



Biowaste disposal vs. biowaste recovery – the Italian experience

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Italians can get their act together when they want.....

1° in the world for recycled wood (panels)

1° in Europe for recycled aluminium

2° in Europe for recycled paper and cardboard

2° in Europe for the production of quality
compost

3° in Europe for glass recycling

Packaging Waste Directive 1996 contributed fundamentally to these results



Some commendable Italian data

1° Brescia voted the world's best incinerator by the WtERT Columbia University, N.Y.C., 2006

50 incinerators working, **7** in construction, **18** planned

200+ composting plants operating

55% of packaging waste is recovered and recycled

Recycling rates (2007) - MSW

REGIONE VENETO (Venezia) recycling rate **42%** (4 ML pop)

REGIONE LOMBARDIA (Milano) recycling rate **41%** (10 ML pop)

REGIONE EMILIA ROMAGNA (Bologna) recycling rate **39%** (4 ML pop)

REGIONE TOSCANA (Firenze) recycling rate **36%** (4 ML pop)

REGIONE PIEMONTE (Torino) recycling rate **34%** (6 ML pop)



But there are two sides to every coin....

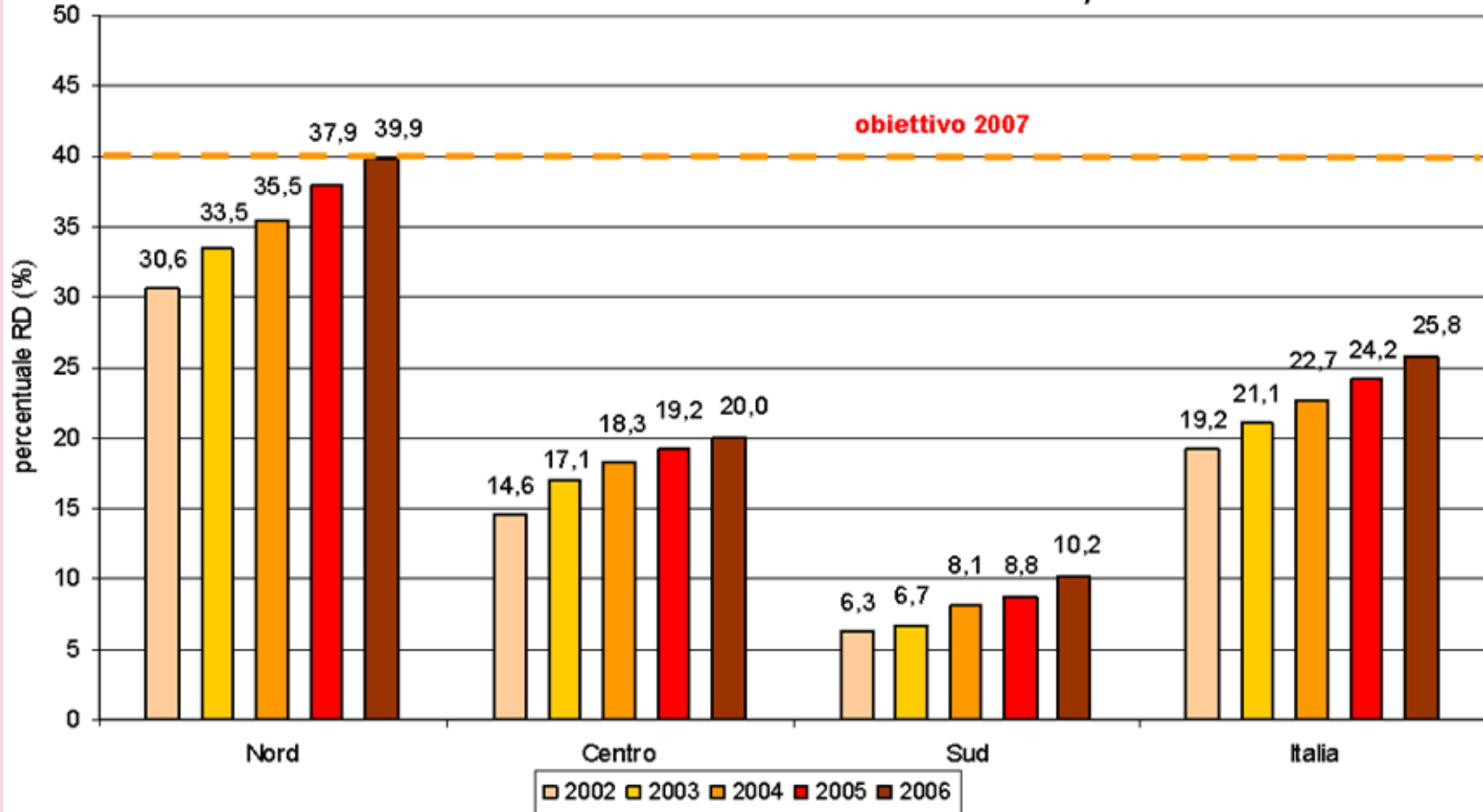
- 👍 *Incinerators in southern Italy.....2*
- 👍 *Recycling in southern Italy.....>10%*
- 👍 *Crimes related to waste < 75% happen in southern Italy*
- 👍 *Landfilling of MSW c. 50% nationally, in southern Italy c. 80%*
- 👍 *(southern Italy means Campania, Calabria, Sicilia, Molise, Puglia, Basilicata, Sardegna)*

