ANNEX 1: SOURCES AND TYPES OF LITTER

A1. SOURCES AND TYPES OF LITTER

A1.1 Data Availability

The Marine Strategy Framework Directive (MSFD) Technical Sub-Group on Marine Litter examined the availability of data on marine litter[1]. Although a number of sources provide data on marine litter, there are significant drawbacks with the nature and quality of the data. As yet, there are no standard monitoring programmes across Europe, or even voluntary agreements between all regional seas on a consistent measurement methodology for the description of the litter items, the sources, volume in kilogrammes, data on the number of items, and detailed information on the conditions of the reference beaches.

Beach litter monitoring provides the most comprehensive data on trends in the amount of litter washed ashore and/or deposited on coastlines. Large data sets are already held by, amongst others, the Ocean Conservancy through its International Coastal Clean-Up (25+ years) the UK's Marine Conservation Society's Beachwatch (18+ years), the North Sea Beach litter monitoring programmes of three German NGOs (20+ years) and the OSPAR marine litter monitoring programme, which covers the North East Atlantic regional sea[2]. Beach surveys provide important information but not necessarily the full picture of the total load of marine litter in the coastal and marine environment[3].

The OSPAR beach litter monitoring programme has been running for 11 years and is one of the most comprehensive monitoring programmes to date[4]. The number of participating countries and beaches varies per year, with approximately 50 beaches in 10 countries surveyed in total[5]. The project's final report is based on a statistical analysis of marine litter from 609 surveys, using a common, standardized survey protocol on 100 meter stretches of 51 regular reference beaches monitored during the pilot project period (2001–2006), supplemented by 335 surveys of 1 kilometer stretches on 31 regular reference beaches during the same period. Additional surveys were carried out during 2006 on four beaches in France.

The importance of monitoring is recognised by the Marine Strategy Framework Directive (see Box A1.1) and this could result in better and more comparable data becoming available in future. The MSFD requires an initial assessment of marine litter status to be completed by Member States by 2012, along with the setting of targets. These were due to be submitted to the Commission by October 2012.

---

1 Joint Research Centre (2011): **Marine Litter: Technical Recommendations for the Implementation of MSFD Requirements**. European Commission, downloaded from: *http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/22826/2/msfd_ges_tsg_marine_litter_report_eur_25009_en_online_version.pdf*

2 Joint Research Centre (2011): *op cit.*

3 Ospar Commission (nd): **Marine Litter, preventing a Sea of Plastic**, downloaded from http://www.ospar.org/html_documents/ospar/html/marine_litter_unep_ospar.pdf

4 ibid

5 Joint Research Centre (2011): *op cit.*

Monitoring programmes for marine litter are due to begin in 2014. The Technical Subgroup made recommendations on the development and use of standard EU-wide monitoring methods to enable comparability between different regions and to allow trends to be identified over time.

Box A1.1: Descriptor 10 of the Marine Strategy Framework Directive

The main goal of the Marine Strategy Framework Directive is to achieve Good Environmental Status in the EU marine waters by 2020. In order to help Member States interpret what GES means in practice, the Directive sets out, in Annex I, eleven qualitative descriptors which describe what the environment will look like when GES has been achieved. Descriptor 10 focuses on marine litter and sets out the following criteria for Good Environmental Status: *"Properties and quantities of marine litter do not cause harm to the coastal and marine environment"*.

A number of indicators have also been suggested to support the monitoring of marine litter, these include:

- trends in the amount of litter washed ashore or on coastlines;
- trends in the amount of litter in the water column and on the sea-floor;
- trends in the amount, distribution and composition of micro-particles; and
- trends in the amount and composition of litter ingested by marine animals

Suggestions for the types of targets include a set % for the reduction of volume of litter, the increase of micro plastics as well as the change in the amount of plastic particles consumed by animals.

Source: European Commission, Marine Strategy Framework Directive downloaded from http://ec.europa.eu/environment/water/marine/ges.htm

Types and sources of marine litter have also been examined in the parallel study on plastic recycling cycle and marine environmental impact - Case studies on the plastic cycle and its loopholes in the four European regional seas areas.

