

Resource Recovery Forum *Professional Sharing Series* Sei Singapore Environment Institute

The Role of Prevention in Sustainable Resource Use

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Resource Recovery Forum

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Structure

- current European policy drivers for sustainable resource use
- developing tools for waste prevention
- the need for effective communications
- relevant case studies: plastic bags

My thanks to colleagues Francis Radermaker (ACR+) and Dominic Hogg (Eunomia) for some of their data

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Current European policy drivers

EU approach to waste is based on three principles:

1. **Waste prevention:** This is a key factor in any waste management strategy.
□
2. **Recycling and reuse:** If waste cannot be prevented, as many of the materials as possible should be recovered, preferably by recycling.
3. **Improving final disposal and monitoring:** Where possible, waste that cannot be recycled or reused should be safely incinerated, with landfill only used as a last resort.

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What is waste prevention

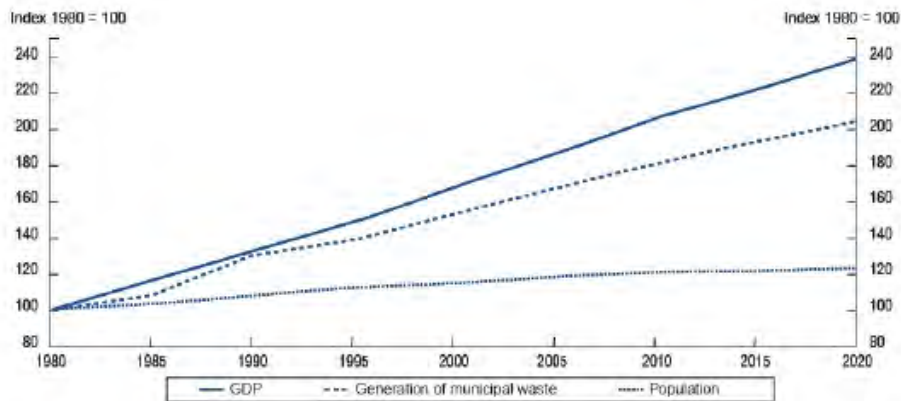
OECD defines waste prevention as: □

- **Strict avoidance** - the complete prevention of waste generation by virtual elimination of hazardous substances or by reducing material or energy intensity in production, consumption, and distribution
- **Reduction at source** - minimising use of toxic or harmful substances and/or minimising material or energy consumption
- **Product re-use** - the multiple use of a product in its original form, for its original purpose or for an alternative, with or without reconditioning.

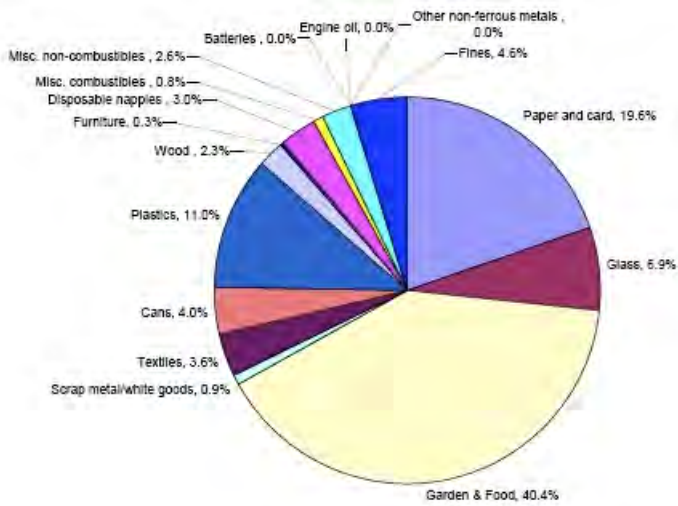
What is waste prevention

- "Minimising the quantity and hazardousness of municipal waste generated for collection, by the local authority, through prevention/reduction at source and reuse in the local community" (Defra, 2005)
- Household waste prevention is minimising the quantity (weight and volume) and hazardousness of household-derived waste generated in a defined community for collection by any party (NRWF, 2005)

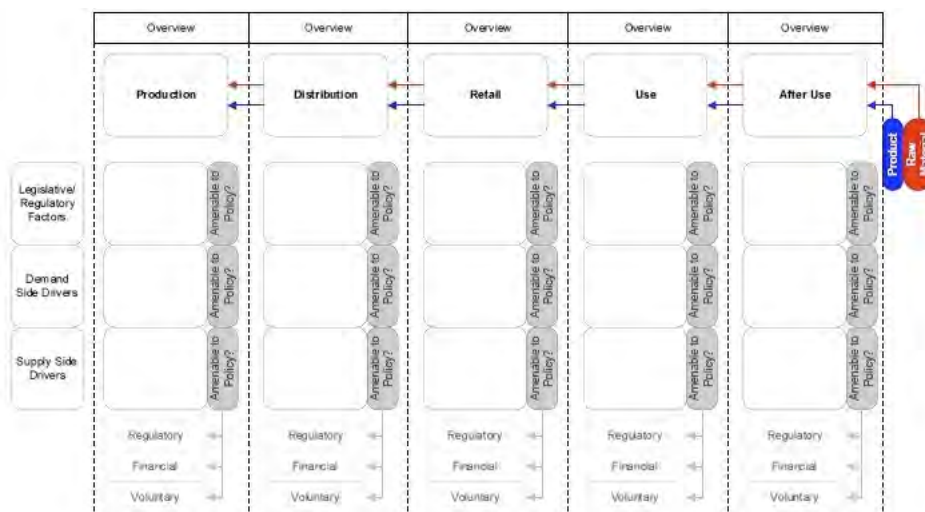
MSW ARISINGS, GDP & POPULATION (1980-2020)



