all waste capable of undergoing anaerobic or aerobic decomposition, such as food, garden waste, paper and paperboard, and textiles.

The strategy both defines waste reduction target (as set by decree 36/03) and the calculation method, based on the amount of waste generation in 1995. It also prescribes tools that should be adopted to minimize transfer of biodegradable waste to landfills.

**Table 3.1. Targets for the reduction of BMW going to landfills**

Date	BMW reduction
Within 27 March 2008	Below 173 kg per capita
Within 27 March 2011	Below 115 kg per capita
Within 27 March 2018	Below 81 kg per capita

It was decided to adopt a set of targets based upon the quantity of BMW per capita, instead to simply transpose the targets based on percentages as stated in the Landfill Directive. The two main reasons behind this move are the lack of reliable data on the quantity of BMW generation in 1995, and, above all, ease for the implementation of a better monitoring system at local level. The set goals must be achieved at ATO level - this approach has guaranteed a more efficient controlling and monitoring activity than would have been achieved at national level; furthermore, in this way the targets are more restrictive. For instance, targets set at national or regional level do not allow the identification of an underperforming smaller region (some regions have only 300,000 inhabitants) if larger regions meet the targets (Lombardia has 9 million inhabitants).

Decree 36/03 also included a ban on any waste having net calorific value over 13,000 kJ/kg. Lately, decree 300/2006 has postponed this proposal until 31 December 2008. Further bans on specific types of wastes were introduced by Ministerial Decree n.141 of 11 March 1998 (table 3.3).

<sup>2</sup> Tourism has a big influence on the local waste generation. For instance, tourist destination like Rimini, on the Adriatic Riviera, has a per capita waste generation of 830 kg/year against national average of 539 kg/year.

### Separate collection

In 1988, Law n. 475 introduced a recovery target for certain type of beverage packaging. Decree 22/97 recommended separate collection of municipal waste at national level. The decree 152/06 introduced new targets for the separate collection which has recently been modified by Financial Law n. 296 of 27 December 2006 with ambitious targets. Table 3.2 illustrates targets for separate collection set at national level. As stated in the last amendments, ATOs must comply with the following targets concerning weight of separate collection of municipal waste.

- 40% by 31 December 2007
- 50% by 31 December 2009
- 60% by 31 December 2011

**Table 3.2. Targets for the separate collection of municipal waste**

Act	Year of Introduction	Target	Year of reference
D.Lgs. n.22 of 1997 (22/97)	1997	15%	1999
		25%	2001
		35%	2003
D.Lgs. n.152 of 2006, (152/06), modified by L. 296/06 (Financial Law 2007)	2006	40%	2007
		50%	2009
		60%	2011

It is necessary to underline that while calculating separate collection value, the organic fraction produced from Mechanical Biological Treatments (MBT) must also be considered.

### Used tyres

Financial Law 448/2001 demands that public administration offices must spend at least 20% of total budget allocated for purchasing tyres on retreaded ones. However, at present there is no information on the implementation of this law.

Decree 36/03 enforced ban on disposal of tyres in landfill: as of 16 July 2003, it is not longer possible to landfill whole used tyres, with the exception of tyres used as engineering materials. Shredded used tyres, except bicycle tyres, and tyres with an outside diameter larger than 1,400 mm, could be landfilled until July 2006.

Under the Green Public Procurement (GPP) framework, the Ministry of the Environment issued an ordinance in 2005<sup>3</sup>, providing specific operational procedures for the rubber sector. It expected to improve and enhance the development of recycling market.

### Construction and Demolition (C&D)waste

There is no specific target set for the management of C&D waste at national level. Ministerial Decree of 5 February 1998 includes some measures for the recovery of certain non-hazardous construction and demolition waste.

The Ministry of the Environment has issued an ordinance under GPP framework in 2005<sup>4</sup>. It contains minimum criteria for recycled materials and articles/goods obtained from the construction and demolition waste and specifies procedure for its reuse.

To enhance the recycling of C&D waste at regional and provincial level, voluntary agreements have been developed.

<sup>3</sup> Circolare del 19 luglio 2005 recante specifiche indicazioni operative per il settore gomma

<sup>4</sup> Circolare del 19 luglio 2005 recante specifiche indicazioni operative per il settore edile, stradale e ambientale, n. 5205

## 3.2. The package of measures to meet objectives

### Landfill

According to the Deliberation of 27 July of 1984, landfills have been classified in the following categories:

- 1 Municipal waste
- 2 a) Inert  
b) Toxic and harmful waste (below prescribed threshold)  
c) Special waste
- 3 Toxic and harmful waste (exceeding threshold)

This classification was binding until the transposition of Landfill Directive (1999/31/EC), with the Legislative Decree n. 36 of 13th January 2003. Decree 36/03 includes all the provisions of the Landfill Directive. Coherent with the principles of the Landfill Directive, decree 36/03 provides prescriptions for all the different stages of the life cycle of a landfill site, such as location, construction, management, monitoring, closure and post-closure, with the aim of avoiding and minimising any possible adverse environmental impact of the landfill. Moreover, decree 36/03 establishes standards for the localisation of landfills and technical requirements. The landfill applicant is required

to submit the following specific plans to authorities for the acquisition of a landfill permit:

1. operational management plan
2. post-operational plan
3. monitoring and control plan
4. site closure plan
5. financial plan that defines the tariff (including all the costs involved in the life-cycle of the site - setting up, management, closure and after-care)

In line with the Landfill Directive, Decree 36/03 reclassified landfill sites. There are now three broad classes of landfill site instead of five (as classified by Deliberation of 27 July 1984).

1. landfills for inert waste
2. landfill for non hazardous waste
3. landfill for hazardous waste

The decree identifies specific technical criteria and requirement for the construction and operation for each category of landfill site. The Ministerial Decree of 3 August 2005<sup>5</sup> established the criteria and the procedures for the acceptance of landfills on the basis of leaching of waste. The decision 2003/33/EC sets acceptance procedures for each landfill class based on the leaching value of waste.

### The Italian National Strategy for the reduction of biodegradable waste

This strategy identifies the following instruments for the implementation:

- economic instruments aimed to discourage landfill disposal
- separate collection of organic, wooden and textiles fractions
- mechanical/biological treatment
- biological treatment
- incineration with energy recovery
- ban on landfill disposal for certain waste streams

Since 2004, each region has developed its own programme for the reduction of biodegradable waste disposed in landfill. In order to improve the monitoring of produced bio-waste, such regional programmes provide sampling procedures and the methods for quantifying BMW. The calculation is based on municipal waste generation and considers the amounts of separate collection of all fractions of biodegradable waste and the BMW

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<sup>5</sup> Amending M.D. of 13 March 2003

quota in the mixed waste. The management plan for BMW in each region is tailored to its local nature and generation. Finally depending on the local context and need, a specific separate collection system is implemented. The regional programmes for BMW provide a detailed analysis of the existing waste management system, including information regarding the planned facilities for the treatment of BMW collected.

In most of the regions, economic instruments are used to discourage the landfilling of mixed municipal waste. These include a tariff for municipal waste management, increase in landfill fees and promotion of voluntary agreements for certain waste streams (i.e. agricultural waste).

The analysis of the regional programmes shows some common features. For example, the programmes of many regions (i.e. Piemonte, Lombardia, Veneto, Liguria, Marche, Basilicata and Sardegna) identify several instruments for the reduction of BMW with major emphasis on:

- waste minimisation (in particular, reduction road side waste)
- economic instruments aimed to discourage the landfilling of residual waste

The instruments more frequently adopted in these programmes are:

- mandatory adoption of integrated systems for separate collection of dry and humid fractions,
- instruments aimed at promoting door-to-door waste collection, both from household and commercial sites,
- incentives for landfill alternatives,
- use of economic instruments to discourage the residual waste to landfill (for instance - waste tariff is made proportional with the amount of generated dry residual waste; increase of the landfill tax),
- promotion of household composting,
- development of plant network (MBT and composting plants),
- energy recovery from residual waste (dry fractions),
- promotion of separate collection of paper, cardboard and wood,
- prolongation of the agreements and conventions drawn with the material consortia,
- promotion of green procurement in the public administration,
- public awareness programmes (courses and trainings on household composting).

A brief outline of the measures adopted in Lombardia is presented in Box 3.1. Comparison of the regional programmes shows use of different methodologies to achieve the targets. For example, the Veneto Region emphasises the separate collection of biowaste, household composting and promotion of composting plants.

### Box 3.1. Measures for the reduction of BMW to landfill in Lombardia Region

- The Region of Lombardia has adopted following measures to reduce BMW:
- promotion of household composting of residual and garden waste
  - support reusable packaging material having low environmental impact
  - application of green procurement
  - development of new composting plants
  - development of a quality label for locally produced compost
  - waste incineration with energy recovery (house heating and electric energy production)

The progress of the landfill ban for certain waste types is summarized in table 3.3.

**Table 3.3. Waste streams included in the landfill ban**

Banned waste type	Introduction in Italy	Included in Landfill Directive
Liquid waste	Already introduced by D.M 141/98	Yes
Explosive and/or combustive waste	D.M 141/98	Yes
Waste with a flashpoint <55°C	D.M 141/98	Yes
Corrosive waste	D.M 141/98	Yes
Sanitary waste, infectious as defined in category H9, annex I	D.M 141/98	Yes
Waste arising from the production of medical or pesticides compounds	D.M 141/98	Yes
Waste containing or contaminated by PCBs, PCTs, mono-methyltetra-, dichloro- and dibromodiphenylmethane, with concentration > 25 ppm	D.M 141/98	No
Waste containing or contaminated by PCDD or PCDF, with concentration > 10 ppb	D.M 141/98	No
Waste containing Ozone layer depleting substances	D.M 141/98	No
Waste containing substances from research activities, with unknown effects on the human health and the environment	D.M 141/98	No
Waste and materials according reg.1774	Decree 36/03	No
Whole used tyres, excluding tyres used as engineering material, and shredded used tyres three years from that date (excluding bicycle tyres, and tyres with an outside Ø> 1.400 mm)	Decree 36/03 from 16/07/03	Yes
Waste with Net Calorific Value > 13.000 kJ/kg	Decree 36/03 set it from 01/01/07; Recently post-poned to 31/12/08	No

### 3.3. Stages of implementation

**Table 3.4. Implementation of the measures**

	<b>Measures</b>	<b>Implementation</b>
<b>Municipal waste in general</b>	Deliberation of Inter-ministerial Committee of 27 <sup>th</sup> July 1984	Waste management and treatment. Introduced the first landfill classification (5 categories)
	Legislative Decree n.22 of 5 <sup>th</sup> February 1997 (22/97)	Waste Framework Law (now amended by Legislative Decree 152/06). Among the other provisions, it established the first set of targets for the separate collection of municipal waste.
	Legislative Decree n.36 of 13th January 2003 (36/03)	Transposition of Landfill Directive
	Ministerial Decree of 3rd August 2005, (amending M.D. of 13th March 2003),	Established the criteria and the procedures for the acceptance at landfills, according Decision 2003/33/EC
	Legislative Decree n.152 of 3 <sup>rd</sup> April 2006 (152/06)	Current environmental framework law. Established a new set of targets for the separate collection.
	Financial Law n.296 of 27th December 2006	Increased the separate collection targets.
<b>Biodegradable Municipal Waste</b>	Law n.748 of 1984 (now amended by Legislative Decree 217/06)	Defined the compost features for its classification as a product (soil improver), including the use of biodegradable waste
	Legislative Decree n.36 of 13th January 2003 (36/03)	Transposition of Landfill Directive; it established a specific set of per capita targets for BMW, more ambitious than the Directive's ones (2008, 2011,2018)
	National strategy for the reduction of biodegradable waste going to landfills (2003)	Enhanced the elaboration of regional programmes for the biowaste landfilling
	Regional Programmes for reduction of BMW landfilling (since 2004)	Each Region developed a specific programme, identifying measures and instruments to reduce BMW going to landfill
<b>Tyres</b>	Financial Law 2002	Public administration must cover at least the 20% of their annual need buying retreaded tyres
	Ban on landfilling tyres (Decree 36/03)	From 16/07/03, whole used tyres, excluding tyres used as engineering material, and shredded used tyres 3 years from that date (excluding bicycle tyres, and tyres with an outside Ø> 1.400 mm)
<b>Construction and demolition waste</b>	Ministerial Decree 5 <sup>th</sup> February 1998 (a)	Specific measures and options for the recovery of certain non hazardous C&D waste
	Voluntary agreements for the recovery of C&D waste	Developed at regional and provincial level

Note: (a) This decree deals with a wide range of non hazardous waste, including C&D waste

## 4. Understanding the associated package of measures

### 4.1. Relationships with a package of other policy interventions

There is a wide range of different instruments implemented to promote the recovery of material at national level:

- targets of separate collection,
- recycling and recovery targets (Packaging, End of live vehicles, WEEE),
- landfill bans for certain waste streams (D.Lgs.36/2003),
- obligation of use of recycled materials (D.Lgs. 203/2003),
- simplified procedures and regulations (D.Lgs.152/2006, DM 5 February 1998 e DM 161/2002).