This particular diversity between northern and southern Italy is one of the country's principle problems, politically, economically and socially. Waste is simply a reflection of this.



Separated collection by macro regions

Andamento della raccolta differenziata dei rifiuti urbani, anni 2002 – 2006





The opportunity from organic waste

- 👍 *Organic waste collection represents over one third of all separated MSW waste collected.*
- 👍 *Composting selected wastes accounts for nearly 3,5 million tonnes p/a*
- 👍 *Compost produced is sold at good prices or requested by local farmers at zero value*
- 👍 *Despite the north-south diversity, organic waste recovery has now taken off throughout the central-northern part of the nation – **but wide areas still lagging behind due to uncertainty of long-term strategies!***
- 👍 *The long-term trajectories are unclear – need for common EU drivers*



Drivers for organic waste recovery in Italy

- 👍 *Recycling targets (65% of MSW to be separately collected)*
- 👍 *Volume (30-40% of MSW)*
- 👍 *Economic sustainability of treatment*
- 👍 *Less public opposition when compared to incineration*
- 👍 *A final product has a market (albeit difficult)*
- 👍 *Organic substance is needed for soil protection (desertification)*
- 👍 *Rise in cost and closure of landfills*



Constraints

- 👍 *Landfill diversion targets do not specify the contribution required by composting and AD. (achievable also through incineration or MBT)*
- 👍 *Composting requires both treatment capacities and implementation of schemes for separate collection*
- 👍 *Different roles and responsibilities among authorities often not matching each other*
- 👍 *(therefore) Clear drivers are badly needed in order to ensure*
 - *Cross-consistency of actions on collection and treatment*
 - *Profitability of investments*
- 👍 *A Directive including targets/drivers would be extremely helpful in order to trigger further activities everywhere in Italy – similar to what was caused by the Packaging Directive.*



Organic waste streams recovered

Three principle streams treated in Italy:

- 1. Catering waste from homes, stores, restaurants.*
- 2. Green waste from gardens, parks, agricultural activities.*
- 3. Sludges from sewage, agro-industrial activities.*

But also

Waste from food production, animal manures.



Catering waste



Domestic food waste collected separately with biodegradable bags, destined to quality composting facilities. Average annual production in Italy is circa 180 kg/p



**Green waste being unloaded at a quality composting plant.
Average annual production in Italy is 150 kg/p**



The three principle waste streams

- 👍 *Kitchen waste, green waste, sewage and agro-industrial sludges*
- 👍 *All three organic waste streams are:*
 - 👍 *Continuous throughout the year*
 - 👍 *Ubiquitous, available in every urban area*
 - 👍 *Compatible with each other*
 - 👍 *Rich in carbon*
 - 👍 *Pay a gate fee to be treated (financial flow)*



Composting v MBT

- 👍 *Two distinct waste collection methods determine treatment methods and final product outputs*
- 👍 *From Mixed Waste- MBT- unclean compost*
- 👍 *From Source Separated Waste- Quality Composting- clean compost*
- 👍 *This position is not shared throughout the EU*



MBT, ITALY treats 3x quantities in compost plants

- 👍 *In Italy MBT plants treat 23% of MSW, about 9.000.000 tonnes, producing these outputs*
- 👍 *Many companies run both MBT and quality composting facilities together*

<i>Dry fractions to recycling</i>	<i>2.600.000 t (34%)</i>
<i>Biostabilised waste</i>	<i>1.700.000 t (22.5%)</i>
<i>RDF</i>	<i>780.000 t (10%)</i>
<i>Wet waste</i>	<i>175,000 t (1.7%)</i>
<i>Dried waste for incineration</i>	<i>230,000 t (3 %)</i>
<i>MSW to landfill</i>	<i>1.800.000 t (24,2%)</i>
<i>Other fractions</i>	<i>370,000 t (4.7%)</i>



Biostabilised or “grey” compost



Can contain elevated levels of heavy metals, pieces of plastics, metals and other unwanted fractions unsuitable for land use.