As a result of the current lack of standardisation at EU level, the Öko Institut[6] identifies the following challenges in interpreting the data:

- data relate to the situation in a defined area at the time of the investigation or monitoring programme, thus constituting a spot check;
- results depend heavily on local conditions such as winds, water currents, beach conditions (sand or gravel), the people taking part (number of collectors), the classification of the litter items, the difference in practice and the frequency of the sampling;
- data on marine litter items do not facilitate the calculation of the overall litter amount per year for the specific location and no calculation of "average" values for the entire shore is possible; and
- the aim of the data collection is geared more to monitoring (changes over time) than to absolute values.

The lack of a consistent classification of items makes comparison of data between studies difficult. For example, the names given to different categories of items vary between studies, the plastic content of some items (e.g. 'food packaging') is not clear

[6] Öko Institut (2012): **Study on Land-Sources Litter in the Marine Environment**. Review of Sources and Literature. Freiburg, Öko Institut e.V.

and there is no direct correlation between the item names and whether they arise from land or sea-based sources.

The position is similar for litter on land, although a number of national guidelines exist, such as the Netherlands guide on the uniform monitoring of litter[7], which describes a standard method for litter monitoring for municipalities, including preparation and implementation of the assessment, the analysis and reporting. Similarly, Keep Britain Tidy conducts an annual survey of England's streets on behalf of the UK government using a standard methodology. This covers different litter types, graffiti, fly-posting, staining and detritus amongst others. The methodology takes into account seasonal differences and provides a focus on where improvements need to be made. The survey, carried out by trained employees, covers over 10,000 sites each year, examining problems as diverse as the condition of bins to the state of landscaping, rating them as "good", "satisfactory", "unsatisfactory" or "poor."

The Netherlands has also developed a standard model for calculating the costs of litter, to enable municipalities to obtain an accurate picture of the costs they incur. The calculation model makes an inventory of the costs of street cleaning and cleaning up litter. A number of relevant indicators are also calculated, such as costs, kg of litter per capita and costs of street cleaning per km street length.

We have not so far identified similar programmes in other Member States, however, and there is currently no EU-wide approach to monitoring litter on land to allow trends to be identified and the effectiveness of litter prevention measures to be assessed.

[7] Senternovem (2007): **Handreiking Uniforme Monitoring Zwerfafval Voor Gemeenten**. Uitvoering Afvalbeheer, Utrecht, SenterNovem

A1.2 Types of Litter

Studies tend to measure marine litter either as numbers of items or as volume in kilogrammes and to distinguish between beach litter, litter floating in the water column and litter on the sea floor. Considerably more data are available for items than for volume and most of the data refers to beach litter; data for floating litter and sea floor litter are rarely available. Table A1.1 sets out the top 10 marine debris items globally and for the Baltic, North and Mediterranean Seas.

Table A1.1: Top 10 Marine Debris Items from the International Coastal Clean-up Programme Globally and for the Baltic, North and Mediterranean Seas, 1980-2007

Items	Global	Baltic Sea	North Sea and NE Atlantic	Mediterranean Sea
Cigarettes/filters	24.6%	37.4%	16.0%	29.1%
Bags (paper and plastic)	9.4%	2.6%	4.1%	4.1%
Caps/lids	9.1%	8.8%	12.4%	6.7%
Food packaging	8.9%	7.7%	12.7%	4.0%
Cutlery	7.2%	-	4.8%	-
Beverage bottles (plastic < 2l)	5.5%	6.5%	7.9%	5.1%
Beverage bottles (glass)	4.8%	5.9%	-	5.5%
Beverage cans	4.6%	4.7%	5.2%	6.3%
Straws, stirrers	4.4%	-	-	4.7%
Rope	2.1%	-	8.1%	-
Cigarette lighters	0.8%	-	-	5.2%
Tobacco packaging	0.7%	4.4%	-	-
Pull tabs	1.1%	3.6%	-	-
Clothing/shoes	1.7%	2.5%	-	-
Fishing nets	0.8%	-	8.0%	-
Fishing line	0.9%	-	4.2%	-
Cigar tips	0.8%	-	-	3.1%
Others	12.6%	15.9%	16.6%	26.2%
Total number	103 247 609	35 925	220 877	49 453