#### Recovery

Public administrations have to reduce the final disposal of waste according to article 181 of decree 152/06, which promotes:

- Reuse and recycling
- Other forms of recovery, to get secondary raw material from waste
- Adoption of economic instruments, and contract conditions that include the obligation of the use or material recovery from waste, in order to promote the market of these materials
- Use of waste to produce energy

According decree 152/06, public administrations and producers have to implement life cycle analysis and promote awareness campaigns to encourage reuse, recycling and recovery.

Article 181 of decree 152/06 ensures special economic instruments, such as financial facilitations (subsidies and special funding), for the companies that modify their production cycles to reduce the quantity and hazardous waste.

Agreements, which can include administrative facilitations and economic incentives, between public administrations and stakeholders (trade associations, sector organisations) are also seen as effective instruments to encourage the recovery of materials (article 181 and 206 of decree 152/06). These agreements can be signed by the Ministry of Environment and the Ministry of Productive Activities together with local authorities and public bodies, private and public stakeholders and sector organisations. This has been widely used at local level - mostly provincial and regional - for many different waste types (agricultural, certain types packaging materials, compost, construction and demolition waste). Examples of agreements signed at national level regarding specific waste streams such as telephone poles, wooden railway poles, automobile shredder residues, and sludge from aluminium industry. Among the most effective agreements is the one signed between the National Packaging Consortia (CONAI) and the Association of Italian Municipalities (ANCI) on separate collection of packaging materials.

The agreements can include:

- implementation of specific sector plans for waste reduction and recovery
- research, promotion and development of productive processes and clean technologies for enhancing the quantitative and qualitative prevention of waste
- development of innovations that favour the production of recyclable goods
- promotion, testing and adoption of reuse and recovery activities

- utilisation of the recovery materials from separate collection of municipal waste

### **Packaging**

The Packaging Directive was transposed into the national legislative framework through the decree 152/2006, including its dispositions in Part 4 of the decree (Parte Quarta -Title II: Packaging management).

After the introduction of decree 22/97 (Ronchi decree) in 1998, there has been a developed system for the management of packaging and waste packaging materials. Consorzio Nazionale Imballaggi (CONAI, National Packaging Consortia) was established with the aim to coordinate the recovery of aluminium, glass, paper and cardboard, plastic, steel and wood. The management of packaging waste by CONAI is financed by packaging producers and users.

### **Green Public Procurement**

The Italian Environmental Strategy for Sustainable Development (Resolution 57/2002 of Inter-ministerial Committee for Economic Planning) considers GPP as one of the most effective instruments to integrate environmental measures into the market.

Following this resolution, the Ministry of Environment issued the Ministerial Decree 203/2003 supporting the recycled material market through public procurement. The decree demands that all regions issue legislation ensuring that public bodies and companies funded by public capital buy at least 30% of their annual demand with products and goods made of recycled material. This means that the implementation of the rule is not limited to the public administration, it also includes institutions like public utilities and societies with public capital.

The aim of this regulation is to create a market for recycled goods; this includes traditional materials, such as paper and cardboard, wood, used oils, rubber items, C&D waste and textiles.

### **Incineration**

The Directive 2000/76/EC on waste incineration has been transposed into national legislation through the Legislative Decree n.133 of 11 May 2005. This decree establishes precise technical and operational provisions for waste incineration and co-incineration and repeals former decrees regarding this sector.

### **Best Available Techniques**

With the Ministerial Decree of 29 January 2007, the best available techniques (BAT) for different kinds of waste management and treatment plants have been published in seven guidelines. These documents, developed according the integrated pollution prevention and reduction (IPPC) discipline, provide a basic technical and operational support for both the plant operator and the authorities responsible for permit. The guidelines contain the BAT for the following plants:

- waste incineration,
- mechanical biological treatment,
- RDF production,
- waste storage facilities,
- physio-chemical treatment of solid waste,
- biological, physio-chemical treatment of liquid waste therapy.

According the IPPC Directive (fully transposed in Italy through Legislative Decree n. 59 of 18 February 2005) these guidelines supply the regional authorities with updated and useful information for the application of BAT.

### **Economic instruments**

Since the mid 1990s, different economic instruments have been developed at national level to promote the collection and recovery of specific waste streams. Among others, these instruments include:

- special charge/fee for waste disposal - Law 549/95
- tariff for municipal waste management - D.Lgs 152/2006 (article 238)
- environmental contribution for recycling and recovery of packaging waste- D.Lgs 152/2006 (article 224)
- environmental contribution/surcharge on used tyres - D.Lgs 152/2006 (article 228)

## 4.2. Objectives

### Packaging

The provisions established by decree 22/97 regarding packaging and waste packaging enhanced the development of a dynamic system that comply with the targets set by the EU legislation.

Historically, there has been a tradition of recovering and recycling materials like wood and paper. The practice has helped the system progress. The Law 475/88 has specifically established targets for the recovery of packaging from beverages container.

Decree 152/06 transposed the targets for the recovery and recycling initially established by the Packaging Directive 2004/12/EC. The targets, to be achieved by 31 December 2008, are listed in the Annex E of the Parte Quarta of the decree.

Decree 152/06 set higher targets for the recycling of certain packaging materials than that by Packaging Directive As shown in Table 4.1. Higher targets were set because Italy is already well advanced in recovery of certain packaging waste fractions.

**Table 4.1. Comparison between recycling targets set in EU and Italian legislation**

Recycling targets for each packaging material (% on weight)		
Packaging material	Packaging Directive	Decree 152/06
Glass	60 %	60 %
Paper and cardboard	60 %	60 %
Metals	50 %	50 %
Plastics	22,5 %	26 %
Wood	15 %	35 %

### Green Public Procurement

Producers can register their products in Public Register (Repertorio del Riciclaggio). All the companies and public bodies must buy at least 30% of their supplies from this register.

For the operation of the decree 203/2003, the Ministry of the Environment issued specific ordinances for paper, wood, soil improver, textiles, plastic, construction & demolition, oils, and rubber. These acts contain minimum criteria for recycled materials and registration of articles/goods at Repertorio del Riciclaggio with specific operational procedures. A National Action Plan for GPP is currently under elaboration.

### Economic Instruments

Law 28 December 1995, Nr 549 – Financial Law 1996 – has instituted a tax system commonly known as the landfill tax. Implemented since January 1996. The law established that at least 20 % of the tax yield must be used by the local administration (here, the Region; only the 10 % of the income goes to the Province) to finance environmental project regarding:

- waste prevention,
- recycling and recovery of material, and generation of energy from waste (Priority is given to the projects which provides alternative to landfills),
- remediation of polluted sites and dismissed industrial sites,
- financing of the regional environmental protection agencies,
- institution and maintenance of protect natural areas.

This tax is designed with a possibility to stimulate investments in waste management sector to achieve environmental goal.

Law 549/95 established that the detailed definition of the taxation is delegated to the competent regional administrations, which have the possibility to deliberate on three important elements;

1. the tax level,
2. the waste typologies to which the tax applies,
3. the destination of use of the tax revenue.

### **Tariff for municipal waste management**

At present, most of the municipalities impose waste management tax based building's floor area (in m<sup>2</sup>). However some municipalities (935 in 2006) have developed new system of municipal waste tariff - based of number of people living in a building and the quantity of waste produced. Furthermore, it must be properly commensurate to the results of the separate collection reached.

The structure of the tariff includes:

- Fixed quota, for the essential components of the cost of the service;
- Proportionate quota depending upon quantity of waste produced by individual /activity.

One of the main purposes of the tariff scheme is to achieve separate collection target by encouraging minimization of municipal waste disposal. The municipality that fails to comply with the targets for separate collection will be forced to increase the landfill tariff. The tariff system encourages the municipality to introduce an industrial accounting system to handle waste efficiently. At present, the application of such tariff is still in a phase of implementation and development.

### 4.3. Stages of implementation

1988	Law n.475 of 9th November 1988 (art.9)	Mandatory Consortium for Spent Lead Batteries and Lead Waste
1995	Law 28 <sup>th</sup> December 1995, nr. 549 (Financial law 1996)	Introduction of tax on waste disposal
1997	Legislative Decree n.22 of 5 <sup>th</sup> February 1997	First set of targets for packaging waste; other material Consortia
1998	Decree 5 <sup>th</sup> February 1998	Promotion of recovery activities
1999	Agreement ANCI-CONAI (renewed in 2004)	Coordination for the separate collection at municipal level of the packaging materials
2003	Ministerial Decree 203/2003	Green Public Procurement
2004-2006	Specific Ordinances of the Ministry of the Environment for the GPP	Textiles - Min. of Environment notice of 8 <sup>th</sup> June 2004 Plastic - Min. of Environment notice of 4 <sup>th</sup> August 2004 Paper - Min. of Environment notice 3 <sup>rd</sup> December 2004 Wood & furniture - Min. of Environment notice of 3 <sup>rd</sup> December 2004 Compost / Soil improvers - Min. of Environment notice of 22 <sup>nd</sup> March 2005 Construction, roads, & environmental Min. of Environment notice of 15 <sup>th</sup> July 2005, n. 5205 Rubber - Min. of Environment notice of 19 <sup>th</sup> July 2005 Used mineral oils Min. of Environment notice of 31st January 2006, n. 862
2005	Legislative Decree n. 59 of 18th February 2005	Transposition of IPPC Directive 61/96/EC
	Legislative Decree n.133 of 11 <sup>th</sup> May 2005	Transposition of Incineration Directive 2000/76/EC
2006	Decree 152/06 transposed Directive 2004/12/EC targets	Targets mostly achieved, in particular for some materials (wood and plastic)
2007	Ministerial Decree 29 <sup>th</sup> January 2007	National Guidelines with BAT for waste treatment plants (7 documents)

## 5. Factors influencing the effectiveness of a policy of waste diversion from landfill

In this section we present a reference indicator related to the Landfill Directive target on BMW and factors related to the landfill, incineration and recycling of waste. This information serves as input to the proposed methodology presented by Mazzanti and Zoboli (Mazzanti & Zoboli 2007). The information will also be used in the comparative analysis of the five countries and one region in the study. The information is summarised in Tables 5.2 to 5.4.

The main notion behind the proposed procedure is that the causal relationship between specific landfill policy change and the change in indicator representing waste diversion from landfills is controlled by the state of other hindering/favouring factors at the time of policy implementation. This reflects a system-wide approach, and it should help us to identify the specific role of policy change in the framework of co-causation arising from the many factors at work in the waste system. The proposed methodology is a mixed quantitative/qualitative one, and it should be able to exploit the information on policy changes and other ‘explaining factors’ in a coherent model-like approach.