RESIDUAL WASTE COMPOSITION (ENGLAND)



WASTE PREVENTION POLICY ANALYSIS



Eunomia, 2007

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Policies examined as case studies were:

1. Implementation Plans for Waste Prevention
2. Inclusion of Home Composting in LA(T) S
3. Waste Prevention Targets and Residual Waste Levy
4. Low Waste Schools / Charging for Schools Waste
5. Junk Mail Policies
6. Mandatory Use of Rechargeable Batteries
7. Deepening Producer Responsibility
8. Collaborative Procurement
9. Minimum Standards for Appliances
10. Stimulating Re-use of Durable Goods
11. Extended Product Warranties

Eunomia, 2007

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SCOTLAND

Executive: five types of policy tools available for prevention:

- **Economic instruments** eg taxes.
- **Incentives** eg deposit-refund schemes
- **Legislation** eg producer responsibility legislation, bans on certain materials and on certain materials going to landfill, direct variable charging for collection of household waste
- **Education and awareness raising**, to change values/attitudes and then behaviour, eg 'resource efficient shopping', home composting, real nappies
- **Voluntary agreements & partnerships** such as supply chain/community partnerships, eg on product design and packaging, take back/reuse, and direct marketing

NETHERLANDS

Policy tools available for prevention:

- 'Diftar' (Tariff Differentiation), or 'Pay As You Throw'
- landfill bans
- landfill tax
- home composting
- product re-use
- 'No Junk Mail' stickers on post boxes (self-regulation/initiative)
- (Small) Batteries (Qualitative Prevention and Re-use)

GERMANY

Policy tools available for prevention:

- Disposal ban
- DSD
- Deposit on Cans and One-way Bottles (one-way deposits)

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AUSTRIA

Waste prevention methods comprise:

- replacement of hazardous substances by less harmful ones
- establishment of material cycles by the application of closed-loop processes (cleaner production) and the repeated use of products (consumer goods and packaging material)
- development of long-lasting, environmentally friendly products, easy to maintain and to repair (eco-design)
- introduction of material saving services and efficient product-service-systems
- adoption of a sustainable lifestyle and efficient consumption

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AUSTRIA

Waste prevention programmes should:

- motivate to take action
- enable to take action
- encourage to take action
- engage in a network
- provide examples

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Tools for prevention used elsewhere

Selection:

- Belgian (Wallonia) Residual Waste Levy
- French Unwanted Mail Decree
- Raw Materials Taxes
- Danish Packaging Tax
- Danish Waste Tax
- Irish Plastic Bags Levy ('Plastax')

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Eunomia study conclusions



Case Study	Waste Streams Targeted	Potential Impact	Accompanying Measures?
Implementation Plans for Waste Prevention	Any	Potentially significant	To be identified in process
Inclusion of Home Composting in LA(T)S	Biowaste	Estimated 1.4 million tonnes per annum	Protocol for calculating contribution from home composting
Waste Prevention Targets and Residual Waste Levy	All household	Depends on target set. Possibly in excess of 3 million tonnes	Impact likely to be strengthened through legislating to allow household charging. Synergy with home composting policy
Low Waste Schools / Charging for Schools Waste	Schools waste (within household waste)	Estimated possible reduction of 113,000 tonnes. Not all of this is currently counted as household waste	Need to include both legislation requiring quality segregation systems at schools and requirement to introduce charging.
Junk Mail Policies	Junk mail and free newspapers	Estimated potential of 119,000 - 223,000 tonnes	This level of impact would result from implementation of a combination of policies. For some of these, forms of licensing of direct mail suppliers may be necessary

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Eunomia study conclusions



Household Waste Prevention Policy Side Research Programme

Final Report for Data
 National Research and Innovation Agency
 Agency for Applied Science and Technology


Author:
 Eunomia Research & Consulting,
 The Environment Council,
 The National Environment Agency,
 PAP,
 National Council on Environmental Policy

May 2017

Case Study	Waste Streams Targeted	Potential Impact	Accompanying Measures?
Mandatory Use of Rechargeable Batteries	Primary portable batteries	Unclear - total market is 20,000 tonnes or so - focus is on both quantity and hazardousness	A mandate to include rechargeables in appliances could be easily sidestepped. May require one or more of producer responsibility targets and measures to reduce switching to more hazardous materials
Deepening Producer Responsibility	Packaging, WEEE, batteries, and other streams (direct mail)	Tonnage impact potentially significant in the case of packaging (estimated at 250,000 tonnes)	
Collaborative Procurement	Materials / products / services procured by public authorities	Unclear - potentially significant environmental impact, but waste prevention impacts may be small	Would benefit from state of the art information regarding what might be technically feasible
Minimum Standards for Appliances	Durable goods	Unclear	Good technical data is required. A range of possible options exists