Source: Öko Institut (2012): **Study on Land-Sources Litter in the Marine Environment**. Review of Sources and Literature. Freiburg, Öko Institut e.V

There are significant differences in the types of marine litter found between the three seas bordering the EU and with the global totals. Packaging materials (plastic and other) accounted for over 30% (Mediterranean) to over 40% (North Sea) of total marine litter, with smoking-related material accounting for 16% (North Sea) to 42% (Baltic Sea). Fishing-related material was only part of the top ten types of litter in the North Sea, where it accounted for 20% of the total. Plastics accounted for 30% to 70% of beach litter in the Baltic, 44% to 95% in the North Sea and 37% to 80% in the Mediterranean.

Figure A1.1 shows the composition of land-based litter dropped in England for the period 2003 to 2007. Although the categories are somewhat different from those in Table A1.1, smoking-related litter and food and drink packaging represent the largest share. Plastic bags represent only a minor share. In the US and Belgium, smoking-

related litter also accounts for the largest share of litter dropped on land, representing 50% or more of the total number of litter pieces[8,9]. However, as cigarette butts are harder to clean up and might accumulate, it is possible that the share of smoking related litter is overestimated.

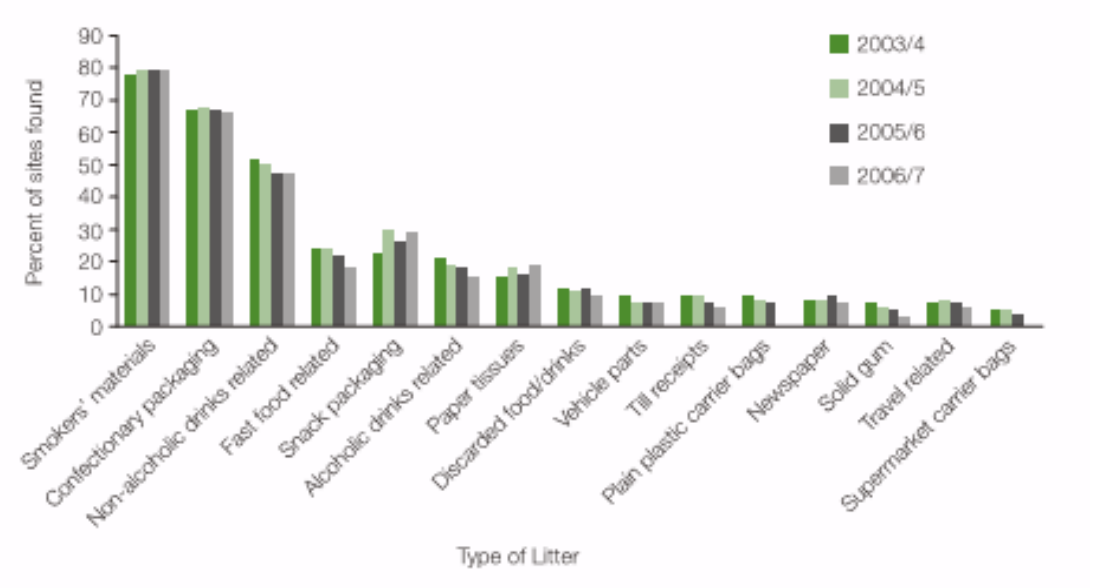

Figure A1.1 Types of Litter Dropped on Land in England
Source: Lewis et al (2009a)

A1.3 Sources of Marine Litter

A1.1.1 Overview

The sources of litter reaching the marine environment can be categorised in a number of ways, for example according to whether they are sea or land based[10] (see Table A1.2).