The time of policy implementation is the year where the Landfill Directive was transposed and in the study it is used to assess the trends before and after the policy implementation. In Italy the Landfill Directive was transposed in 2003.  
#Common writeup!!!! This could be from the template#

### 5.1. Development in reference indicator

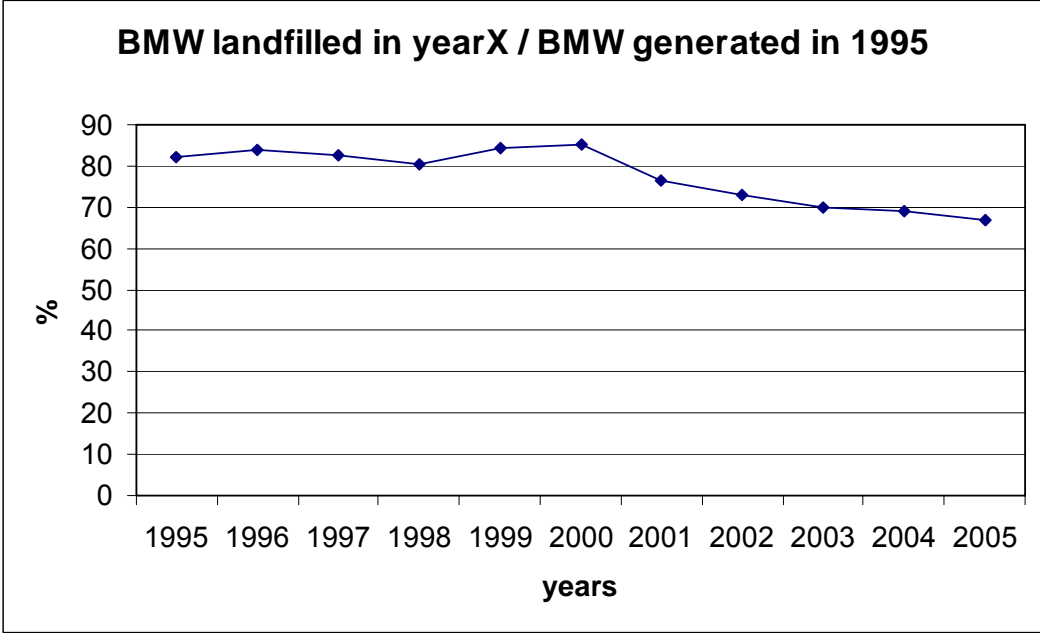
The indicator chosen to represent the progress of landfill policy objectives (waste diversion from landfill) is the ratio between the amount of BMW to landfill for a given year against BMW generation in 1995. The indicator was adopted to define a set of possible “configurations”, corresponding to the change in the indicator from ‘before’ to ‘after’ the implementation of the Landfill directive. The values and the trend of the reference indicator are shown in table 5.1 and figure 5.1.

**Table 5.1. Diversion indicator: BMW to landfill in year X/BMW generated in 1995 (%)**

Years	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Diversion Indicator	82	84	83	81	84	85	76	73	70	69	67

The methodology evaluates the changes of the indicator over time comparing the diversion trend before and after the implementation of the Landfill Directive.

**Figure 5.1. Trend of the diversion indicator (%), years 1995-2005**



The average rate of change in the indicator after the implementation of directive (in 2003) compared with the change before implementation shows approximately the same value. Hence the resulting configuration is number 1<sup>6</sup>: trend of diversion from landfills before the directive implementation which did not change even after implementation.

<sup>6</sup> For further information, please refer to the methodology paper (Mazzanti & Zoboli 2007)

## 5.2. Factors influencing effectiveness of a policy for municipal BMW diversion from landfill

**Table 5.2. Factors influencing effectiveness of a policy for municipal BMW diversion from landfill**

Favouring/ hindering factors	Influ- ence on diver- sion	Justification of the +/- sign	Indicator	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Factors related to BMW landfill policy</b>														
<i>Landfill Directive 1999/31/EC transposed</i>	+	<i>Legal framework in place</i>	<i>Dummy (1/0)</i>	0	0	0	0	0	0	0	0	1	1	1
<i>Landfill tariffs/gate fees for BMW or MSW (excl. VAT and landfill tax)</i>	+	<i>High cost of landfill</i>	<i>Average for country, or the highest gate fee and the lowest gate fee for new landfills, EUR/tonne</i>	At present, there are no official data for all the sites at national level. Federambiente reports a range of 90-110 EUR/tonne. Some surveys have been carried at regional level; one of the most recent (elaborated by the Regional Authority for the monitoring of public services and waste management of Emilia Romagna), which covered 12 sites, reports gate fees ranging from 53.8 EUR/tonne to 104.5 EUR/t, for an average value of 79.5 EUR/tonne.										
<i>Landfill tax on BMW (or MSW)</i>	+	<i>High cost of landfill</i>	<i>Average for country, or the highest and the lowest tax, EUR/tonne</i>	25.8 EUR/tonne - highest 7 EUR/tonne – lowest (referred to year 2004) (a)										
<i>Prohibition of untreated waste in landfill</i>	+	<i>Discourage landfill</i>	<i>Dummy (1/0)</i>	0	0	0	0	0	0	0	0	1	1	1
<i>Selective ban on BMW</i>	+	<i>Quantity limitation by law</i>	<i>Dummy (1/0)</i>	0	0	0	0	0	0	0	0	0	0	0
<b>Factors related to waste production and collection</b>														
<i>BMW generation per capita</i>	-	<i>High production requires many management options</i>	<i>BMW generation [kg per capita]</i>	278	280	286	289	305	311	320	323	325	330	334
<i>Separate collection for BMW: Split into the following fractions (if possible):</i>	+	<i>Basic requirement for recycling</i>	<i>Share of generated BMW collected separately [%]</i>								21.0	22.9	25.4	27.1

Favouring/ hindering factors	Influence on diver- sion	Justification of the +/- sign	Indicator	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		
· paper and cardboard (incl. newspapers etc.) · kitchen, garden and wood waste · other BMW fractions separately collected · BMW in residual waste											9.1	10.4	11.2	11.8		
												9.9	10.2	11.5	12.4	
													2.0	2.3	2.7	2.9
'Full cost' collection tariffs/charges (excl. VAT and taxes)	+	Higher capacity to invest in separate collection and recovery/recycling	Share of municipal waste management cost covered by tariffs [%]	79.0	n.a.	78.6	n.a.	83.4	n.a.	87.7	n.a.	85.2	n.a.	90.1 (b)		
<b>Factors related to landfill sector</b>																
Share of MSW to landfill (Eurostat Structural Indicator)	+	Pressure on capacity	Landfilled MSW over MSW generation [%]	n.a.	83.3	80.0	77.4	76.7	75.7	67.0	63.1	59.9	57.0	54.4		
Landfill residual capacity (non-hazardous waste)	-	Discourage diversion	Landfill residual capacity (non-hazardous waste)	Actually, it is not possible to evaluate the exact value. In Italy the situation is developing because of the adaptation of the old landfills to the new prescriptions. Of the 487 landfills for municipal waste in 2003, 134 sites have been closed (at 2007); 317 landfills were closed since year 2000.												
Land for capita	-	Land available makes it a non-scarce resource	Land per capita [m <sup>2</sup> ]	5089 m <sup>2</sup> per capita (2006)												
<b>Factors related to incineration sector</b>																
Share of MSW incinerated (Eurostat Structural Indicator)	-	Low incineration rate: makes diversion more difficult	Incinerated MSW over MSW generation [%]	n.a.	6.1	6.6	7.0	7.3	7.7	8.6	8.9	10.5	11.4	12.1		
Dedicated incineration capacity for MSW (available)	+	Makes diversion easier	Incineration capacity available [% of MSW generated]	n.a.	n.a.	n.a.	n.a.	10.6	12.1	11.5	14.1	15.3	15.4	16.1		

Favouring/ hindering factors	Influence on diver- sion	Justification of the +/- sign	Indicator	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Incineration gate fees for MSW (excl. VAT and incineration tax)	-	High fee, low incentive to diversion	Average for country, or the highest gate fee and the lowest gate fee, [EUR/tonne]	According the study by Eunomia in 2001, the gate fee is ranging between 41,3 and 90,3 EUR/tonne, its value anyway is depending upon the subsidies given to the plant (green certificates, CIP 6), that could enable to cut down the fees of about 40 EUR/tonne. Federambiente reports a range of 70 - 90 EUR/tonne. A more recent survey showed a much higher range of values, from 104,91 to 111,97 EUR/tonne, for an average of 107,84. (c)										
National policies on RES	+	Targets for RES policies stimulate energy from MSW	Distance-to-target for E-RES [% points from target]	10.1	8.5	9.0	9.4	8.1	9.0	8.2	10.7	11.3	9.1	10.9 (d)
<b>Factors related to material recycling and recovery sector</b>														
Packaging and packaging waste policy	+	Stimulates diversion	Recycling rate of paper [%] (recycling over packaging placed on the market) [%]	n.a.	n.a.	n.a.	37.0	40.8	44.2	50.7	56.2	57.8	62.4	66.6
MBT capacity	+	Favours diversion	MBT capacity, [1.000 tonnes/year]	n.a.	n.a.	n.a.	n.a.	4,292	5,071	6,785	10,255	11,767	11,865	13,279
Compost capacity (i.e. input of biowaste)	+	Favours diversion	Compost capacity, [1.000 tonnes/year]	n.a.	n.a.	n.a.	n.a.	2,175	2,966	4,263	5,238	5,394	5,279	6,041

(Sources: APAT 2007, except: (a) Paina & Zatti 2005, (b) Federambiente 2006, (c) Eunomia 2001, (d) Eurostat 2007)

**Table 5.3. Evaluation of indicator for landfill policy in 2003**

Landfill policy	Indicator	Strong	Weak
Landfill Directive 1999/31/EC transposed	Dummy (1/0)	<b>1</b> <b>(Transposed in 2003)</b> If yes (=1), with early ( $\leq$ 2003) implementation, or beyond directive's provisions	
Landfill tariffs/gate fees for BMW	Average for country, or the highest gate fee and the lowest gate fee, EUR/tonne	<b>Not available (it is not possible to draw a comparison over the years)</b> If higher with implementation > 20% increase in gate fees 3 years after implementation	If low after implementation < 20% increase in gate fees 3 years after implementation
Landfill tax	Average for country, or the highest and the lowest tax, EUR/tonne	<b>Not available (it is not possible to draw a comparison over the years)</b> If higher with implementation If tax > 50% of gate fee 3 years after implementation	If low after implementation If tax < 50% of gate fee 3 years after implementation
Pre-treatment requirements	Dummy (1/0)	<b>1</b> <b>(Transposed in 2003)</b> If yes (=1), with early ( $\leq$ 2003) implementation, or beyond directive's provisions	
Selective ban on BMW implemented	Dummy (1/0)		<b>0</b> If no (=0), or yes but delayed (> 2005) and implemented with exceptions
<b>Summary evaluation</b>		<b>2</b>	<b>1</b>

According to the information reported in Table 5.2 and 5.3, since it is not possible to properly weigh 2 of the 5 indicators chosen, the evaluation of the indicators related to landfill policy was difficult to assess,