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Eunomia study conclusions



Household Waste Prevention Policy Side Research Programme

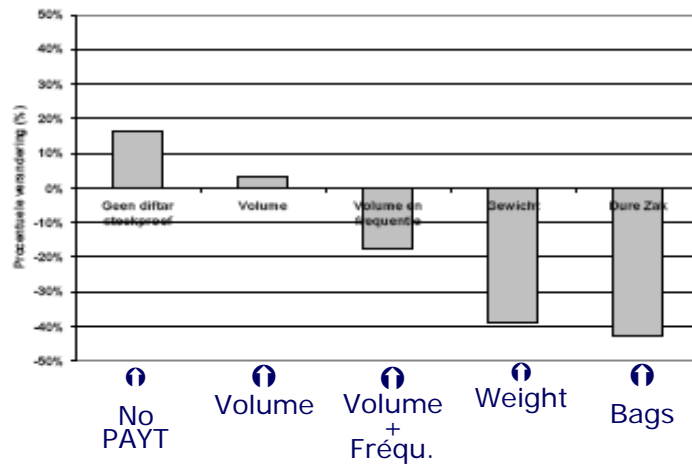
Final Report for Data
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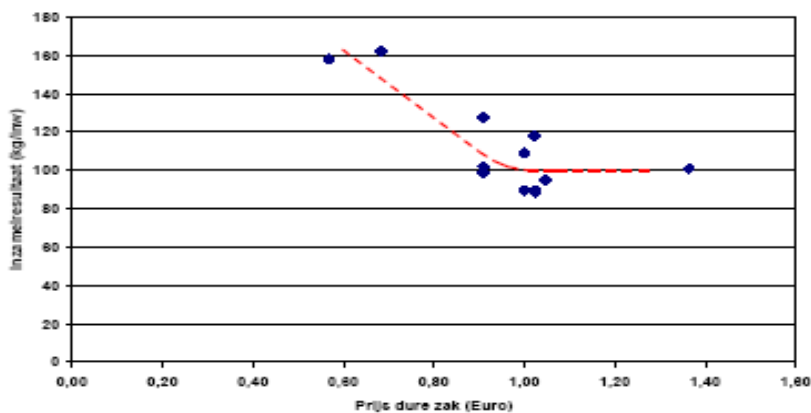
May 2017

Case Study	Waste Streams Targeted	Potential Impact	Accompanying Measures?
Durable Goods	goods		
Extended Product Warranties	Durable goods	Uncertain, but a slower turnover of durable products is the aim, and this would be expected to lead to prevention of household waste	Requires policy on labelling to be effective.

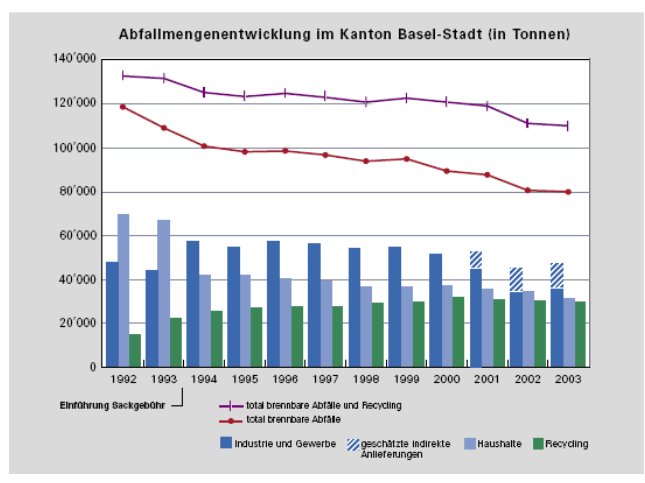
Some examples Netherlands Evolution of costs with & without PAYT Evolution of residual waste between 1995 and 2001



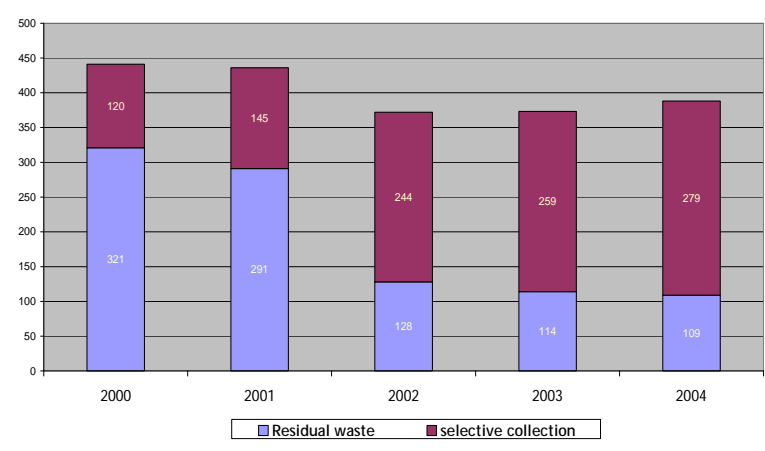
Some examples: Netherlands Amounts of residual waste ./. Price of bag