Table A1.2: Sources of Marine Litter

Sea-based Sources	Land-based Sources
Waste from vessels: • merchant shipping (cargo, equipment, etc.) • Naval and research vessels • private vessels (pleasure) • public vessels (cruise liners, ferries)	Individual actions: • littering in general (inland and coastal) • littering caused by tourism (recreational visitors to the coast) • events (e.g. charity balloon releases)
Fishing activities: • fishing vessels	Facilities and construction: • industrial or manufacturing releases (e.g. by-

8 OVAM (2007): Zwerfvuil in Vlaanderen 2006. **Analyse van proefstroken**, Mechelen, pp. 192.

9 Schultz and Stein (2010): **Litter in America**, 2009 national litter research finding and recommendations. Executive Summary

10 UNEP (2005b): **Marine Litter: an Analytical Overview**, UNEP Regional Seas Programme, UNEP, available at: http://www.unep.org/regionalseas/marinelitter/publications/docs/anl_oview.pdf

Table A1.2: Sources of Marine Litter	
Sea-based Sources	**Land-based Sources**
• abandoned, lost or otherwise discarded fishing gear (fishing nets, ropes etc.) • aquaculture installations	products, plastic resin pellets) • construction and demolition sites • harbours (seaports, commercial ports, fishing ports, ferry ports etc.) • ship-breaking yards • agricultural activities
Other structures: • legal and illegal dumping at sea • offshore oil and gas platforms and drilling rigs	Municipalities • litter and waste generated in coastal and inland zones from improper waste management • wastes from dump sites located on the coast or riverbanks • untreated municipal sewage
Transport of litter and waste: • natural events (storms, strong tides, tsunamis)	Transport of litter and waste (on land or waterways) • rivers and floodwaters • discharge from stormwater drains/sewers • natural storm-related events (e.g. mistral, tornados, hurricanes)
Source: Öko-Institut (2012): Study on Land-Sourced Litter in the Marine Environment	

Globally, land-based sources are estimated to account for some 80% of marine litter, with the remaining 20% stemming from sea-based sources. The breakdown between sources differs from region to region, however. The Öko Institut study of the Mediterranean, North and Baltic Seas noted that land-based sources accounted for 75% to 90% of the total number of marine litter items at beaches (mainly based on the collection of beach litter). For the Mediterranean, land-based sources are predominant, accounting for all of the top ten types of litter found. The MSFD GES Technical Subgroup on Marine Litter[11] found considerable variation in sources of litter between regional seas. In the Mediterranean, 80% of waste was thought to be from land-based sources, mainly related to shoreline and recreational activities. In the southern North Sea (German and Dutch beaches), shipping, fisheries and offshore installations were the main sources. Commercial shipping and recreational boating, together with fisheries, were also important sources in the Baltic, while in the Black Sea uncontrolled coastal landfills and land-sourced litter carried to the sea through river runoff were the main sources.

Sources of marine litter have been examined in more detail in Project 41 by Arcadis (Pilot project '4 Seas': Case studies on the plastic cycle and its loopholes in the 4 EU regional seas).

A1.1.2 Sea-based Sources

Sea-based sources of litter include merchant shipping, ferries and cruise liners, commercial and recreational fishing vessels, military fleets and research vessels, pleasure craft, offshore installations such as oil and gas platforms, drilling rigs and

[11] Joint Research Centre (2011): **Marine Litter: Technical Recommendations for the Implementation of MSFD Requirements**. European Commission, downloaded from: *http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/22826/2/msfd_ges_tsg_marine_litter_report_eur_25009_en_online_version.pdf*

aquaculture facilities[12]. Although there is considerable literature on waste management offshore, very limited information is available specifically about the amounts or types of litter arising from sea-based sources, or the factors that give rise to it.

It is important to distinguish between vessel types, such as ferries, cruise liners, commercial cargo vessels and fishing vessels, for example. The differences between these have implications for quantities and spatial accumulation of marine litter. The largest ferries rarely carry more than 1 000 passengers, whereas cruise liners may hold up to 6 000 people. However, ferries are the most likely vessels to follow near-identical routes and make more journeys within a shorter space of time, therefore distinct paths of litter may be traceable to these activities. Cruise liners and cargo ships do not adhere as closely to the same routes as ferries when in the deep ocean (although are likely to follow navigational channels in and out of port), but may be responsible for regional littering across remote areas.