**Table 5.4. Evaluation of favouring and hindering factors in 2003**

Favouring factors (+ sign)				Hindering factors (- sign)			
	Indicator	Strong if	Weak if		Indicator	Strong if	Weak if
<b>Related to waste production and collection</b>							
Separate collection for BMW	Share of BMW collected separately of generated MSW, %	> 30%	<b>22,9%</b> < 30%	1	BMW generation	BMW generation, tonnes per capita	> EU15 average <b>325</b> <341 (EU15 average)
'Full cost' collection tariffs/charges	Share waste management cost covered by tariffs/charges, %	> 90%	<b>85,2%</b> < 90%				
<b>Related to landfill sector</b>							
Landfilled MSW of MSW generation	Landfill share in MSW waste generation, %	<b>59,9%</b> >48% (EU-25 average)	< EU-25 average	2	Landfill residual capacity (non-hazardous waste)	Landfill capacity (non-hazardous), 1000 tonnes <b>Not available</b>	Higher than 5 years of generation (in implementation year) Lower than 5 years of generation (in implementation year)
				3	Land availability	Land per capita in m2	<b>5206</b> (>5000) <5000
<b>Related to incineration sector</b>							
Dedicated incineration capacity for MSW (available)	Incineration capacity, % of MSW generated	If capacity > 20% of generated MSW	<b>15,3%</b> If capacity < 20% of generated	4	Incineration gate fees for MSW	Average for country, or the highest gate fee and the lowest gate fee, EUR/tonne	<b>Not available</b> > 30% increase in gate fees after implementation < 30% increase in gate fees after implementation

Favouring factors (+ sign)				Hindering factors (- sign)			
	Indicator	Strong if	Weak if		Indicator	Strong if	Weak if
			MSW			tation	ation
National policies on RES	<i>Distance-to-target for E-RES on domestic electricity consumption, %</i>	< 50% of the 2010 target has been met	<b>55%</b> > 50% of the 2010 target has been met	5	Share of MSW incinerated	<i>Incinerated MSW over MSW generation, %</i>	> EU25 average <b>10,5%</b> < 17 < EU-25 average
<b>Related to material recycling and recovery sector</b>							
Packaging and packaging waste policy	<i>Recycling rate paper and paperboard, %</i>	<b>57,8%</b> > 50%	< 50%				
MBT capacity	<i>MBT capacity, % of generated BMW</i>	<b>63,2 %</b> Either: 20% of BMW generation	Either : < 20% of BMW generation				
Compost capacity	<i>Compost production capacity, % of Generated BMW</i>	<b>29,0 %</b> Either: > 20% of BMW generation	Either : < 20% of BMW generation				
<b>Summary evaluation</b>	<b>Globally neutral: 4 out of 8</b>	<b>Globally strong: If at least 5 strong out of 8</b>	<b>Globally weak: If at least 5 weak out of 8</b>	<b>Summary evaluation</b>	<b>Globally weak : 2 out of 3</b>	<b>Globally strong: If at least 3 strong out of 5</b>	<b>Globally weak: If at least 3 weak out of 5</b>

Table 5.4 evaluates the factors favouring and hindering the waste management system. Each indicator has been compared with a critical value to assess the influence of related factors. The resulting influence was weak when the comparison between the favouring factors associated with waste production and collection and those related with the incineration sector, whereas comparison between the favouring factors connected to landfill sector and to material recycling and recovery sector appeared stronger. Hence it is not immediately possible to evaluate whether the favouring factors are globally strong or weak.

On the other hand, the hindering factors are globally weak. nevertheless, it must be noted that it was not possible to get the values for the two indicators necessary to define a hindering factor.

**Table 5.5. Policy evaluation for Configuration 1 of diversion indicator: 'Trend of diversion from landfills *existed before the directive implementation and it did not change after the implementation*'**

Combination	Landfill policy change	Favouring factors +	Hindering factors -	Summary evaluation
6	Strong: <i>The existing policy was far from the directive or was already in line but its change went beyond the directive</i>	Weak	Weak	Ineffective: policy has been very active but it was unable to exploit 'neutral' favourable and hindering factors
8		Strong	Weak	Ineffective: policy has been very active but it was unable to exploit favourable factors in the presence of weak hindering factors

Note: For further information, please refer to the methodology paper (Mazzanti & Zoboli 2007).

The evaluation concludes that according to the proposed methodology, the policy did not have a significant impact on the diversion of waste from landfill site. Although the policy has been very active, it failed to exploit favouring factors - either weak or strong – and the comparatively weak hindering factors.

However, it is important to note that the transposition of Landfill Directive in Italy is very recent. Some of the indicators that lead to the above conclusion are very close to the edge of the “critical factors” defined. In addition, considering the differences in implemented measure in the different regions, positive results achieved in certain regions may be overshadowed by the poor performance in other regions. Hence the impact of the implemented measures may be noticeable in next few years. measures implemented may only be visible in few years.

### 5.3. Factors related to waste generation and collection

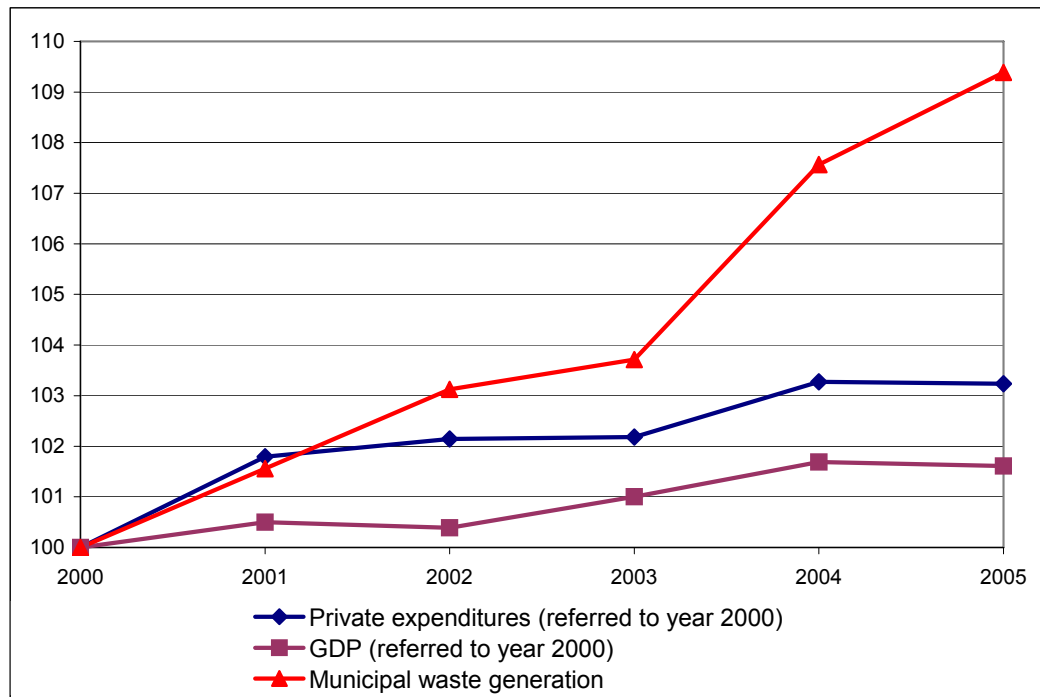
Waste generation in Italy has been increasing steadily since last decade. During the years 2001-2005 waste production increased by almost 8%; this breaks down to 5.5% between 2003-2005, and 2.1% between 2001-2003(Table 5.6).

From 2004 onwards, increase in the municipal waste generation has been noticeably high compare to increase in GDP and private expenditure. In the period 2003-2005. GDP grew by 1%, private consumption by 0.6%, while municipal waste generation grew by 5.5% (Figure 5.2).

Thus, an increase in municipal waste generation does not correspond with change in socio-economic indicators - total household expenditure in particular. A possible explanation could be that the municipal waste also includes other waste types which do not necessarily originate from household.

Besides separate collection targets, decree 22/97 also describes an integrated system for the management of packaging waste. The provisions included in the support the development of an integrated waste management system. Separate collection, in particular, was one of the most influent tools of this decree.

**Figure 5.2. Trend in municipal waste generation compared to some socio-economic indicators – years 2000-2005**



Note: Index, year 2000 =100.

After decree 22/97 came into force, many effective separate collection schemes were developed. Although some of the provinces already had a separate collection system, many performance poorly.

Numerous waste collection solutions have been developed throughout Italy. These include a range of schemes for collecting and handling waste fractions. Each solution has merits and demerits depending upon the context and circumstance where it is implemented. However, door-to-door separate collection system has been quite effective compared to roadside container collection method.

There is no reliable national data available on average landfill tax. The tax is fixed at regional level based on general criteria set nationally. Largely used by most of municipalities since 1995, this instrument has indeed helped to reduce the economic attractiveness of landfill.

Since 1999, municipalities are liable to calculate the tariff on waste for their respective regions. At present, 935 municipalities of total 8,100 municipalities have adopted such tariff scheme. Since the people can quantify their waste generation and are exposed to a financial impacts of that generation, the economic instrument has an influential role in waste prevention. Furthermore, the practice acts as an instrument for transparency to the waste operators and municipalities besides serving as an indicator for the waste management system.

## 5.4. Factors related to landfill sector

In 2005, the amount of municipal waste to going to landfill was 17.2 million tonnes, a decline of 3% from 2004. Just under half of this decrease (241 000 tomes, or 46%) took place in northern regions; this equated to a 4% reduction for the northern regions.

**Table 5.6. Municipal waste generation and landfill (in tonne)in Italy**

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Municipal waste generated</b>	25,800	25,960	26,605	26,846	28,364	28,959	29,409	29,864	30,034	31,150	31,664
<b>Municipal waste landfilled</b>	n.a.	21,624	21,275	20,767	21,747	21,917	19,704	18,846	17,999	17,740	17,225

In 2005, the number of operational landfills decreased from 401 to 340, mainly due to closure of landfills in the southern regions. In northern region, the number of landfill sites fell by seven while in the central region two new landfills were added. Figure 5.4 illustrates present geographical distribution of landfill sites in Italy. It shows that there are 176 landfill sites in the southern region, 110 in the northern region and 54 in the central region.

## 5.5. Factors related to incineration sector

Even with 50 incineration plants spread across the country, they are not yet readily accepted by the people. However, the situation varies as many regions do not have municipal waste incinerators (Figures 5.3 and 5.5).

The recent transposition of the Incineration Directive 2000/76/EC in May 2005, and the recent issuance <sup>7</sup> of national guidelines with the Best Available Techniques for Waste Incineration, should help improve the Italian plants. These factors are expected to enhance the adoption of advanced technologies to achieve high environmental performances.

Even though most of the Italian incineration plants have already adopted the BATs developed at national level, and plants have been improved with some of the most recent technologies, there is still widespread public opposition to the construction of new incineration facilities.

As of 2005, there were 50 operational incineration plants for municipal waste; 30 in the North of Italy (13 in Lombardia), 13 in the Centre (8 in Toscana and 3 in Lazio), and 7 in the South. In 2004, two plants came into operation, after reconstruction and modernisation.

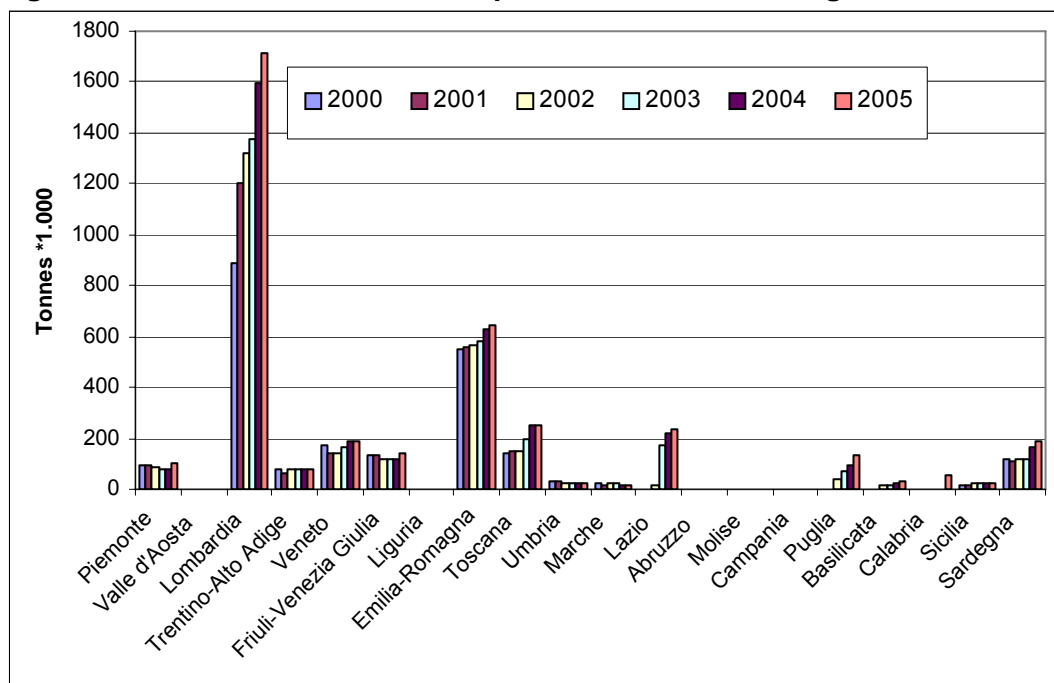
In 2005 the incinerators performed at 85% of their total capacity, treating a total of 4,378,000 tonnes of waste (municipal waste, RDF, special waste and a little amount of biomass). Municipal waste and RDF accounted for 3.8 million tonnes of this total (3.2 million of municipal waste, 611,000 tonnes of RDF), an increase by 8.7% compared with 2004.