Some examples: Switzerland Effect of PAYT in Basel



Some examples: Italy Effect of PAYT in Priula



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PAYT system : Comparative invoice

Mol municipality (B)

Plaatsingsadres	Container	Aantal kg.	Aantal
	GT 20R 7125 2400001885	50,5	1

Ledigingsgegevens								
05/01/2003	6,50	20/02/2003	4,00	20/03/2003	3,50	11/04/2003	4,00	15/05/2003
12/06/2003	2,50	10/07/2003	7,00	25/08/2003	5,50	19/09/2003	4,00	30/10/2003
11/12/2003	6,00							

Totaal Bedrag:	7,58 Eur
Totaal betaald:	7,58 EU
Totaal te betalen:	0,00 EU

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Incentives for Prevention

Munich

Repair work day

Craftsmen repair broken utensils

Started in 1997
Every year since then

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Rotterdam - The NU « SPAARPAS »

Wanneer pak jij dubbele winst?

Spaar de wereld, beloon jezelf met de NU spaarpas

Vragen? Pas gevonden? Bureau NU spaarpas tel. 010 4013460 info@nuspaarpas.nl

www.NUspaarpas.nl

1234567890

Je NU-nummer is 024680

Meer mogelijk gemaakt door

Logo's: Gemeente Rotterdam, RST, European Union

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Assets of the « SPAARPAS »

- **Positive:** Consumers get an incentive, not a penalty
- **Demand side driven:** stimulates the demand for sustainable products
- **Marketing tool :** for sustainable consumption patterns.

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Incentives for prevention

Vienna

kauf-schrau.at
Produktvergleich

Benutzer: vogel Datum: 28.4.2003

Kategorie: Mineral- und Sodawasser Marke: zB: Gösler, Kei, Pago
Produkt: zB: Pils, Multivitamin, Orange Menge (in Liter):
[Neues Produkt eingeben]

Produkt mit niedrigstem Preis pro Liter suchen Produkt mit geringstem Müllanteil pro Liter suchen
Produkt mit höchstem Preis pro Liter suchen Produkt mit größtem Müllanteil pro Liter suchen


Produkt mit niedrigstem Preis:		Produkt mit geringstem Müllanteil:	
Marke:	Astoria	Astoria	De Spar
Produkt:	prickelnd	still	ohne Kohlensäure
Volumen (ml):	1000	1000	2000
Gebinde:	Flasche	Flasche	Flasche
Material:	Glas	Glas	Pet
Müll pro Liter (g/L):	29	29	21
Preis pro Liter (Euro):	0.15	0.15	0.17
Gekauft bei:	Spar		
Preis:	0.15		

1. Bild laden Produkt: 1 2. Bild laden 3. Bild laden

Admin Status: [Warte auf Einsatz!](#)

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Brussels – Observatory of consumption

	nettoie-tout avec désinfectant		nettoie-tout concentré
Consommation :	15,6 l/an/ménage	1,56 l/an/ménage	
Déchets :	1,206 kg	92 g	
Coût :	€ 34,4	€ 2,27	

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Brussels – Comparative Caddy


	Waste : 1057 g Price : 23.37€
	Waste : 191 g Price : 17.67€

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ECO-TEAMS

Flanders (Be)

- NGO
- > 250 Working groups
- 8-10 participants
- 8 meetings
- Working manual with tips for savings



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ECO-TEAMS

Participation cost : 18€
Average savings : 150-250€

Meeting is knowing

- 1 L oil 8,9 m²
- 1 L petrol 11,6 m²
- 1 kg biologic beef 261,0 m²
- 1 kg fresh beans 9,7 m²
- 1 kg deep-frozen beans 14,5 m²
- 1 kWh 2,6 m²
- 1 kg white paper 20,8 m²
- 1 kg recycled paper 7,15 m²

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BEBAT – Belgium Gifts for schools

**4 kgs of batteries collected =
1 € gift for schools**

10kgs = 1 T-shirt



25kgs = 1 ticket for cinema




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**Provincia Varese Italy
2003**

Competition for schools

Waste prevention projects

4 categories :

- Communication : campaign development
- Knowledge (educational material)
- Games
- Projects

Award

2.500€ for each of the 12 laureates


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Incentives for companies

Brussels

“TO PRINT OR NOT TO PRINT ?”

- Office Paper 140 kg/pers/a
- Rationalise the use of New technologies



Brussels – 10 pilot companies



→ Paper Reduction (%)

- - 17%
- - 44%
- - 37%
- - 9%
- - 7%
- - 3%
- + 14%
- - 11%
- - 8%
- - 29%



**Some identified incentives systems
in Europe
for municipalities**

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The stick – penalty fees

Walloon Region

Penalty fees if waste amounts/cap exceed defined levels (1991)

Rates :

• 27 €/tonne	> of 270 kg/inhab	from 1999
• 30 €/tonne	> of 260 kg/inhab	from 2000
• 32 €/tonne	> of 250 kg/inhab	from 2001
• 35 €/tonne	> of 240 kg/inhab	from 2002.