Advantages of MBT treatment are:

- 1. Reduces volumes destined to landfill**
- 2. Stabilizes organic fraction**
- 3. Reduces atmospheric emissions from landfills**
- 4. Plants have easily adaptable technology for future transformation into quality composting plants- ie a transitory phase**



Fuel outputs from MBT

- 👍 *MBT can produce RDF, dried, selected and baled waste suitable for combustion*
- 👍 *Requires two main solutions – cement kilns or dedicated incinerators*
- 👍 *Main problem in Italy is lack of burning capacity- cheaper to burn untreated MSW*
- 👍 *Producers of RDF pay cement kilns to burn – difficult economic sustainability*



MBT- Recovery or Disposal ?

- 👍 *Through MBT some dry fractions are recovered.*
- 👍 *Through MBT waste volumes are reduced (25% process loss) and organic waste is stabilised.*
- 👍 *Through MBT however, the organic fraction is 95% disposed in landfill either as cover or as waste.*
- 👍 *The RDF fraction is difficult to sell for burning.*
- 👍 *Therefore MBT is a disposal operation.*



Organic waste from source separated collection

- 👍 *In Italy organic waste from source separated collection accounts for 10% of the MSW stream, about 1.4 million tonnes of domestic kitchen waste, about 1.4 million tonnes of green waste plus 400.000 tonnes of sludges.*
- 👍 *The main destination is composting for the production of fertiliser substitutes and soil improvers.*

