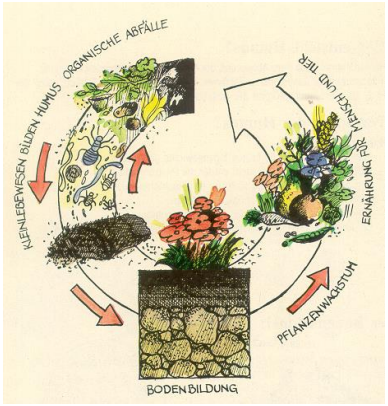
Implementing and optimising separate collection of biowaste:

the *Italian way* to tackle operational and economic issues



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Development of source separation of biowaste in the EU

- Obligations for biowaste management
  - NL: compulsory schemes for separate collection
  - AUT: obligation upon households to either take part in separate collection or to compost in the backyard
  - GER: KrW-AbfG → separate collection widely diffused
  - Catalunya (Spain): ley 6/95 → compulsory for all Municipalities with a pop. > 5000 (recently extended to cover all Municipalities)
  - SK (Act 24/04): Garden Waste to be separately colelcted by 2006; biowaste by 2010
- Targets
  - SWE: 35% composting target
  - ITA, UK: recycling targets acting as drivers
    - 65% separate collection targeted in Italian Env. Act

In separate collection, what does “OPTIMISED” mean?

- High captures
- Good quality (low % of impurities)
- Avoid increase of waste arisings
- Allow for cost optimisation
- Contribute to fulfilling diversion targets of the Landfill Directive

Kerbside (door-to-door) collection

“Biowaste”

Foodwaste (FW)

- Bulk density: 0,6-0,8 kg/l
- High moisture

SSO: 70 – 130 kg/inhab/yr.

Yard and Gardenwaste (GW)

- Bulk density: 0,15 – 0,35 kg/l
- Medium to low moisture
- **Sesonality** (wheather, rain)

SSO: 20–150 kg/inhab/yr. (home-composting to be promoted)


ASCIT
RACCOLTA DIFFERENZIATA
"PORTA A PORTA"
MULTIMATERIALE
(VETRO, BOTTIGLIE E
FLACONI DI PLASTICA,
LATTINE DI ALLUMINIO,
BARATTOLI IN METALLO,
CONTENITORI IN TETRA PAK,
VASCHETTE PER ALIMENTI)
ASCIT
COMUNE DI
CAPANNORI
RACCOLTA DIFFERENZIATA
"PORTA A PORTA"
RESIDUI ALIMENTARI)
"porta a porta"

Biobins (carts) for food waste – some issues

- The use of biobins may imply high deliveries of garden waste
- Bins require mechanical loading
- Low density implies adoption of expensive packer trucks – or high costs for transport
- Reduced frequency of collection is therefore considered to save money
- This impairs captures of food waste – fairly high percentages in residual waste

Biowaste – Paradigm for optimisation

Buckets

- 6.5 - 30 litres
- hand-picked – saves time
- collection time per pick-up point: 20” - 60”
- **at high-rises**, carts adopted to serve 15-20 households with one single pick

Biodegradable bags

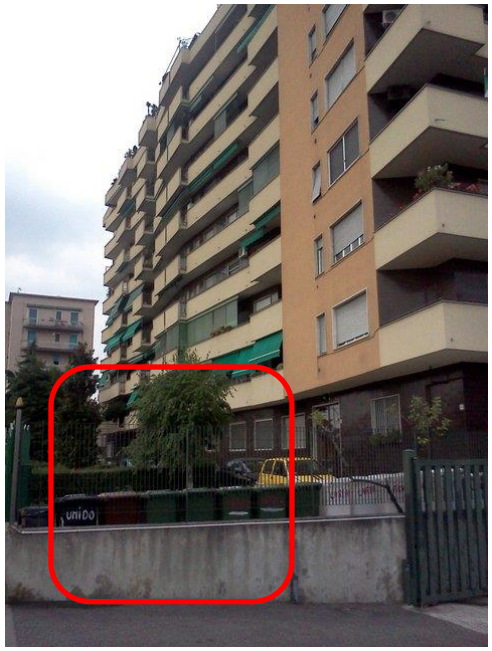
- Help keep containers clean
- The bags + a relatively frequent collection make it an “user-friendly” system
- Highest captures, lowest percentages of organics in residual waste
- Residual waste may be collected at a much lower frequency – saves money !