Increased use of the seas for recreation has the potential to give rise to litter. For example, a cruise ship with a capacity of 2 000 - 3 000 passengers may generate up to 7 000 – 10 500 kilos of solid waste. Incorrect disposal of this waste can contribute to marine litter. A range of measures have been adopted to ensure the correct management of waste. For example, sectoral guidelines for the marine waste management of passenger ships have been introduced by UNEP, with a number of recommendations for the reduction and safe disposal of waste. This includes the proper disposal of all marine waste on-shore and the use of receptacles; the use of durable, high-quality and reusable products such as linen, tableware, cups, etc. rather than plastic/foam material. It therefore seems likely that litter from cruise ships is most likely dropped by passengers, rather than arising from a lack of waste management systems. The guidelines also call for the education of crew and passengers about the importance of reducing marine litter[13].

Commercial shipping vessels can also generate waste and incorrect disposal can contribute to marine litter. As for cruise ships, a range of measures are in place to ensure correct waste management from commercial vessels, including regulations under the International Convention for the Prevention of Pollution from Ships (MARPOL) and EU Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues. National port authorities have to prepare waste management plans and adjust port operations to meet these international standards[14]. Despite such international legislation, items continue to be accidentally released,

---

12 Joint Research Centre (2011): **Marine Litter: Technical Recommendations for the Implementation of MSFD Requirements**. European Commission, downloaded from: *http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/22826/2/msfd_ges_tsg_marine_litter_report_eur_25009_en_online_version.pdf*

13 UNEP, IMO (2008): North-West Pacific Action Plan**: Sectoral Guidelines for the Marine Litter Management, Passenger Ships,** prepared by NOWPAP, MERRAC as part of the NOWPAP MALITA.

14 Palabıyık and Altunbas (2004): **Ship and Port Solid Waste Management: Some Further Views on Canakkale, Turkey,** Proceedings of the First International Conference on the Management of Coastal Recreational Resources Beaches, Yacht Marinas and Ecotourism, Euro-Mediterranean Centre on Insular Coastal Dynamics Foundation for International Studies, Micallef and Vassallo (Eds), 20-23 October, pp. 273-279, Valetta, Malta, 2004

stored inappropriately or discarded deliberately by shipping vessels, particularly on long journeys. A key concern is the loss of cargo containers from commercial shipping, with up to 10,000 of these containers lost worldwide each year[15]

Users of pleasure craft can add to marine litter, both at sea and in ports[16]. Recreational boat owners and operators may accidentally or deliberately discharge waste and other manufactured items into the marine environment. Such litter can include food containers, plastic bottles and recreational fishing gear.

The fishing industry also contributes to sea-based sources of litter. Nets, ropes and other fishing debris are among the most visible elements of marine litter and result from a failure to remove gear, the accidental loss of gear or the deliberate dumping of nets, ropes and other waste by fishing crews[17]. For the North Sea, the Öko Institut[18] study found that more than 12% of the items found in beach surveys are waste from fishing activities, although percentages in the other regional seas were much lower.

A1.1.3 Land-based Sources

Pathways to the Marine Environment

Litter may be deposited directly into the marine environment by recreational visitors and beach-goers[19]. Litter dropped on land, either by individuals or from commercial activities (such as accidental release of plastic pellets by spillage during transport), can also enter the marine environment through a series of pathways. These include wind-blow, water bodies such as rivers, lakes and ponds that are used as illegal dump sites, riverine transport of waste from landfills and other inland sources, discharges of untreated municipal wastewater and storm sewers. Poor waste management at ports could also give rise to marine litter; however, no data on littering / lost material at ports are available[20].

Natural events, such as rough seas, flooding, melting of snow and heavy rainstorms, may also transport litter into the marine environment. Debris resulting from natural weather events can contain almost anything, from roofs to plastic straws, depending on the severity and scale of the event. The most common items entering the marine

15 KIMO International (2008): **Fishing for Litter Scotland** Final Report 2005-2008.

16 Trouwborst (2011): **Managing Marine Litter: Exploring the Evolving Role of International and European Law in Confronting a Persistent Environmental Problem**, Merkourious Utrech Journal of International and European Law, Volume 27/Issue 73, Article, pp. 04-18.

17 KIMO International (2008): **Fishing for Litter Scotland** Final Report 2005-2008.

18 Öko Institut (2012): *op cit.*

19 Trouwborst (2011): **Managing Marine Litter: Exploring the Evolving Role of International and European Law in Confronting a Persistent Environmental Problem**, Merkourious Utrech Journal of International and European Law, Volume 27/Issue 73, Article, pp. 04-18.