Value and Recovery



Domestic food waste, source separated collection, Italy



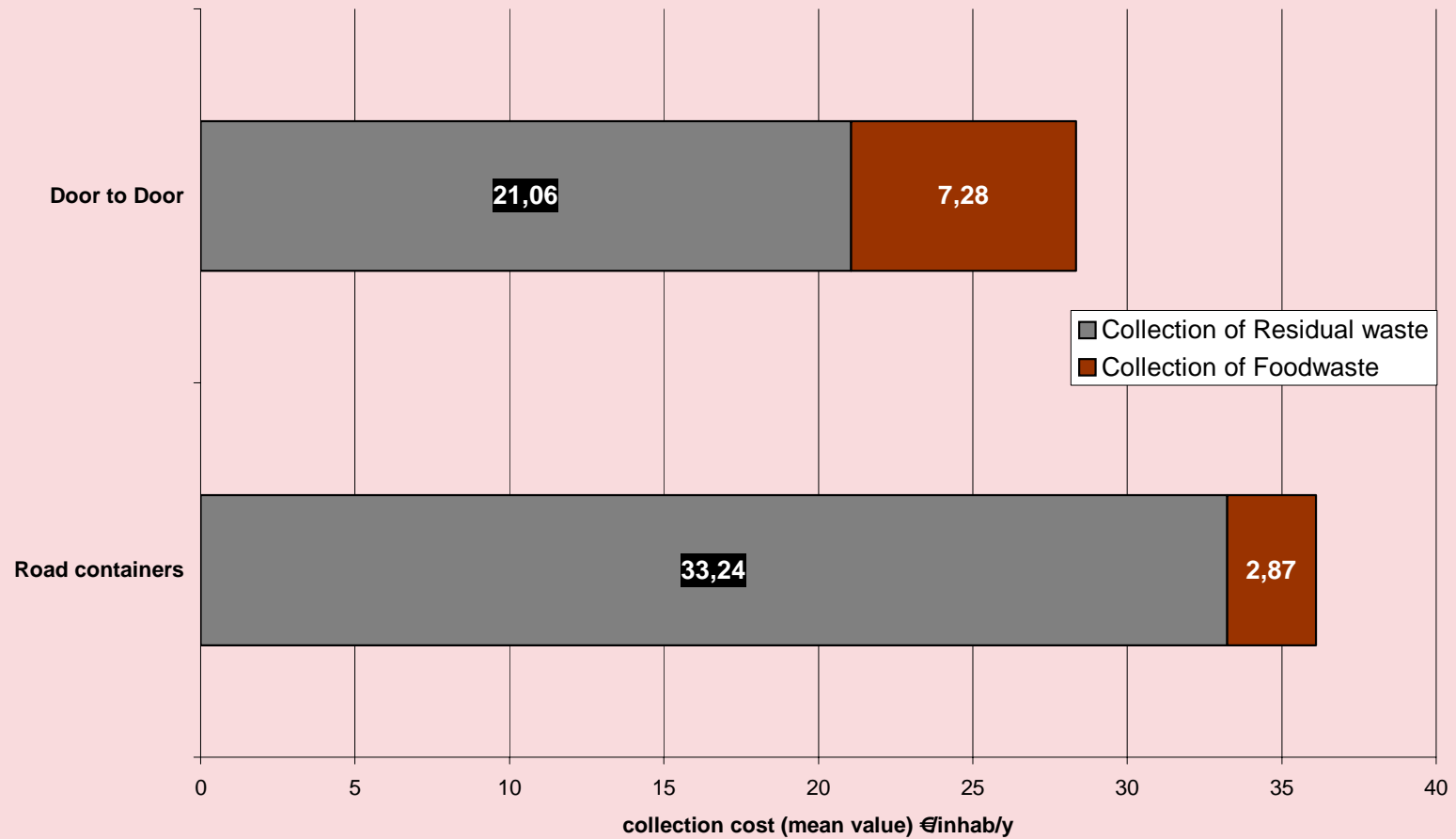
Labour Intensive, Low capital costs

Reso



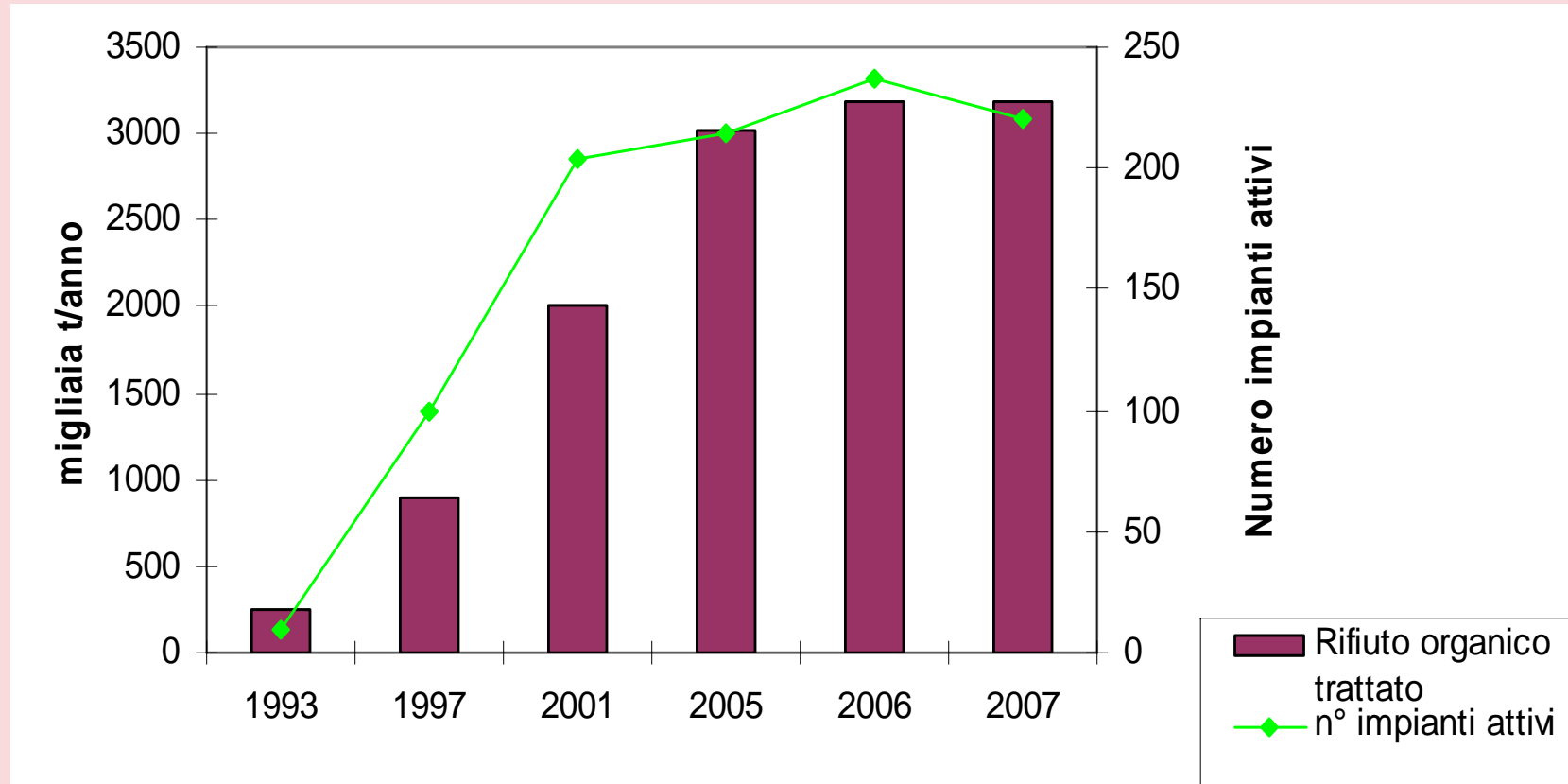
Costs of source separation

Integrating collection schemes + Federambiente 2003 - mean values





Quality Composting in Italy 1993-2007





Quality Composting plants in Italy 2007

	<i>Operative plants</i>	<i>Quantity MSW (tons)</i>	<i>Total Quantity (tons)</i>
<i>North</i>	<i>181</i>	<i>1.798.018</i>	<i>2.187.964</i>
<i>Centre</i>	<i>50</i>	<i>347.866</i>	<i>548.232</i>
<i>South</i>	<i>45</i>	<i>222.314</i>	<i>444.508</i>
<i>ITALY</i>	<i>276*</i>	<i>2.368.199</i>	<i>3.180.703</i>

- +18 plants more than 2006 (+40 on 2005); there are about 100 very small plants treating less than 1000 t/a of green waste: the number of industrial plants is **171**.
- circa 100 plants treat more than 10.000 t/a



What value is derived from composting ?

- 👍 *Substitution of landfill costs*
- 👍 *Treatment of organic waste costs from € 60-100/tonne in Italy, 50% less than landfill.*
- 👍 *Production of soil improvers with sales value of up to € 50 /tonne*
- 👍 *Jobs*



Compost products



**In 2007 Italy made
1.400.000 tonnes
of quality compost**





Certification is essential

👍 *Quality control schemes in Italy*

➔ Ecolabel EC/688/2001 (1)



➔ CIC (33)



➔ “Allowed in organic farming” (129)



Composting plus energy- recovery of energy and matter.

- 👍 *Anaerobic digestion upstream of composting*
- 👍 *Advantages:*
 - 👍 *Increases composting plant capacity*