Food waste in residual waste

Municipality	% Food waste
Altivole	7,82
Arcade	8,24
Breda di Piave	7,61
Casale sul Sile	9,42
Castello di Godego	8,05
Cessalto	6,30
Conegliano	9,40
Cornuda	7,19
Giavera del Montello	6,88

Intensive SS of foodwaste at detached houses

Intensive SS of foodwaste at high-rises



Collection of garden waste

- **at Civic Amenity Sites (Municipal Recycling Centres)**
- **at the doorstep**
  - ✓ **less frequent than food waste**

➔ **lower cost, higher participation in home composting programmes**

Best Recycling Municipalities, pop < 10,000 inhabitants

	COMUNE	Pr	Abitanti	Indice	% RD	Kg CO_2 *
1	**GIFFONI SEI CASALI**	**SA**	**5.350**	**82,58**	**84,4%**	**142,9**
2	SALENTO	SA	1.049	75,96	76,1%	199,1
3	SAN MARTINO IN PENSILIS	CB	4.848	75,77	70,6%	72,3
4	VILLAFRANCA SICULA	AG	1.458	75,03	73,6%	72,8
5	FONNI	NU	4.138	74,78	66,0%	126,9
6	ROCCADASPIDE	SA	7.447	74,26	81,3%	66,9
7	ATENA LUCANA	SA	2.362	73,80	98,1%	195,6
8	ROFRANO	SA	1.727	73,26	77,4%	33,4
9	FOGLIANISE	BN	3.550	72,99	73,5%	56,4
10	CERRETO SANNITA	BN	4.209	72,88	74,4%	45,7
11	TORREVECCHIA TEATINA	CH	4.077	72,47	69,3%	81,0
12	MOIO DELLA CIVITELLA	SA	1.922	72,28	66,7%	51,7
13	CASTEL SAN LORENZO	SA	2.724	71,30	72,8%	90,1
14	SANZA	SA	2.761	70,80	77,6%	162,9
15	ANACAPRI	NA	6.742	70,16	69,1%	162,3