The fraction of generated municipal waste that was incinerated increased slightly over the timeperiod; from 8.6 % in 2001 to 12.1% in 2005. In this period, the incineration capacity in the country has increased by 50%.

<sup>7</sup> With Ministerial Decree 29 January 2007

Considering the regional scenario (Figure 5.3 and 5.5) it can be noticed that northern region has a higher ratio of incineration: Lombardia (36%), Friuli-Venezia Giulia (23.5%), Emilia-Romagna (23%), Trentino-Alto Adige (16.1%) and Veneto (8.2%). Sardegna (21.5%) in the southern Italy is the only region with a considerable amount of incinerated waste.

**Figure 5.3. Incineration of municipal waste and RDF at regional level**



## 5.6. Factors related to material recycling and recovery sector

### Composting and MBT

The composting sector is steadily growing and the quantity of biodegradable waste sent for composting is increasing every year.

The number of composting plants for source separated materials has increased from 10 in 1993 to 284 in 2006 (215 operative plants; 161 plants with a capacity of less than 1,000 tonnes per year).

The main sources of compost waste are; domestic food wastes, green wastes from gardens and parks, agro-industry wastes, sewage sludge and other miscellaneous source. The result is a quality, marketable compost, regulated by Decree 217/06<sup>8</sup>. Under specific regulations, quality compost can also be used for organic agricultural production. The compost is marketed the following ways:

- Sold through the floriculture sector, (the bulk compost is sold to the fertilizer industry where it is mixed with peat, with the final product then sold in supermarkets)
- direct sale from the composting plant (only small amounts of compost are sold directly to the public)
- sale to agricultural businesses, in the cultivation of open-field crops.

In 2005, more than 3 million tonnes of waste was treated in the composting plants, 12.9% more than in 2004.

<sup>8</sup> D.Lgs. 29 aprile 2006 "Revisione della disciplina in materia di fertilizzanti"

Moreover between 2000-2005, the total capacity of compost processing in Italy has increased noticeably - the capacity was about 3 million tonnes in 2000 while the figure rose to 6 million tonnes in 2005, Therefore, plants are able to treat higher quantities of waste arising from separate collection.

Referring to 2005 data, the input flows of the waste treated in the composting plants consisted of the organic fraction and green wastes (70%), sludge (15,7% or 470,000 tonnes) and agro-industry waste (15% or 451,000 tonnes).

The propagation of the regional programmes for the reduction of biowaste going to landfill sites increased the practice of home composting. In Veneto, for example, total home composting in 2005 amounted 14,000 tonnes.

Many regions issued specific regulations for the soil restoration of farmlands using organic soil improvers. Emilia Romagna region provides about 150-180 EUR/ha to the users to promote the use of compost.

In 2005, national average of 41.4kg of municipal waste per capita (organic fraction and green waste) was sent to composting plants. However, the figure is diverse among different parts of the country (Table 5.8) reflecting discrepancy between the North and South.

**Table 5.8. Per capita amount of municipal waste treated in composting plants**

Area	Kg/inhab. per year
North	70,5
Centre	30,3
South	9,9

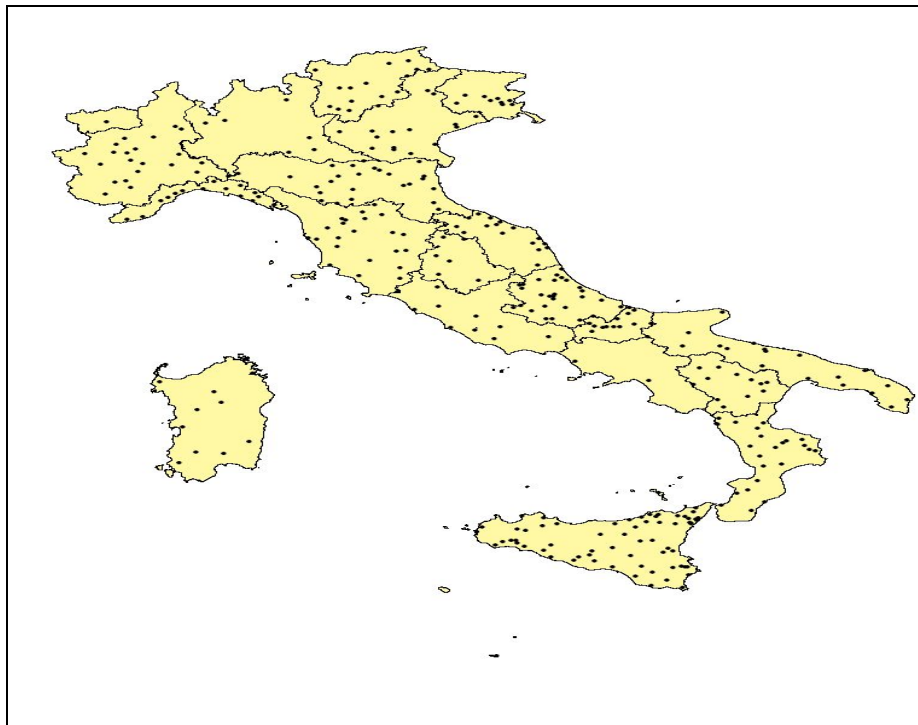
The majority of the composting plants (about 72%) are located in Northern Italy as a consequence of the local development of separate collection over the last decade. Recently, many efforts have been made in Southern Regions, with a specific goal to fill the gaps - either by commencing or increasing the composting facilities. This has produced a gradual increase in the number of plants and treated quantities.

The mechanical-biological treatment of residual mixed waste plays an important role in integrated waste management. An increase in both treated waste quantities and the number of MBT plants is evident - 128 in 2005 (109 operative plants) with a total capacity of more than 13.2 million tonnes and 8.3 million tonnes of treated waste.

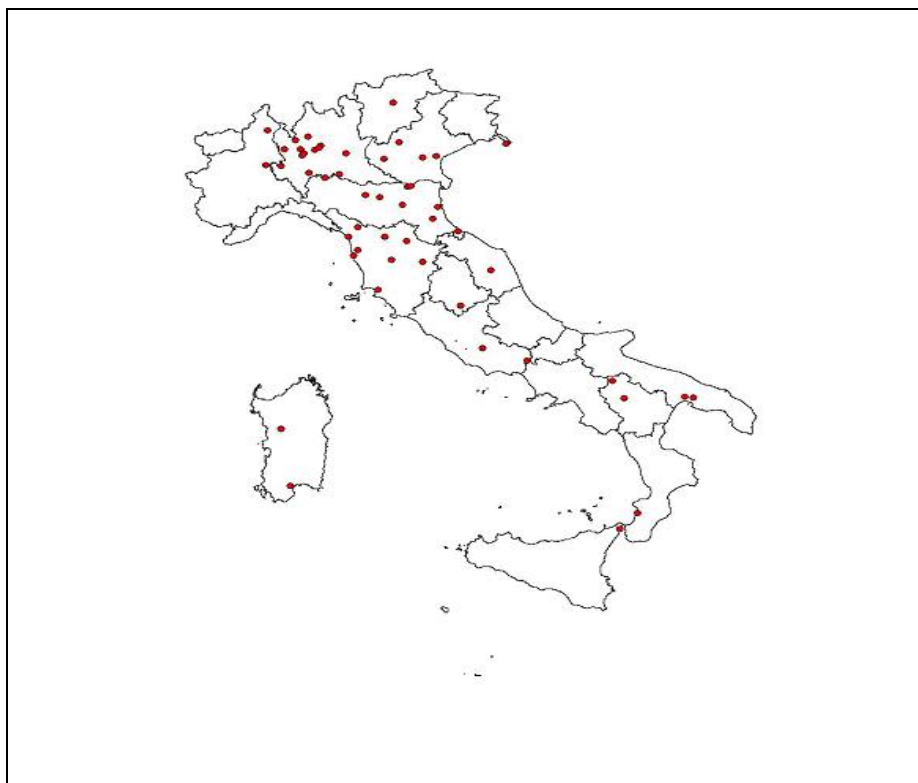
An increase in waste quantities for MBT in underdeveloped regions would surely improve the system. It should be noticed that the plants' full potential has not yet been exploited. More plants need to be built in the southern regions to overcome the dependence on landfill. The plants will also help reduce waste volumes destined to landfill and add to production of Refuse Derived Fuel (RDF). At provincial level the development of composting and mechanical-biological treatment is essential to achieve BMW reduction target.

Another major environmental drive for the reduction of greenhouse emission policy has been the commitment to the Kyoto Protocol on climate change. The Kyoto Protocol of the United Nations Framework Convention on Climate Change is an international environmental agreement which targets greenhouse gas emissions. The Kyoto Protocol was negotiated at the third Conference Of the Parties in Kyoto, Japan, December, 1997 and the Parties of the UNFCCC agreed to a protocol to reduce greenhouse gas (GHG) among the member countries. In Italy the Kyoto Protocol was adopted by Law 120/2002.

**Figure 5.4. Landfill distribution in Italy, year 2005**



**Figure 5.5. Incineration plants distribution in Italy, year 2005**



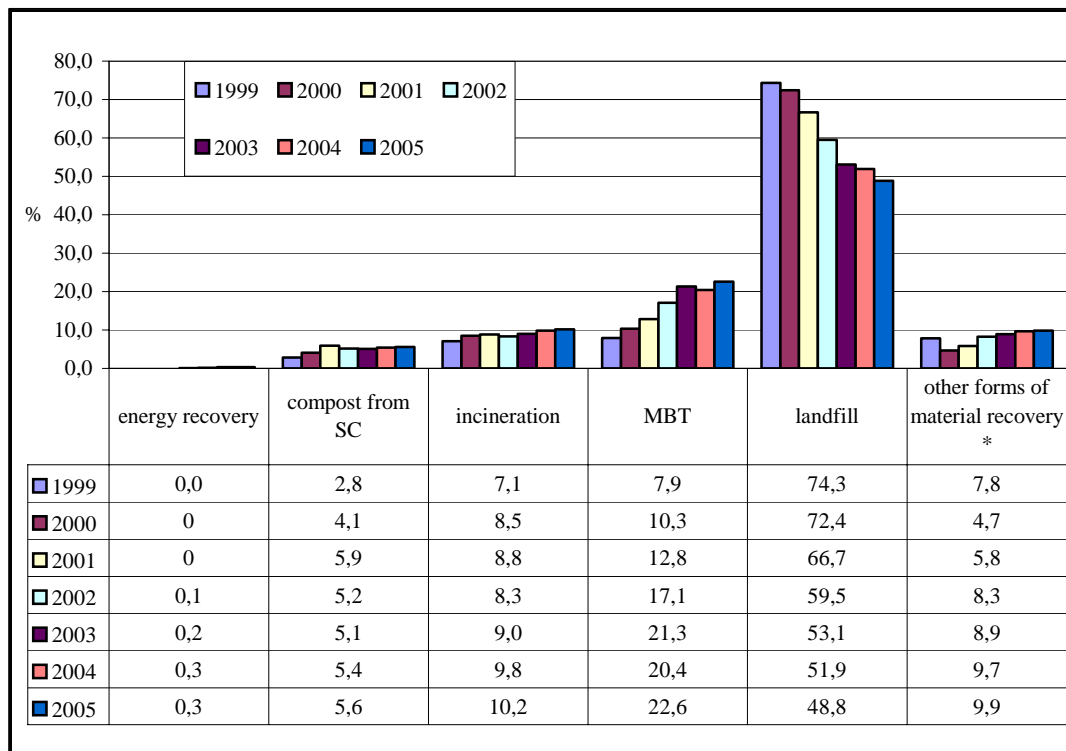
## 6. Assessment of the status of municipal waste, tyres and C&D waste

### Municipal waste

In 2005, the total municipal waste generation in Italy reached 31.7 million tonnes, an increase of 530,000 tonnes and 1.6 million tonnes from 2004 and 2003 respectively. Figure 6.1 shows some key elements of municipal waste management over last 6 years.