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The Carrot - subsidies

Flanders

- Agreements and subsidies to municipalities (251/308)
- Support and consulting to companies (PRESTI) (15.000/40.000)




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STIP Info

STIP info : database of municipal initiatives
(www.stip.ovam.be)




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Provincia Bergamo Italy 2002-2003

Competition for local authorities

Waste minimisation projects

Selection criteria :

- Innovativeness
- Efficiency (results, economic, awareness raising)
- Reproducibility, transferability

Award

10.000.000 Liras (5.200€) for each of the 10 laureates

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PLASTIC BAGS - A CASE STUDY



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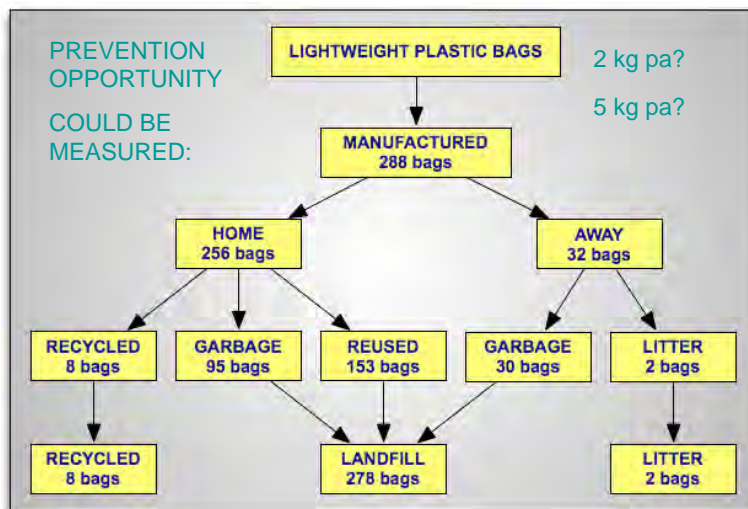
PROS & CONS OF PLASTIC BAGS

 <p>LIGHTWEIGHT CHEAP STRONG DURABLE ADVERTISING MEDIUM</p>	 <p>PUBLIC LITTER NUISANCE DIFFICULT TO COLLECT PROXY FOR CONSUMPTION LOW RECYCLING RATES OFTEN NEGLECTED CAUSES MRF PROBLEMS</p>
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Significant potential to reduce life cycle environmental impacts of plastic bag use in:

- *resource consumption*
- *energy*
- *greenhouse gas emissions*
- *litter*

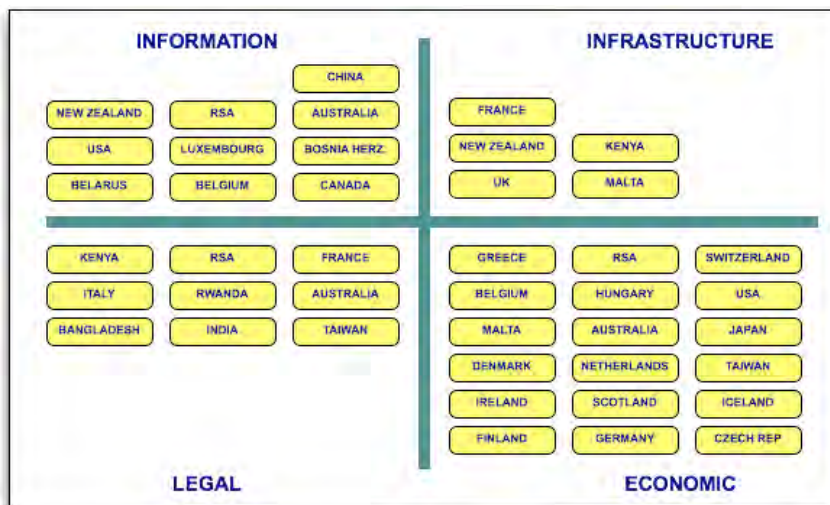
PER CAPITA PLASTIC BAGS - TYPICAL FATE



TOOLS TO CHANGE THE USE OF PLASTIC BAGS

Class	Policy tool	Applicability
Information	Education & campaigns (use of bags and littering)	National, regional & local
	Promoting Reusable Bags	National, regional & local
	Encourage retailers to adopt Codes of Practice	National, regional & local
Infrastructure	Kerbside recycling of plastic shopping bags	Local
	Biodegradable bags	Local
Legal	Ban on plastic bags	National & regional
Economic	Impose a mandatory charge system	National & regional
	Agree a voluntary charge system	National & regional

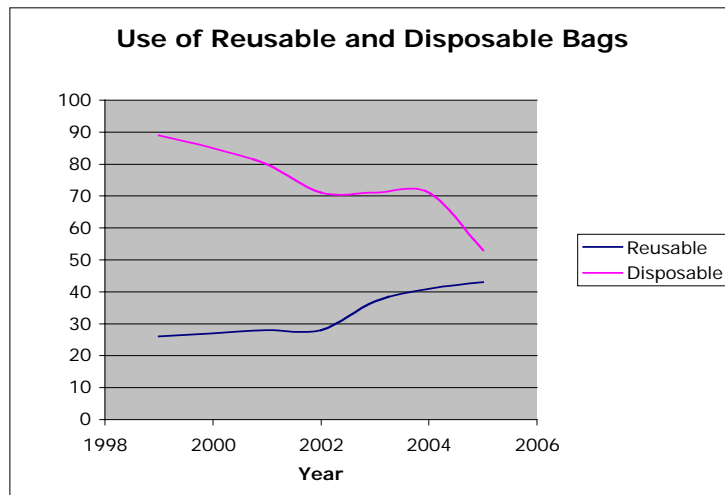
APPLICATIONS OF DIFFERENT TOOLS VS PLASTIC BAGS