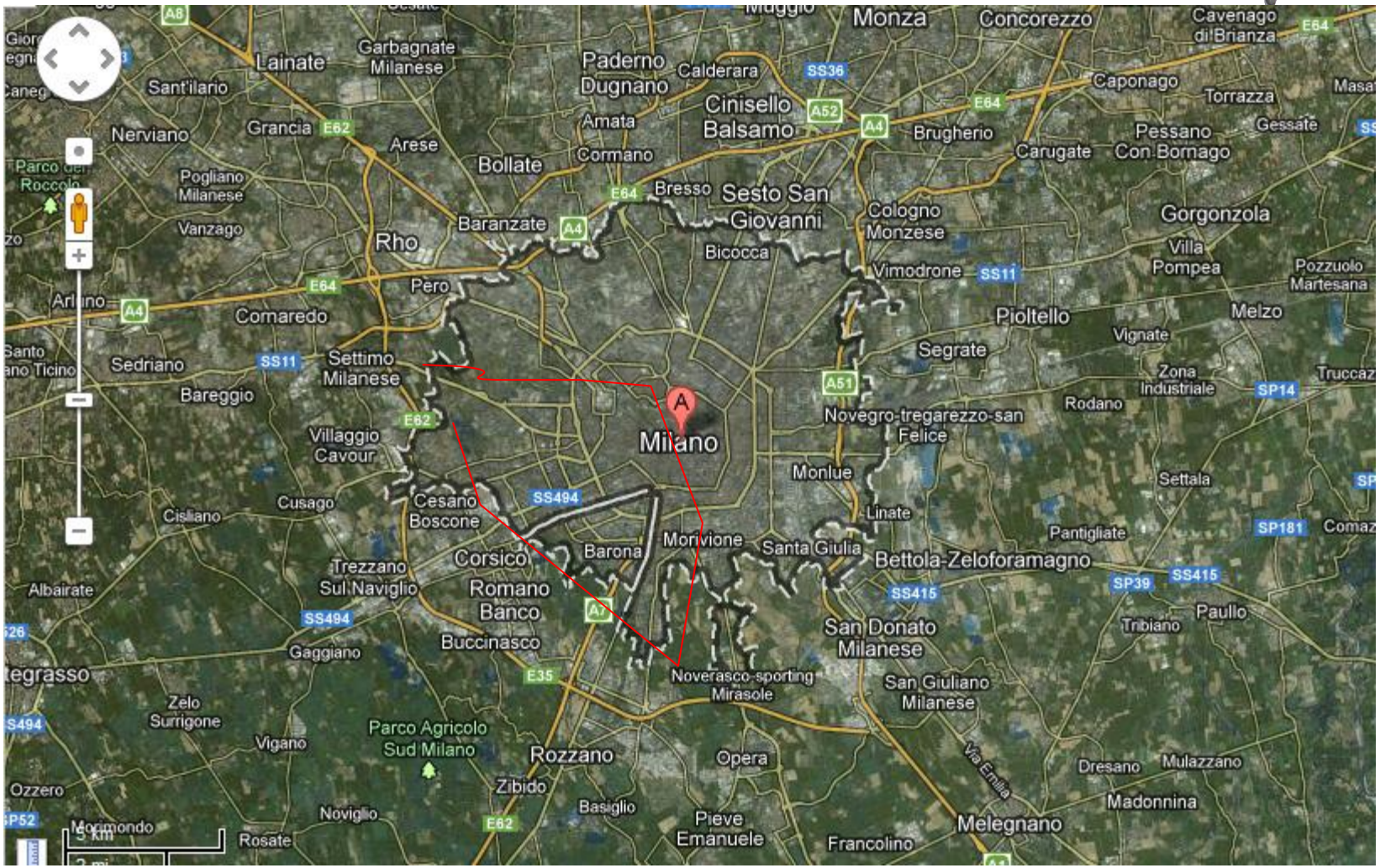
Province capitals (larger towns, with high-rise buildings)

	COMUNE	Prov.	Abitanti	% RD
1	**VERBANIA**	**VB**	**31.157**	**71,7%**
2	PORDENONE	PN	51.404	76,3%
3	NOVARA	NO	104.390	72,0%
4	BELLUNO	BL	36.618	62,4%
5	ASTI	AT	75.848	62,1%
6	TRENTO	TN	115.551	56,6%
7	MONZA	MB	121.545	53,4%
8	BERGAMO	BG	119.234	51,2%
9	GORIZIA	GO	35.667	54,1%
10	UDINE	UD	99.439	50,0%
11	ROVIGO	RO	51.872	58,3%
12	REGGIO EMILIA	RE	166.678	51,1%
13	LECCO	LC	47.791	54,1%
14	BIELLA	BI	45.845	50,8%
15	TREVISO	TV	86.301	50,6%
16	SONDRIO	SO	22.331	50,0%
17	CUNEO	CN	55.464	50,8%

Salerno

- 150,000 inhabitants
- Separate collection= 75 %
- Organics 50% !

Milan Metropolitan Area



Municipality of Milano - Primaticcio district

- Collection done mainly with non-compacting vehicles
- Transport to AD/composting plant done with packer-trucks