20 Öko Institut (2012): *op cit.*

environment as a result of such events include containers and other unsecured outdoor items[21].

The Öko Institut study identifies a number of pressures which affect the amount of land-sourced litter entering the marine environment. These are:

- population density;
- tourism/recreation (level of littering inland and on the shore, littering caused by tourism/recreational visitors/events at the coast);
- activities at ports (level of littering at ports and littering caused by commercial activities at ports);
- solid waste management (including collection and treatment of municipal waste, dumpsites located on the coast or near river banks, plastic packaging waste management, management of commercial and industrial waste, management of agricultural plastic waste); and
- waste water treatment (coverage of collection and treatment; sewer and combined sewer overflow).

Countries where a high population density and a high level of tourism (or a high level of port activities) is combined with less developed waste management and a high level of plastic packaging waste, are likely to have the highest risk of land-sourced litter entering the marine environment.

Households and Individuals

A high proportion of litter on land is deposited directly on land by individual pedestrians or motorists. Individual activities giving rise to the generation of litter on land include[22]:

- pedestrians dropping waste directly on the street or into rivers;
- motorists discarding waste out of vehicle windows;
- litter is thrown at a bin and misses it; and
- litter is buried, often under sand at the beach.

However, litter can also be caused by animals tearing garbage bags or through spilling during kerbside collection. Figure A1.2 provides an overview of the litter 'cycle'.

[21] United States Environmental Protection Agency: information available at http://water.epa.gov/type/oceb/marinedebris/md_sources.cfm.