The trend shows that there has been a continuous decline in landfill waste whereas a gradual increase in recoverable entities. Since 2001, the proportion of waste going to landfill has decreased from 67% to 49% .

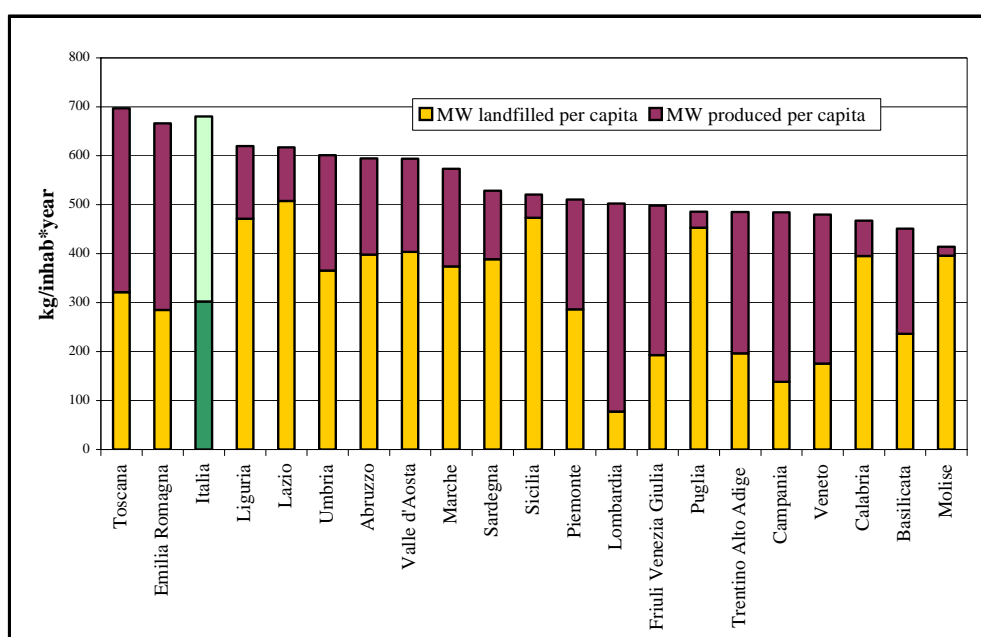
**Figure 6.1. Trend in municipal waste management, years 1999-2005**



Note: \*: 'Other forms of material recovery' includes slag from incineration plants recovered in cement kilns and some separate collection fractions sent to recovery. It does not include discards from selection facilities such as packaging waste, textiles and bulky waste.

A regional overview of municipal waste generation is illustrated in Figure 6.2 The graph shows that the Lombardia region landfills the lowest quantity of municipal waste, with 15% of generated municipal waste ending up in landfill site. Besides, a very small fraction of waste is transferred to landfill without prior treatment. On contrary, some regions predominantly rely on landfills for waste management, eg. Molise, Puglia and Sicilia where more than 90% of generated municipal waste is send to landfills.

**Figure 6.2. Regional generation and landfilling of municipal waste, 2005, (kg/inhab per year)**



Note: Italian average shown in green

### Biodegradable Municipal Waste

Analysis of BMW landfill data in 2005 shows that BMW continues to follow the past trends. On the basis of several nationwide surveys, APAT has estimates that on average BMW constitutes 62% of total municipal waste.

Based on specific analysis on waste landfilled and consideration on separate collection schemes, APAT estimated the ratio of the biodegradable waste over the total landfill waste per capita.

Figure 6.3 shows the generation and disposal of BMW in 2005 at regional level against recommended target for 2008 (173 kg/inhabitant per year) set by decree 36/06. Most of the regions in the southern and central Italy still fail to meet the target to reduce biowaste. The collection of biodegradable fraction accounts for 14% and 5.3% of total municipal waste in southern and central regions respectively.

Of the 20 regions, six - namely, Lombardia, Friuli Venezia Giulia, Veneto, Trentino Alto Adige, Basilicata and Campania<sup>9</sup>- have reduced BMW to landfill to the 2008 target. Lombardia in particular has already achieved the target set for 2018 (81 kg/year per inhabitant).

However, at national level, the 2008 target almost been achieved already.

### Composting and MBT

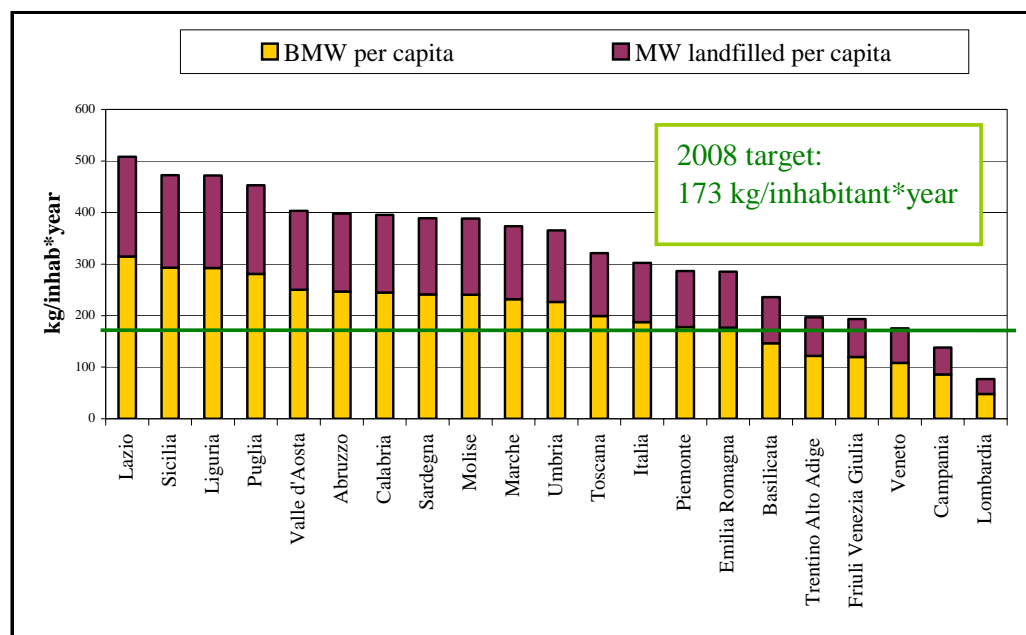
Over the past decade, newly introduced national policies have led to rapid development of the composting sector. In 2005, the country had a capacity to produce around 6 million tonnes of compost but produced only half the quantity due to short supply of compostable material. There has been a remarkable increase in the amount of municipal waste sent to MBT plants. Between 2001-2005, the amount of treated waste increased by 123% (increase from 3.8 million tonnes to 8.5 million tonnes). Treatment of non-selected (resid-

<sup>9</sup> The result of Campania is due to its particular situation, in which a large amount of the MW is treated, then stored to be landfilled or incinerated outside of the region

ual) waste is considered as major factor for the increase. There has been only a modest rise in the selected municipal waste (arising from the separate collection) treated in MBT plants from 2001 to 2005 from 1.73 million tonnes to 2.01 million tonnes (an increase of 21%). MBT plays an important role in the treatment of residual mixed waste from separate collection and in the stabilisation of waste before landfilling.

The north-east region, with developed collection schemes and effective composting plant network, shows an improvement in composting selected fractions of municipal waste.

**Figure 6.3. Regional generation and landfilling of biodegradable municipal waste, 2005, (kg/inhab per year)**



Note: Italian average shown in green

### Separate collection

Separate collection, one of the main instruments introduced by decree 22/97, encouraged the development of collection and management of municipal waste. However, as separate collection of dry recyclable waste (metals, paper, glass, plastics, aluminium) generally does not help in meeting the target, most of the regions and provinces have promoted separate collection systems for kitchen waste and home composting in their management plan. Considering the quality and quantity of material collected, the door-to-door food waste collection system has proved to be effective and cost-effective.

The following tables show the development of the separate collection in three geographical regions in Italy. It provides an overview of fractions of municipal waste collected separately over the last 5 years.

**Table 6.1. Separate collection at national level, years 1999 – 2005 (%)**

Area	1999	2000	2001	2002	2003	2004	2005
North	23,1	24,4	28,6	30,6	33,5	35,5	37,9
Centre	9,0	11,4	12,8	14,6	17,1	18,3	19,2
South	2,0	2,4	4,7	6,3	7,7	8,1	8,8
Italy	13,1	14,4	17,4	19,2	21,5	22,7	24,2

In 2005, the amount of biodegradable waste collected through the separate collection totalled 5,3 million tonnes (almost 91 kg/inhabitant per year) which corresponded to 69% of total waste separate collected. This result is in line with the past findings.

**Table 6.2. Separate collection of the main fraction in Italy, 2001-2005, (1000 tonnes)**

Year	Humid fraction & green	Paper	Glass packaging	Plastic packaging	textiles
2001	1,601.7	1,567.8	874.9	230.1	47.1
2002	1,831.5	1,689.0	862.3	240.3	54
2003	1,895.1	1,935.8	926.4	304.5	50
2004	2,216.0	2,153.8	985.6	336.2	56.5
2005	2,430.1	2,311.9	1,083.1	399.9	63.8

Year	Aluminium packaging	Metal packaging	Wood packaging	Bulky waste	Selective	Other	Separate collection
2001	10,3	200,6	191,1	217,9	22,3	150,9	5.115,0
2002	14,1	149,9	208,6	463,6	22	203,7	5.739,0
2003	8,5	211,4	284,9	482,5	34,1	205,8	6.339,0
2004	14,8	117,1	280,7	676,9	26,9	202,2	7.066,8
2005	17,0	188,6	343,6	586,2	30,8	242,1	7.697,3

**Table 6.3. Separate collection of biowaste, 2002-2005**

Year	Humid fraction + Green	Paper	Wood packaging	Wooden Bulky waste	Textiles	Total Biowaste	Total Separate collection (*)	Percentage of biowaste over total Separate collection
	(1.000*tonnes)							(%)
2002	1.831,5	1.689,0	208,6	113,9	54,0	3.897,0	5.739,0	67,9
2003	1.895,1	1.935,8	284,9	105,9	50,0	4.271,7	6.339,0	67,4
2004	2.216,0	2.153,8	280,7	197,1	56,5	4.904,1	7.066,8	69,4
2005	2.430,1	2.311,9	343,6	176,9	63,8	5.326,3	7.697,3	69,2

Note: (\*) Separate collection includes all the above-mentioned fractions plus the non-organic fractions such as glass, plastics, metals, bulky waste (sent to recovery facilities), medicals, batteries and others (paints, used oils).