 - 👍 *Reduces odours*
 - 👍 *Produces renewable energy – green certificates*
- 👍 *Disadvantages:*
 - 👍 *Investment cost- requires grants*
 - 👍 *Sensitivity to inputs- requires constant homogeneous sources*
 - 👍 *Maintenance*
 - 👍 *Leachate /liquid treatment cost- requires treatment plant*



AD has traditionally been a solution for treating animal residues especially from pigs. Now in Italy there are 10 plants operating with organic waste from MSW.



Padua integrated compost and AD plant, 300.000 t/y capacity



Conclusions

- 👍 *It is illegal to landfill untreated organic waste, doing so creates severe environmental problems*
- 👍 *Treating organic waste as part of mixed waste stream requires either incineration or MBT to be stabilised.*
- 👍 *MBT has advantage of flexibility for conversion into composting facilities.*
- 👍 *MBT provides rapid reductions in volume and GHG emissions from organic waste but is a disposal option.*



- 👍 *However, to create real value from organic waste it has to be collected separately to allow recovery.*
- 👍 *Separate collection of organic waste creates :*
 - a) *Production of clean high quality compost for soil improvers*
 - b) *Easier recycling of dry wastes.*
 - c) *Production of energy from anaerobic digestion when economically viable.*
 - d) *Employment*



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👍 *CONSORZIO ITALIANO COMPOSTATORI*

👍 *Email cic@compost.it Web: www.compost.it*

👍 *Perugia 15-16 April , the ISWA BEACON CONFERENCE ON BIOWASTE www.atiaiswa.it*

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