[22] Öko Institut (2012): *op cit.*

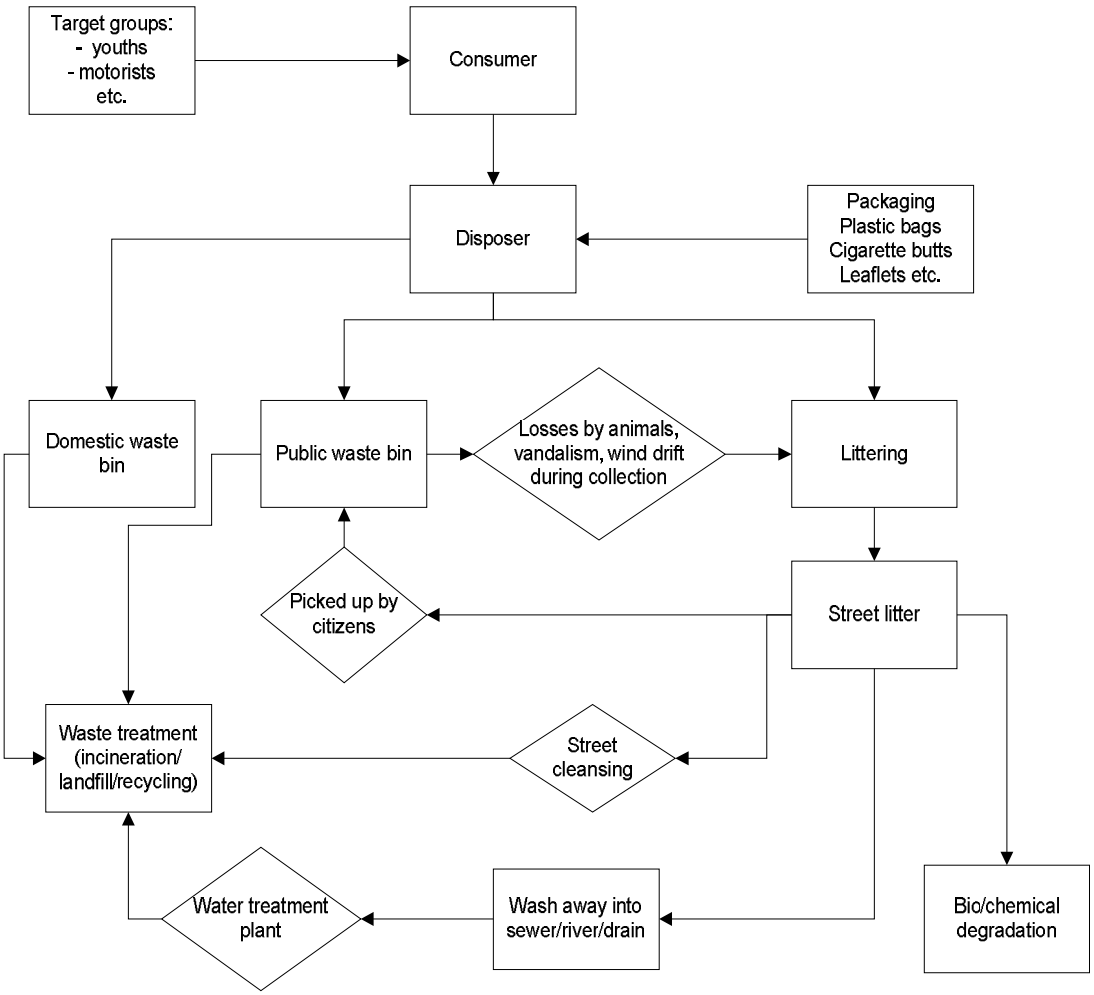

Figure A1.2: Schematic Diagram Showing the Main Sources and Pathways of Litter from Individuals[23]

Major events, whether concerts, art exhibitions or sporting events can cause significant increases in the amount of litter, as large crowds of people leave rubbish. For example, the Glastonbury music festival in the UK generates 2,000 to 3,000 tonnes of waste, from 150,000 staff, performers and visitors over a five day period. Litter is collected during the festival by over a thousand volunteers who generally work three eight-hour shifts picking litter. After the festival, cleaning the site takes a further 10 days to two weeks[24].

Commercial and Business Sources

Similar pathways are responsible for the transport of litter from business and commercial activities on land into the marine environment. For example, pre-production plastics transported in the form of pellets and powders can be accidentally released by spillage. They may then enter the aquatic environment through storm

[23] Based on Bergsma *et. al.* (2001): **Inzamel- en beloningsystemen ter vermindering van zwerfafval, drie concepten voor een aanpak**, CE, Delft.

[24] Peake (2010): *When the Party's Over*, Resource Magazine, No. 59

water drains and discharges, or be spilled directly into waterways during cargo-handling operations at ports or during cargo transport at sea.

The Öko Institut study identified the following commercial activities as potentially contributing to marine litter[25]:

- industrial or manufacturing outfalls (e.g. by-products, plastic resin pellets);
- construction and demolition sites;
- ship-breaking yards; and
- on shore fish-processing.

[25] Moore M and Moore A C (2008): **Synthetic Polymers in the Marine Environment: a Rapidly increasing Long-Term Threat**. Long Beach, CA, USA, Algalita Marine Research Foundation.

ANNEX 2:
UNDERSTANDING THE BEHAVIOUR OF TARGET GROUPS

A2. UNDERSTANDING THE BEHAVIOUR OF TARGET GROUPS

A2.1 Introduction

Improving our understanding of the behaviour of individuals and organisations that are responsible for marine litter can assist with the formulation of effective policy measures to address the problem of litter. Studies show that, on land, individual pedestrians and travellers account for up to 87% of general litter, 3% is from domestic bins (being torn or spilling over), and 4% is commercial/business waste[1]. Most research into littering on land has focused on the behaviour of individuals.

No similar data are available for marine litter. However, the data shown in Table A1.1 in Annex 1 indicates that for some regional seas, materials which can be associated with the workplace, such as fishing nets and rope, can form a significant proportion of total marine litter.

This section examines the factors causing individuals and organisations to litter, first on land and then at sea, in more detail.

A2.2 Factors Influencing Littering Behaviour by Individuals on Land

A2.2.1 Introduction

The Australian *Community Change* developed the Clean Community Assessment Tool (CCAT) for the Australian Beverage Industry Environment Council. It relates litter behaviour to the following primary driving factors[2]:

- context (such as overall 'cleanness' of the location, packaging design, etc.);
- facilities (quality of infrastructure and '*binfrastructure'*); and
- attitudes and perceptions (awareness, opinions and attitudes).