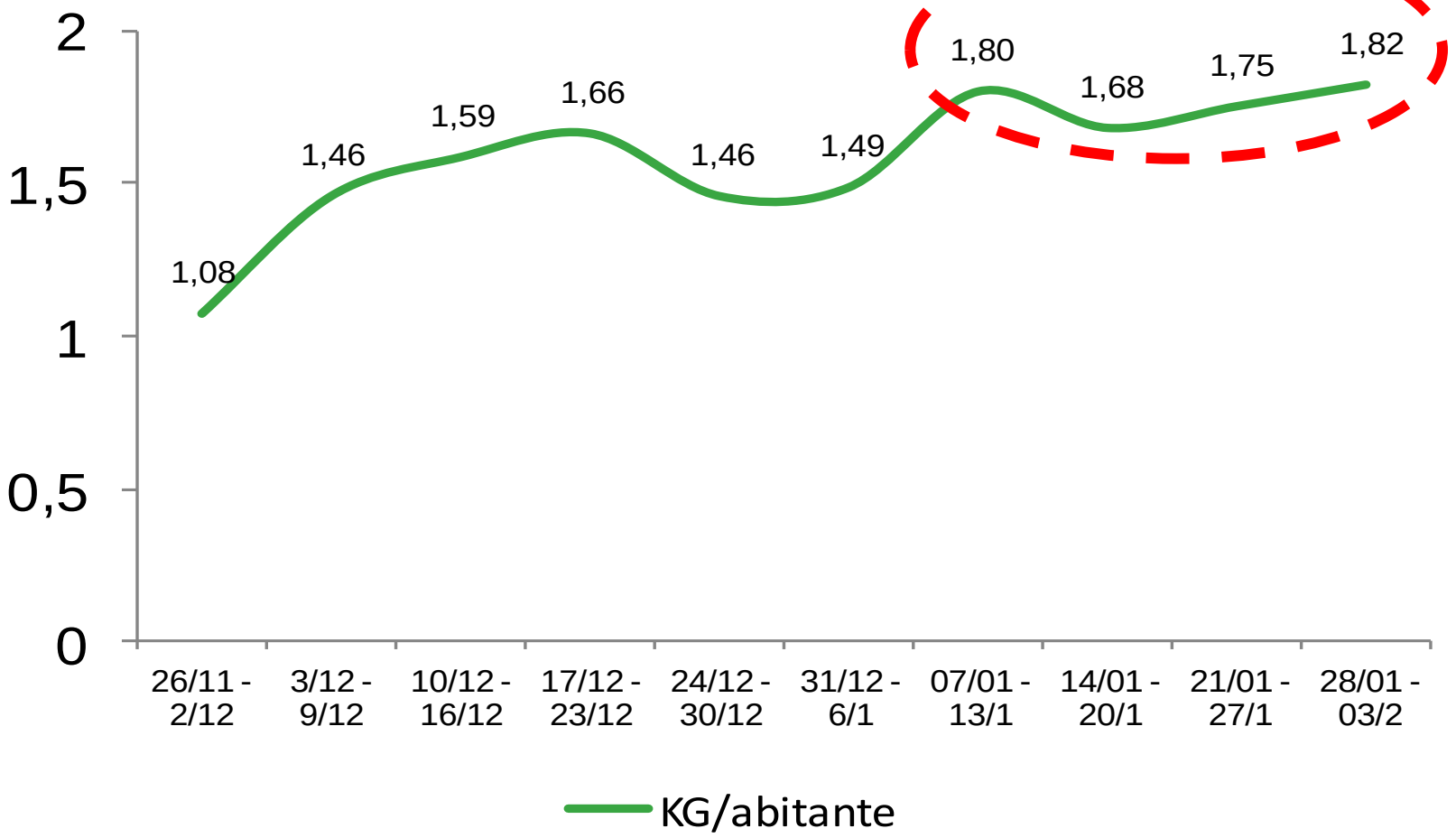
- Collection of foodwaste done 2/week
- Most HH live in flats and high-rise building
- Restaurants, canteens, etc served 2 to 4 times/week

Results:

- Capture of foodwaste:
  - Foodwaste from 23kg/inhab/yr (large producers only) → 90 kg/inhab/yr
  - Residual 140kg/inhab/yr

- Purity of foodwaste from sep. collection:
  - average non-compostable content 2,7% (worst case 5%)
  - Plastics (non-bags) content: about 30% of non-compostables
  - Plastic bags about 7-20% of non-compostables

Captures (kgs/person.wk)



The study tour is kindly supported by

Italian Compost and Biogas Consortium (ICBC)
ATIA-ISWA Italy & Scuola Agraria del Parco di Monza

Study tour on food waste management in Mediterranean areas: effective solutions, competitive costs

4-7 November 2013 - Italy

4-7 November

Travelling Instructions:

Arrival : 3rd November 2013 in Italy (Airports of Malpensa MPX, Bergamo BGY, Linate LNT) and accommodation in Hotel near Novara
Departure: From Rimini distance to the Airport of Bologna is 1h by train, the Airport of Roma Fiumicino (3 h) or Milano Malpensa (3,5h)

Participation fees
Non-ISWA Members: €700/person + VAT 21% total €847; ISWA Members (10% discount) total €762,00

Cost includes: Hotel accommodation on the 3-4-5-6 November; Lunch and Dinners; Travelling cost from Milan to Rimini; Entrance to Rimini Fair
Excluded : alcoholic beverages, return travel from Rimini, airfares to and from Italy

Contacts and registration

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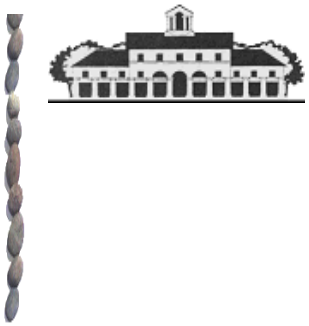
The study tour is intended to give MSW management experts and decision-makers an overview of current best-practices and approaches in foodwaste separate collection and recycling. It will focus on efficient operational solutions, effective instruments and tools supplied to households to enhance collection and standard technologies to recover biowaste into compost and biogas.

During the tour participants will visit mature experiences both in Metropolitan Areas and detached housing structures, showing how foodwaste can be correctly diverted for recycling. A specific focus will be given to bioplastics suitable for foodwaste collection. A clear overview of low-tech and labour-intensive logistics solution for optimizing collection cost will be analyzed with participants.

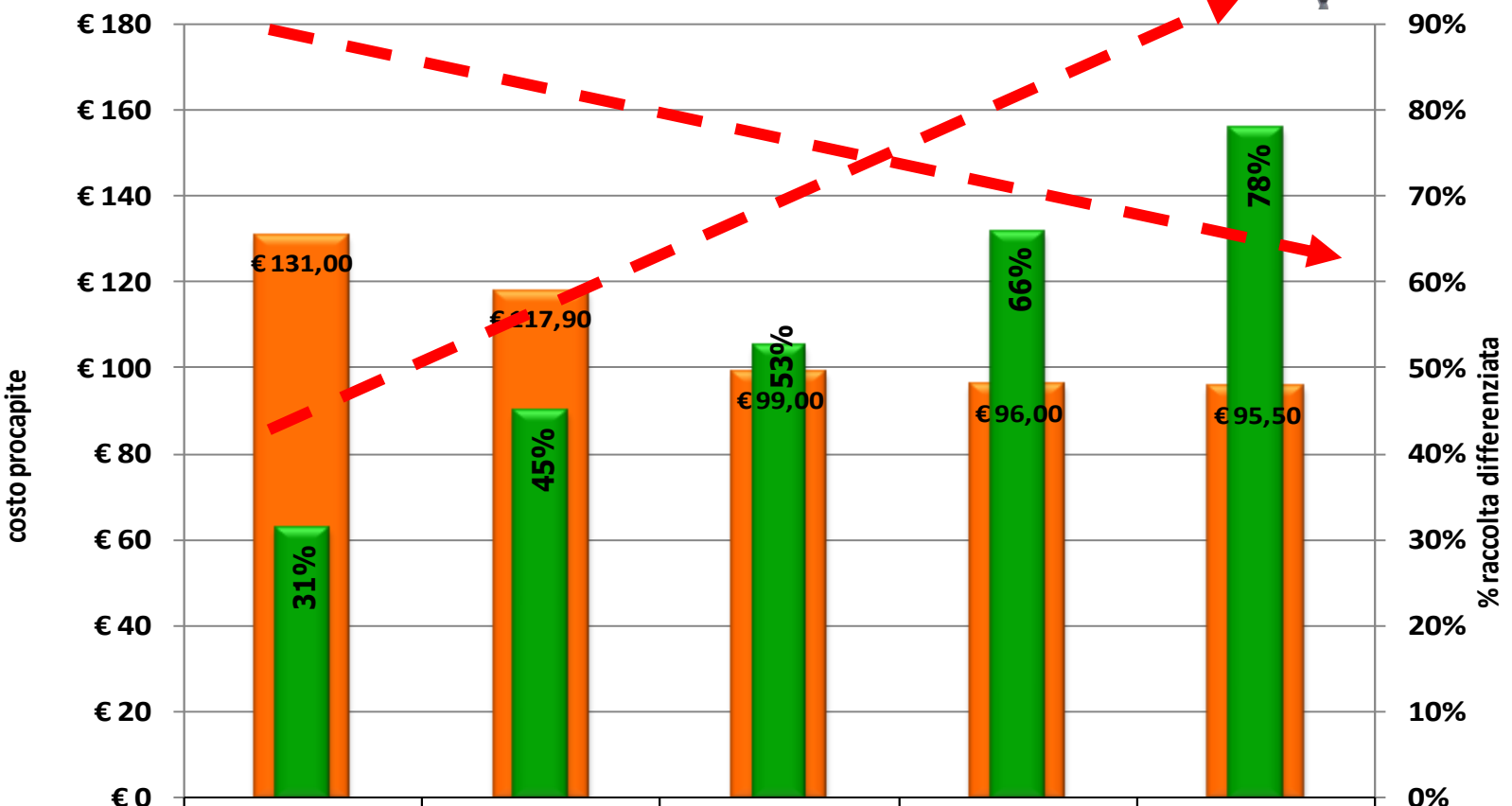
A set of biological treatment plants will be visited, both with low-tech and high-tech solutions for composting and anaerobic digestion.