INFORMATION

- “Choose no plastics” campaign (BEL)
- Supermarkets promoting reusable bags with loyalty card points (B)
- Ecolabelling bioplastic bags (CZ)
- Knot plastic bags (USA)
- Offer free paper or cotton bags (CHN)

IMPACT OF PLASTIC BAG CAMPAIGNS IN BELGIUM



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INFRASTRUCTURE

Collect plastic bags for recycling (UK)
Encourage use of biodegradable plastics (F) (B)

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LEGAL

Ban plastic bags (F) (AUS) (RWA) (RSA) (IND) (KEN) (TAIWAN)

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ECONOMIC

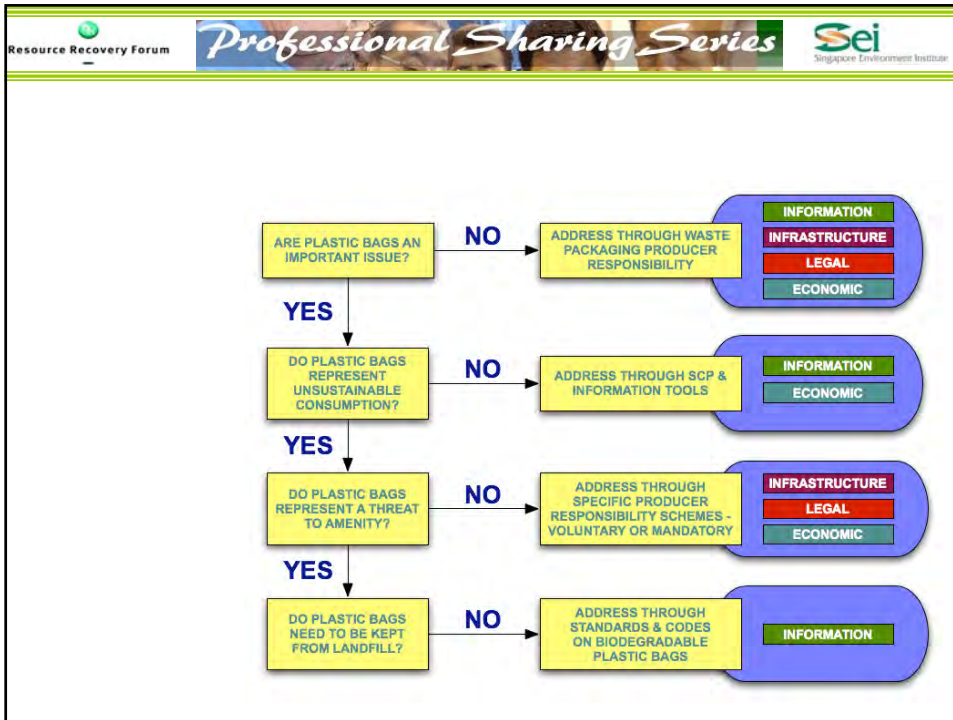
Voluntary charging for bags (AUS) (B) (D) (LUX) (NL) (UK)
Mandatory charging for bags (DK) (ICE) (IRL) (I) (MAL) (KEN)
(RSA) (TAI)
Other intervention (NGR)

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Country	How many plastic bags are used every year?	Are there any 'plastic bag' campaigns?	Are plastic bags banned?	Is there a levy on plastic bags?	Are customers required to pay for plastic bags?	Are there national recycling schemes for plastic bags?	Are reusable 'eco' bags available?
America	San Francisco – 45million bags	California – Schools 'Kids Recycling Challenge'	No	Not yet	California-Yes San Fran - Yes	Yes	Yes
Australia	6.9 billion bags	Yes	In a number of communities in Tasmania & NSW	Some planned	Usually	Yes-instore depots	Yes
Austria	NA	Plastic bags will be a topic in a campaign 'Clever Shopping'	No	No	No	No	Yes
Bangladesh	NA	Yes	Yes	NA	NA	No	Yes
Belarus	NA	Yes	No	No	NA	No	NA
Belgium	NA	Yes	No	No	Often	No	Yes
Bosnia & Herzegovina	NA	'Yes - Say No To Plastic Bags'	No	No	No	No	Yes
Canada	1.4 – 2.7 billion bags in Quebec		No	No	No	No	Yes
China	Large supermarkets use approx 362 million bags	Yes - Free cotton bag give away & 3 year 'clean up'	No	No	Shanghai Supermarkets- Yes	No	Yes
Czech Republic	NA	Ecolabelling	No	No	In some supermarkets	No	Yes
Denmark	750,000	NA	No	Yes Green Tax – Retailer pays DKK22/kg	Usually	No	Yes
Finland	NA	No	No	Yes	Yes		Yes
France	17 billion bags 80,000 t	Yes	Yes if non-biodegradable by 2010	No	NA	No	Yes
Germany	150,000 t (all plastic bags – not just supermarket)	Yes	No	No	Yes – In all large supermarkets	DSD	Yes