As a result of various regional programmes to minimize the transfer of biowaste to landfill, collection of humid, green, paper, textiles and wood waste has increased by 8.6% in 2004-2005 alone, and it accounts for 37% increased if compared between 2002-2005.

The most successful regions are Veneto, Lombardia, Toscana, Piemonte, Trentino Alto Adige and Emilia Romagna, which have diverted most of biowaste from landfills. The collection of biowaste in these regions aggregated 4 million tonnes (77% of the national total).

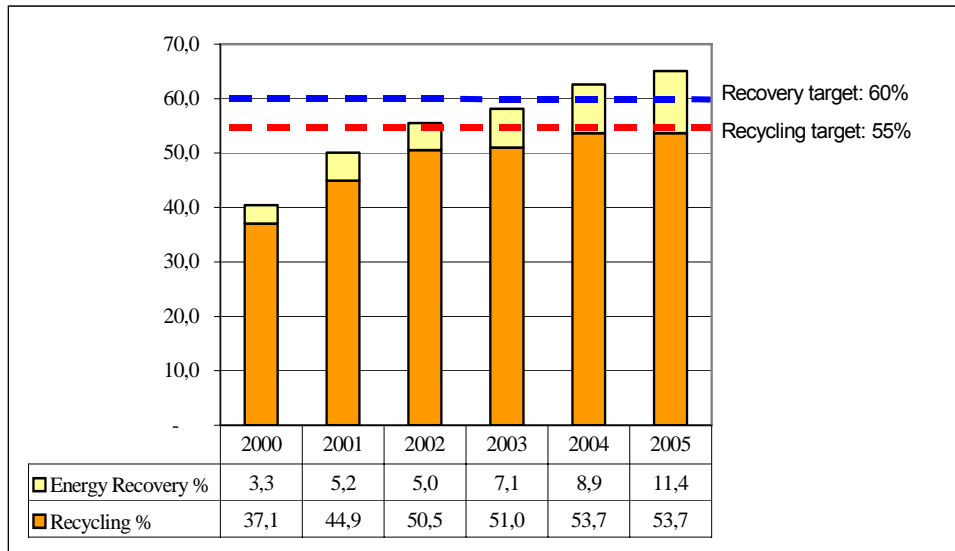
### Packaging waste

The development of six material consortia, an initiative from Consorzio Nazionale Imballaggi (CONAI, National Packaging Consortia), established in 1997, has steadily increased the recovery of packaging materials (aluminium, glass, paper and cardboard, plastic, steel and wood) throughout Italy. Table 6.4 shows the recycling percentage of packaging materials in Italy since its inception following decree 22/97. It also shows the recycling and energy recovery of such materials.

**Table 6.4. Recycling rate of all packaging materials**

Year	1998	1999	2000	2001	2002	2003	2004	2005
Recycling rate (recycling over packaging placed on the market) [%]	32	32,5	37,1	44,9	50,5	51,0	53,7	53,7

**Figure 6.4. Recovery and recycling percentages of packaging waste, years 2000-2005**



## 7. Analysis of effectiveness of the policies implemented

### Waste Prevention

Decree 152/06 provides for regulatory and financial tools for the prevention and recovery of the municipal waste.

At local level, concrete initiatives for waste prevention have been set up by public bodies like municipalities, provinces and regions: waste tariffs, local voluntary agreements, development of domestic composting, information campaigns on waste prevention for citizens and economic operators, green public procurements, set up of networks for the exchange of used goods.

During an interview, Federambiente<sup>10</sup> representative stressed that even with the encouraging scenario at local level (provincial and municipal) there was lack of concrete initiative at the national level. Federambiente mentioned its public database of local experiences on waste minimization and prevention<sup>11</sup>.

### Waste management in general

All the interviewed stakeholders -Federambiente, FISE<sup>12</sup> and CIC<sup>13</sup> -agreed that public disagreement on new waste management plants has been a major impediment. Hence it is necessary to adopt strategies (including public awareness campaigns) to create constructive relationships with the people.

Ascribing to negative experiences in the past, the public opinion on waste management sector has become very critical. FISE pointed out that some incinerators and landfills in the past were built with poor pollution control measures.

The interviewees agreed on the importance of the citizens confrontation phase, of following all the procedures established at EU level, and organising meeting with the local population. These help to tailor solutions on a case-by-case basis, an acceptance of the fact that there is no single solution or strategy for dealing with negative public opinion

FISE underlined that planning at regional level allows the development of management options more appropriate with the local context; flexibility in the legislative approach allows better choices, driven by the market. Federambiente moved critics toward the command & control approach often applied by the Institutions, focused more on the sanctioning side while not giving enough consideration regarding waste management planning. Federambiente reported that recently the NIMBY syndrome rose even against the plants for the recovery of waste, such as composting plants.

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<sup>10</sup> Federambiente (Italian Federation of Public Environmental Services) is the association grouping, in 2006, 270 public companies that manage environmental and waste public services. This organization covers 4.000 municipalities, including 37 millions inhabitants and is responsible of the collection, treatment and disposal of about 22 millions tons of waste.

<sup>11</sup> The database is available on the website <http://www.rifiutilab.it/prevenzione/>

<sup>12</sup> FISE ASSOAMBIENTE is the association of the private companies involved in the waste management. In year 2000 counted almost 300 companies, with 53.000 workers, and a related turnover of about 5.000 millions Euro, serving about 5.300 municipalities for separate collection services, including 18 million inhabitants and about 13, 5 million tons of waste.

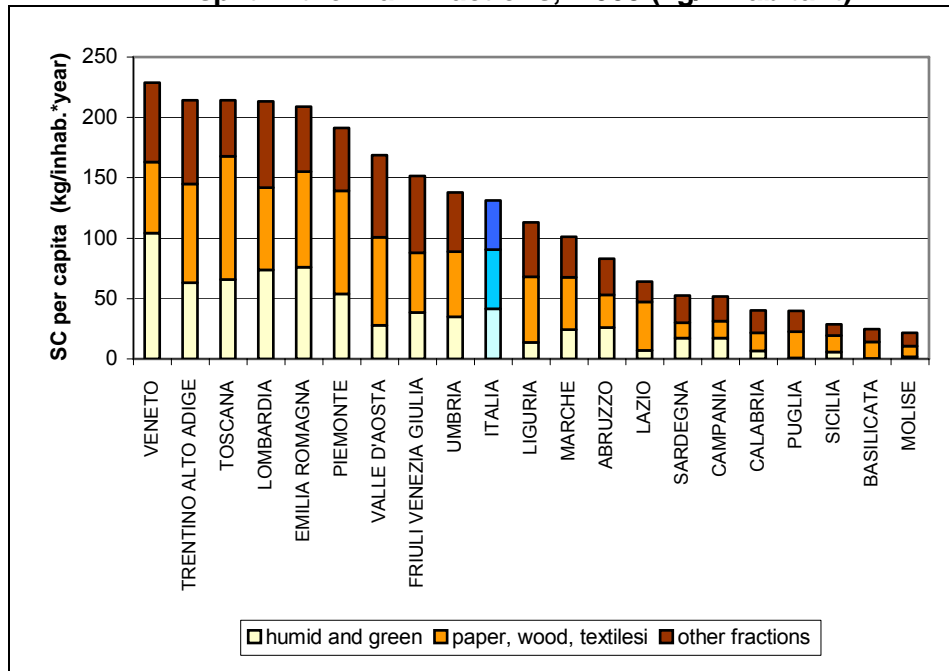
<sup>13</sup> The Italian Composting Association (CIC) has about 100 members, and unites public and private companies, local authorities and others actors involved in the production of compost, as well as organizations which do not make compost but have an interest in the composting process (producers of machinery and equipment, producers of fertilizers, research bodies etc.)

### Separate collection

Italy has developed methods of separate collection, but to a varying degree between regions. Figure 7.1 shows that the northern regions have been able to achieve greater success while central and southern regions are still facing difficulties.

Figure 7.1 illustrates the results of the separate collection of BMW in 2005 in different regions. The values (kg per capita) are split among the main fractions of the biodegradable municipal waste.

**Figure 7.1. Regional separate collection of the biodegradable fraction, split in the main fractions, 2005 (kg/inhabitant)**

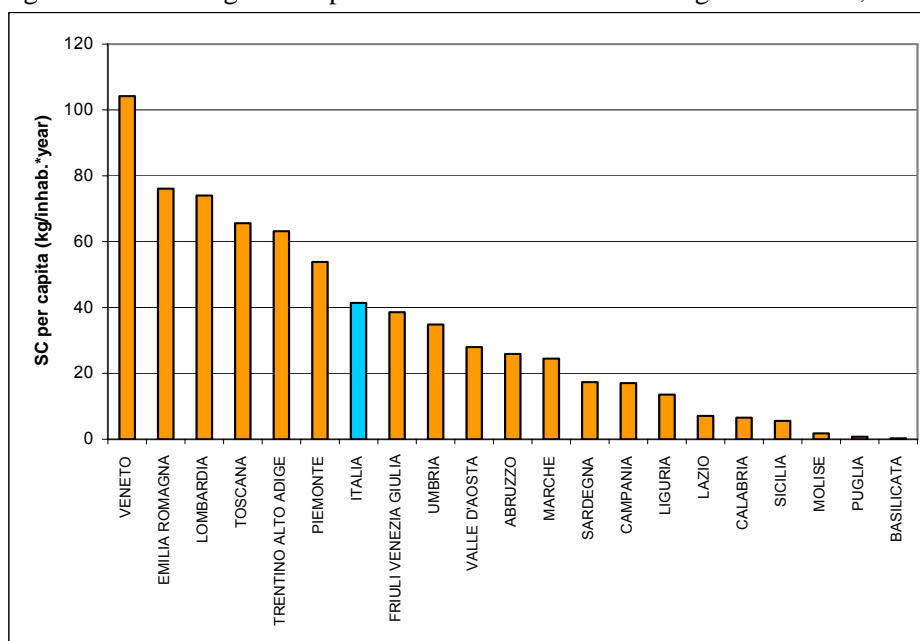


Note: Italian average show in blue

All the interviewees agreed that the separate collection has proven to be an important step for the diversion of waste from landfill. The system has a crucial role for the development of integrated waste management system. As shown in Figure 6.2, the regions that did not start an effective separate collection system in time still rely largely on landfill sites.

Figure 7.2 shows the amount of separate collection of the humid and green fraction of regional municipal waste. The best results are achieved where door to door collection scheme is used.

Figure 7.2 – Regional separate collection of humid and green fraction, in 2005



Note: Italian average shown in blue

Development of the separate collection scheme has enhanced the network of recycling and recovery activities, and improved the recycling industry. A recent study on recycling industries conducted by the Environment Commission of the Italian Chamber of Deputies concluded that integrated waste management system with appropriate collection and recycling options has helped achieve better results. (Commissione Ambiente, 2007).

Interviewees agreed that separate collection has been the basis for the development of the waste management system in Italy.

Commenting on the financial support for the management of packaging waste in public sector, Federambiente pointed out that lack of full financial commitment on the part at CONAI undermines the polluter pays principle. Federambiente also added that there are limitations for separate collection, beyond which no further improvement could be achieved. Problems with impure materials can also reduce the performance of the recycling system.

### Landfill Tax

There is general consensus that the landfill tax contributed to reducing the economic appeal of landfills. Until the early 2000s, landfills remained, by far, the most economic solution for the disposal of municipal waste for many regions in Italy.

However FISE underlined that the landfill tax is currently too low. In order to enhance effectiveness of BMW diversion from landfills, the tax should be raised.