Participants will also have the opportunity to visit Ecomondo 2013, one of Europe's largest trade fairs on environment technologies, suppliers of equipment and technologies for collection and recycling of MSW (70,000 visitors over three days, 60,000 m2 of exhibition space)

Costs of MSW management – some general remarks



- Increased cost of disposal
  - Landfill Directive
  - Incineration Directive + IPPC
- Anyway cost of collection may by itself be comparatively low – similar to commingled MSW collection
  - Savings on disposal



	ITALIA	NORD	VENETO	CONSORZIO TVTRE	CONSORZIO PRIULA
COSTO PROCAPITE (€/ab.*anno)	€ 131,00	€ 117,90	€ 99,00	€ 96,00	€ 95,50
% RACCOLTA DIFFERENZIATA	31%	45%	53%	66%	78%

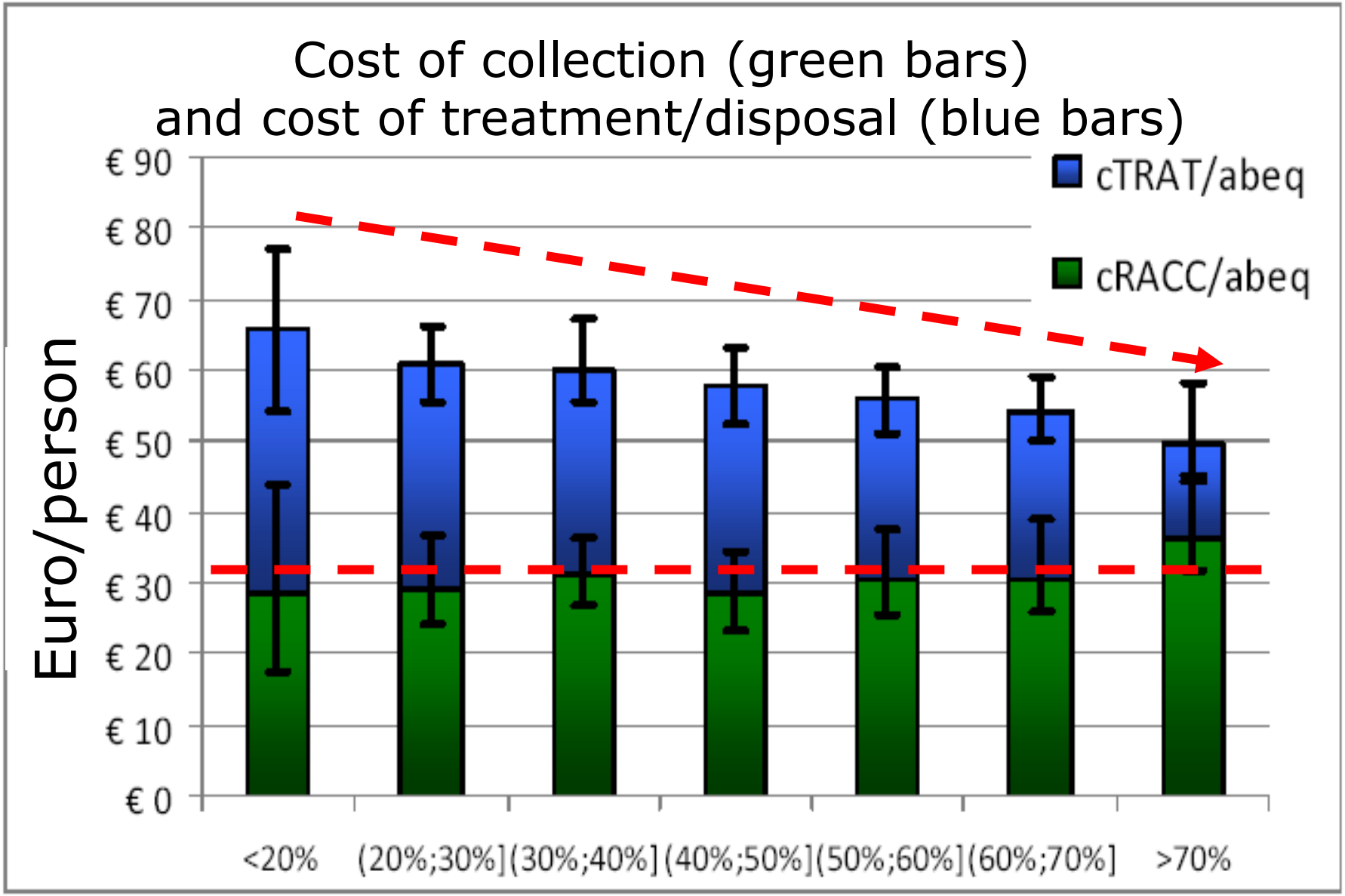
Italia, Nord e Veneto: dati 2006 (fonte Rapporto Rifiuti 2007 APAT - ONR)
Consorzio Priula e Consorzio TvTre: costi dati 2008 - % RD stima anno 2008

INFA-VHE report (Germany, 2004)

	Mixed MSW		Residuals	Biowaste	R+B	Difference to mixed MSW
Rural area						
kg/inhab/y	220		130	100	230	5%
coll/week	1		0,5	0,5	1	
coll/cost (€inhab/y)	**9,4**		**5,93**	**4,63**	**10,56**	**12%**
treat./cost (€/inhab/y)	27,5		16,25	6	22,25	-19%
treat./cost (€/t)	125		125	60		
total cost (€/inhab/y)	**36,9**		**22,18**	**10,63**	**32,81**	**-11%**
Urban area						
kg/inhab/y	270		225	50	275	2%
coll/week	1		0,5	0,5	1	
coll/cost (€(inhab/y)	**17,88**		**14,56**	**5,27**	**19,83**	**11%**
treat./cost (€/inhab/y)	33,75		28,13	3	31,13	-8%
treat./cost (€/t)	125		125	60		
total cost (€/inhab/y)	**51,63**		**42,685**	**8,27**	**50,96**	**-1%**

Cost optimisation

(Lombardy, pop. 10M, 1500 Municipalities)



TOOLS AND STRATEGIES TO CUT COSTS

Tool	Details	Applies where…..
Reducing pick-up time	Hand pick-up of small receptacles much faster than mechanical loading	… food waste collected separately from garden waste, in small receptacles
Reduction of the frequency for collection of "Residuals"	Effective systems to collect biowaste make its percentage in Residuals less than 15 %	…captures of biowaste are increased
Use of bulk lorries instead of packer trucks	Bulk density of food waste is much higher (0.7kg/dm3) than garden waste	…tools for collection of food waste prevent deliveries of garden waste

Thanks for your attention

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