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Country	How many plastic bags are used every year?	Are there any 'plastic bag' campaigns?	Are plastic bags banned?	Is there a levy on plastic bags?	Are customers required to pay for plastic bags?	Are there national recycling schemes for plastic bags?	Are reusable 'eco' bags available?
Greece	10 billion bags	Yes	No	No	Usually	No	Yes
Hungary	NA	NA	No	No	Yes – large bags in supermarkets	No	NA
India	NA	Yes	Yes less than 20 microns	No	NA	No	Yes
Iceland	16 million (2004)	Yes	No	Yes (EURO.2/bag)	Yes	No	Yes
Ireland	1.2 billion bags pre-tax, <0.2 billion after	Yes	No	Yes – PlasTax	Yes	No	Yes
Italy	NA	Yes	No	No	Yes – EURO.05	No	Yes
Japan	30 Billion bags	Yes	No	No – planned for 2007 (Y5-10 per bag)	No	Yes	Yes
Kenya	4,000 tonnes flexibles	Yes	Yes <30 microns	Yes	Yes	In planning	Yes
Luxembourg	NA	Yes	No	No	NA	No	Yes
Malta	50 million bags	Yes	No	Yes-EcoTax EURO.10	Yes	No	Yes
New Zealand	800 million bags	Yes-Regional & National	No	No	NA	No	Yes
Republic of South Africa	NA	Yes	Yes <24 microns	Yes (>24 microns) R2.13/kg	Yes	No	Yes
Rwanda	NA	Yes	Yes >100 microns	No	NA	No	Yes
Scotland	1 Billion bags	Yes	No	No – under consideration	Yes – only in B & Q, Ikea	No	Yes
Spain	NA	NA	No	No	No	No	Yes
Switzerland	NA	Yes	No	No	Yes – Supermarkets (CHF0.15 – 0.20)	No	Yes
Taiwan	20 Billion bags	Yes	If <60 microns	Yes	Yes	Planned	Yes

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Country	How many plastic bags are used every year?	Are there any 'plastic bag' campaigns?	Are plastic bags banned?	Is there a levy on plastic bags?	Are customers required to pay for plastic bags?	Are there national recycling schemes for plastic bags?	Are reusable 'eco' bags available?
The Netherlands	NA	Yes	No	No	Yes – EURO.20 for thick bags	No	Yes
UK	8 Billion bags	Yes 'Bag for Life' 'Penny Back'	No	No	Rarely – eg 'Bag for Life' and Lidl	No – except in-store depots	Yes



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The Plastic Bag Levy in Ireland

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Background to levy

- Plastic bags – significant visibility as litter - Plastic bags used to account for 5% of litter
- Increasing consumption
- Growing public awareness of environmental issues
- Litter countering Ireland's clean, green image

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Consultancy study

1998 - Consultancy study commissioned

" to identify and assess possible fiscal, regulatory or other measures that might be undertaken to minimise the use and environmental impact of plastic bags".

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Consultancy study (2)

Plastic bags in context

- Estimated consumption - 14k tpa
- 1.26 billion plastic bags dispensed free of charge at retail outlets pa
- 328/inh/y- excessive

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Consultancy outcome

- Consultants reported 1999 – recommended **5 cent** levy
- Consultants silent on whether 'supply side' or 'point of sale' levy would be best – further analysis required
- Public consultation process undertaken 1999
- Very strong public support for levy
- Principle opposition from plastic industry, packaging importers/distributors, retail sector

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Legislation

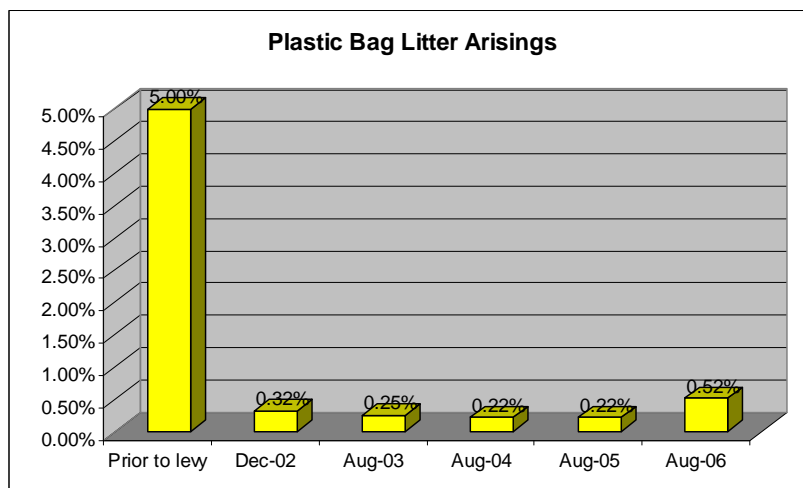
- Enabling provision for plastic bag levy and Environment Fund was provided for in primary legislation - Waste Management (Amendment) Act 2001 – June 2001
- Plastic bag defined as “a bag –
(i) made wholly or in part of plastic, and
(ii) which is suitable for use by a customer at the point of sale in a supermarket, service station or other sales outlet,
other than a class of bag exempted in regulations.”.