### Implementation of Landfill Directive

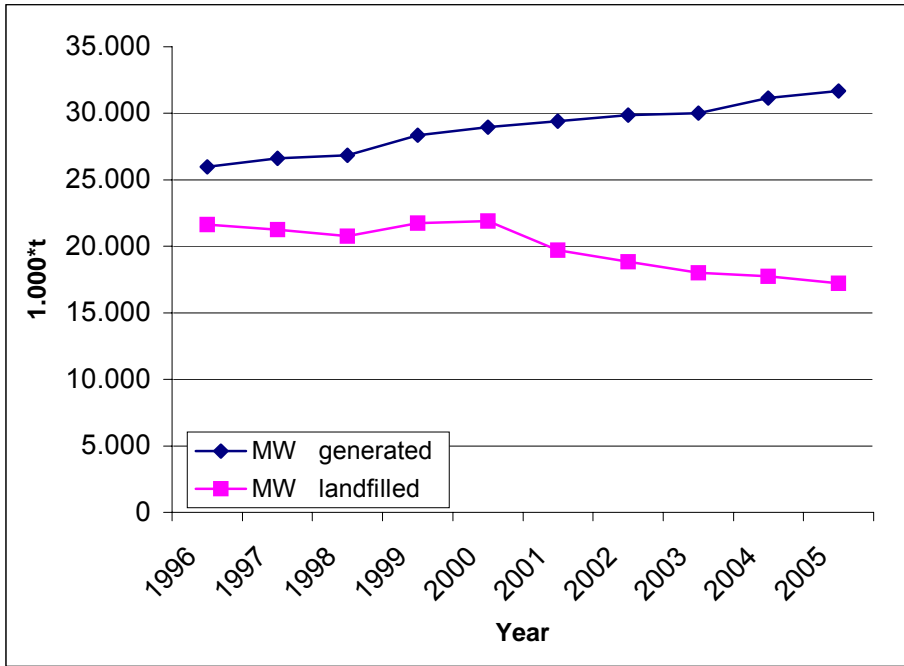
Before the dispositions of the decree 22/97 came into force, Italy relied on landfills (see figure 7.3) to manage its waste. Despite Italy's high population density, landfills have always been preferred disposal method. The situation in Italy is not only differentiated along the north – south axis; for instance, performance variations can arise from different contexts and different reasons: looking at the regions of Veneto and Lombardia, (see also figures 6.2 and 6.3) the achieved reductions in waste landfilled resulted from completely different situation/frameworks: in Veneto it arose from the development of the separate collection, in particular of the humid fraction, and the expansion of composting; in

Lombardia from an increase of the incineration with energy recovery of RDF, dry fraction from MBT and mixed waste.

FISE assumed that the implementation of the Landfill Directive had an influence on closure of many landfills (particularly ones for inert waste) which did not have sufficient technical standards to comply with the requirements. However, since the directive requires compliance to be met in 2009, it is too early to draw this conclusion.

All the stakeholders indicated the Landfill Directive (decree 36/03) as the main driver for the diversion of waste from landfills. However CIC and Federambiente were concerned over equal transposition of the directive at national level - some of the directive's dispositions has not entered into force.

**Figure 7.3. Trend of municipal waste generated and landfilled, years 1996-2005**



FISE rightly pointed out that in certain areas (in Northern Italy), the Landfill Directive had little impact as some landfills in these regions were compliant to the directive before it got transposed.

As it is hard to find insurance companies providing guarantee request for 30 years, FISE feared that the directive might face problem in addressing economical issue. FISE also added that Waste Acceptance Criteria had made it difficult to dispose some categories of C&D waste to landfills.

Because of widely prevalent NIMBY syndrome in Italy, it is very hard to find new locations to replace aging landfills. Federambiente expressed concerned over waste management in those areas where existing landfills are nearly full.

CIC lauded decree 36/06, which has instigated the reduction in the number of landfill sites, but underlined the technical adaptation is still in the process of development and permit procedures are also very slow. There is still a vacuum for appropriate technical solution for biogas collection and recovery.

### **Composting and MBT**

Composting and Mechanical Biological Treatment (MBT), backed with strong national and regional framework, technical standards and effective programmes, have become popular within the integrated waste management systems in recent years. It has played a crucial role in minimising the amount of waste destined to landfills. At present, Italy has a sufficient plant capacity for composting and mechanical biological treatment.

Composting has only recently become popular, mainly because of quality label promoted by the Italian Composting Association (CIC). Such quality label guarantees buyers for specific use – gardening and agriculture. Toscana, Veneto and Marche are also considering to implement regional quality system and labelling to market their products.

Organic content in the Mediterranean soil is faltering due to threat of desertification. Italy has become a victim of desertification and the EU Thematic Strategy on Soil prescribed that compost can be an answer to restore organic content in soils.

Specific regulations have been made to restore farmlands organically. This has prompted increased use of compost. For instance, Emilia Romagna region provides about 150-180 EUR/ha to promote the use of compost.

In 2005 and 2006, APAT, in cooperation with CIC and Regional Environment Protection Agencies (ARPAs), carried out a nationwide monitoring programme on the quality of bio-stabilized waste produced by MBT plant,.

CIC stated that the decree 36/03 has been the main drive for the promotion of compost. According to CIC, regions such as Piemonte, Lombardia, Emilia Romagna, Toscana, Veneto, Abruzzo, Sardegna and Calabria, will integrate the use of compost in forthcoming Agricultural Development Programme (2007-2013).

The compost markets in Italy developed separately depending upon the regional strategy, market and environment. Mr. Centemero of CIC stressed that it is important that the compost product has an associated price for its market promotion and development. In order to create market niche the free distribution of compost should be avoided.

It was pointed out that there is a need of specific legislation for quality standards of BMW both at EU and national level. Federambiente claimed that lack of strong legislation support is one of the problems for the development of compost markets in Italy.

FISE stated that the stability of the biowaste is essential to reduce the impacts of the landfills, but biowaste must comply with established standards. Mere volumetric reduction is not the correct solution in order to mitigate the environmental impacts of the BMW land-filling.

According to FISE, composting of green and humid fractions from separate collection is best suited for the reduction of biowaste to landfills whereas MBT is appropriate for mixed waste.

### **Incineration**

As a result of local management policies, developed under different political and management scenario, regions significantly differ on the amount of waste it incinerates.

### **Best Available Techniques**

The national guidelines on BATs for waste treatment plants are expected to enhance the waste management and treatment plants in Italy, with an effective public participation and wider information dissemination among operators, authorities and people.

The interviewed stakeholders were positive about BAT guidelines for waste management plants. FISE underlined the importance of such flexible and dynamic instrument, since rigid prescriptions can hamper the technological innovation.

### **Voluntary agreements**

Due to their flexibility, voluntary agreements can address issues and problems and so improve the relationship between actors involved (public administrations/private stakeholders). This allows diffusion of the best practices for material recovery, and achievement of efficient results.

Voluntary agreements have been widely used at local level (mostly in provincial and regional level) to handle different waste typologies (agriculture, certain packaging materials, compost etc.).

The stakeholders generally agreed on the importance of the voluntary agreements to improve various aspects of the waste management system. CIC referred various effective collaborations that have been carried out in cooperation with regional and provincial authorities.

## 8. Main findings

The national strategy for the reduction of biowaste going to landfill identifies a mix of instruments aimed at discouraging landfill disposal, providing economic incentives and developing plant network.

On the basis of the national strategy, since 2004 every region has developed appropriate programmes defining a locally suitable set of instruments. In general, development and replication of separate collection of biodegradable fractions has been widely adopted sustainable recovery options along with door-to-door collection scheme.

The establishment of national targets for the recovery and recycling for packaging waste has influenced positively the development of the management waste system, and it indeed resulted in the reduction of municipal waste to landfill.

Separate collection of biodegradable waste has played a significant role in reducing the amount of waste destined for landfill. It has certainly helped in developing an integrated waste management system. The door-to-door collection scheme, with particular focus on the humid fraction, has proved to be the best method to divert biodegradable municipal waste from landfills. This can be effectively supplemented by home composting.

It is also important to promote the separate collection of packaging materials such as paper, cardboard and wood. The development and prolongation of agreements and conventions contracted with the material consortia is important, particularly in the southern regions. To improve system performance, the introduction of targets for the separate collection of humid collection is felt necessary.

The Landfill tax introduced from 1995 contributed to reduce the economic appeal of landfills, that until the early 2000s remained the most economic solution for the disposal of municipal waste for many regions in Italy.

It is necessary to increase the landfill tax where the targets of separate collection have not been met, and to monitor the destination of its incomes in order to steer them toward recycling and recovery schemes, in particular for the increase of separate collection.##

Economic penalties should be levied on public administrations that fail to meet the separate collection targets.

The requirement for the pre-treatment of waste before landfill should be enforced and monitored.

It is necessary to develop a means to fully utilise the organic fraction arising from MBT plants. This could be aided by legislation at the EU level.

The waste management system could be strongly and positively influenced by a community directive, something that is currently lacking.

It is necessary to develop functional Integrated Waste Management Systems, and apply the waste management strategies effectively in the southern regions. This would help to overcome the gap that now exists between the Southern regions and the rest of the nation.

It is necessary to increase the public diffusion of data in information in order to reverse current public opinion, which is largely in opposition and sometimes not completely informed about the waste management system. Educating citizens plays a key role in the development and functioning of an integrated waste management system; the best per-

forming examples often feature the use of education/information campaigns, and eventually training courses for the promotion of use of home composting.

It is important to enhance the application of Best Available Techniques in all waste management plants. The technique should extend beyond IPPC directive recommendations to cover recovery facilities; composting plants in particular. It should also promote environmental management systems, such as EMAS.

It is necessary to propagate the concept of quality labels on compost and materials included in the GPP's inventory "Repertorio del Riciclaggio".

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## 9.1. Acronyms

ATO: Ambito Territoriale Ottimale; optimal management area  
ARPA: Agenzia Regionale Protezione Ambiente; Regional Environment Protection Agency  
BMW: Biodegradable Municipal Waste  
COBAT: Consorzio Obbligatorio Batterie Esauste – Mandatory Consortium for Spent Lead Batteries and Lead Waste  
COOU: Consorzio Obbligatorio Oli Usati – Mandatory Consortium for Used Oils  
GPP: Green Public Procurement  
MATTM: Ministero per l’Ambiente, la Tutela del Territorio e del Mare; Ministry for the Environment, Territory and Sea  
MBT: Mechanical Biological Treatment  
MW: Municipal Waste  
NCV: Net Calorific Value  
ONR: Osservatorio Nazionale sui Rifiuti; National Observatory on Waste  
OPR: Osservatorio Provinciale sui Rifiuti; Provincial Observatory on Waste  
PAYT: Pay As You Throw  
POLIECO: Consorzio Obbligatorio per il riciclaggio dei rifiuti di beni in Polietilene – Mandatory Consortium for the recycling of polyethylene goods  
RDF: Refuse Derived Fuels  
SC: Separate Collection  
SOF: Stabilised Organic Fraction (mixed MSW Compost)

## I. Annex: List of interviewed stakeholders

Name of Interviewed stakeholder	Organization	Mode of interview	Date
Ms. Margherita Gorio, Vice President	Fise Assoambiente	Personal	25 June 2007
Ms. Elisabetta Perrotta, main counsellor <a href="mailto:e.perrotta@fise.org">e.perrotta@fise.org</a> tel. 02 801428	Fise Assoambiente	Personal	25 June 2007
Mr. Daniele Fortini President <a href="mailto:presidente@federambiente.it">presidente@federambiente.it</a> tel. 06 47865302	Federambiente	Personal	5 July 2007
Mr. Roberto Caggiano, Head of Technical Department tel. 06 47865311 <a href="mailto:caggiano@federambiente.it">caggiano@federambiente.it</a>	Federambiente	Personal	5 July 2007
Mr. Leonardo Ghermandi, President	CIC	Personal	10July 2007
Mr. David Newman, Director <a href="mailto:newman@compost.it">newman@compost.it</a>	CIC	Personal	10July 2007
Mr. Massimo Centemero, Coordinator of Technical Committee <a href="mailto:centemero@compost.it">centemero@compost.it</a>	CIC	Personal	10July 2007