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Impacts

- Dramatic change in consumer behaviour re shopping practices
- >90% reduction in plastic bag consumption
- Corresponding positive impact on visual nuisance litter
- Pre levy consumption – **328** bags/inhabitant/year
- Post levy consumption – **21** bags/inhabitant/year
- **Almost €85m** proceeds to date
- used for - waste infrastructure, enforcement, intensive waste awareness campaigns etc

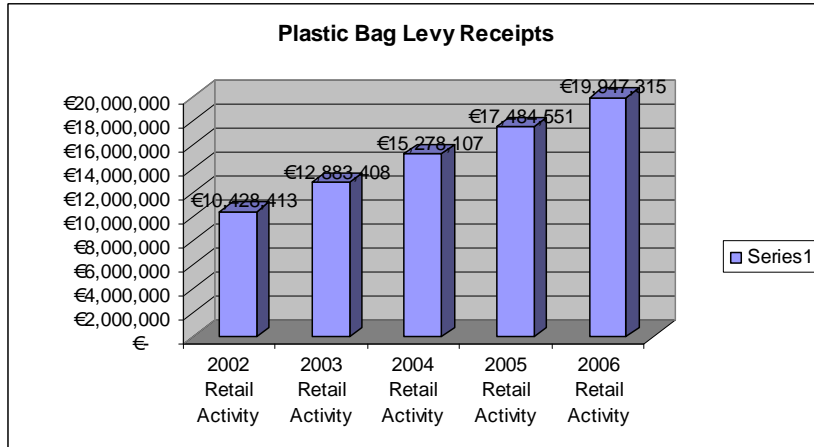
Impacts



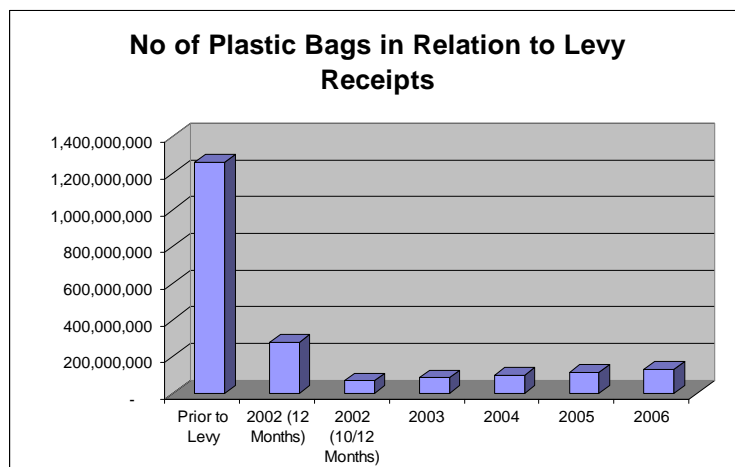
Trends

- anecdotal evidence of a slippage
- plastic bags used to account for 5% of litter Within 9 months this fell to 0.32% of litter, later to only 0.22%
- in 2006 indicate that there is a slight increase in plastic bag litter to 0.52%
- upward trend in plastic bag levy receipts
- per capita usage decreased to 21 bags in 2002
- in 2006 usage increased to 31 bags per capita

Trends



Trends



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Current Position

- Separate Study to apply tax in other areas – chewing gum, ATM receipts and fast food
- Report recommended levies or negotiated agreements
- Agreement reached with chewing gum industry – 3 year programme costing industry €7m
- Plastic bag levy remains popular
- Levy increased to 22 cent on 1 July 2007

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Conclusions - Irish plastax

- Recognized levy's positive effects
- Decision taken to increase levy to 22 cent
- Ring-fencing funds helped public acceptance
- Levy helped raised awareness of waste management & other environmental issues
- Success assisted by substitute - reusable bags
- prior consultation with info on implementation arrangements critical in winning support
- well targeted and designed economic instruments provide incentives for desired environmental behaviour
- has caught public imagination

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CONCLUSIONS - PLASTIC BAGS

- PLASTIC BAGS ARE LIGHT, SHORT-LIVED, POORLY RECYCLED
- DEBATE IS POLARISED - NO ACTION VS BANS
- TOOLS AVAILABLE: INFORMATION, INFRASTRUCTURE, LEGAL & ECONOMIC INSTRUMENTS
- USE OF THESE INSTRUMENTS CAN CUT PLASTIC BAG USE BY UP TO 90%
- THIS COULD CONTRIBUTE UP TO 5 KH/INH/Y TO THE LESS 100 kg MUNICIPAL WASTE

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CONCLUSIONS - PLASTIC BAGS

If a decision is taken to act against plastic shopping bags, the following are effective:

- ending practice of free bags in supermarkets
- make reusable bags available in supermarkets
- provide collection systems for plastic bags, in in-store and household recycling schemes
- local communications campaigns to raise awareness of the issue, problems & solutions
- using any revenue from a levy or charge to fund litter clean-up or relevant research

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CONCLUSIONS - WASTE PREVENTION

- **Plans for Waste Prevention** - a tool that can be used to target any particular waste stream or sector of the economy.

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The Role of Prevention in Sustainable Resource Use

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