We discuss each of these factors in turn below.

A2.2.2 Context

A number of studies indicate that the condition of an area is likely to affect people's behaviour. An untidy environment sends out a signal that it is acceptable to litter; 'litter attracts litter'.

A 1990 study[3] varied the state of the environment (clean/littered) in an experimental situation. An actor was used to change the impact of this perceived state by either

---

1 ENCAMS (2002): **First Annual Report of the Local Environmental Quality Survey**, downloaded from: http://www.keepbritaintidy.org/ImgLibrary/Local%20Environmental%20Quality%20Survey%20of%20England%202002_2003_597.pdf

2 Community Change (2001): **Measuring Environmentally Desirable Behaviour in Australia**, BIEC.

dropping litter or walking by without dropping litter. The results show that littering behaviour was significantly affected by the state of the environment; people were less likely to drop litter if it was clean and vice versa. However, this effect was stronger when the perceived state of the environment was reinforced by seeing someone either drop litter, or not drop it.

This study is supported by work in the Netherlands, which indicated that the visual appearance of (street) cleaning has a positive impact on littering behaviour. The share of people dropping a flyer was reduced from 38% to 4%-7% when someone was cleaning up litter (Giraf Results, 2010)[4]. However, research in the UK found that many people think that if someone else is paid to clean up litter, then littering can be justified[5].

A Keep America Beautiful study[6] found that smokers are more likely to litter if the environment contains any type of litter, not just cigarette butts. The study found that the context and environment influenced cigarette butt litter more strongly than it does litter in general and estimated that 38% of cigarette butt littering was due to context and environment.

There is also evidence of a relationship between graffiti and littering. An experiment in the Netherlands (Keizer *et al*[7]) found that 33% of people would drop a flyer on the ground in an area free of graffiti, while 69% would drop it in an area with graffiti. The study also showed a relationship between the amount of litter and crime levels in a particular area. An envelope visibly containing a €5 note was left hanging out of a mailbox. The study found that 13% of people passing by stole the envelope when the around the mailbox was free of litter, while 27% stole it when litter was present. Thus, signs of inappropriate behaviour such as graffiti, litter or other damage and decay can lead to a rise in other inappropriate behaviour (e.g. more littering or stealing)[8]. This concept is known as the broken window theory.

Although much of the research on this issue has been carried out in only a few countries, the link between cleanliness of the environment and behaviour is further supported by a European Commission Flash Eurobarometer[9]. The survey, entitled 'Urban Audit Perception Survey: Local Perception of Quality of Life', was based on a questionnaire administered in 31 cities across the EU. There were two relevant questions: the first deals with perceptions of the cleanliness of specific cities by their

---

3 Cialdini et al (1990): *A Focus Theory of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places*, Journal of Personality and Social Psychology, vol 58 no. 6, pp1015-1026.

4 Giraf Results (2010): **Zichtbaar reinigen in Nederland, Impulsprogramma Zwerfafval,** Utrecht, p. 13

5 Lewis *et al* (2009a): **Litterbugs. How to Deal with the Problem of Littering**, Policy Exchange, London.

6 KAB (2009b): **Cigarette Littering Misconceptions,** available at: http://preventcigarettelitter.org/why_it_matters/misconceptions.html

7 Keizer et al (2008): *The Spreading of Disorder*, Science 322: 1681-1685

8 Keizer et al (2008): *op cit*

9 European Commission (2005): **Urban Audit Perception Survey**. Local Perceptions of Quality of Life in 31 European Cities. Flash Eurobarometer 156, Brussels, European Commission

inhabitants and the second perceptions of safety. Most city residents thought that they did not live in a clean city – 57% of those polled thought their city was not clean. In 22 of the cities, the majority thought that their city was not clean. In response to the second questions, some 40% of city-dwellers always feel safe, as opposed to 15% rarely or never. The variation in feelings of security was quite high, from Liege, Athens and Lisbon (where those who never or rarely feel safe actually outnumber those who always feel this way) to Munich, Vienna, Helsinki and Copenhagen (where almost no-one feels completely unsafe).

The most outstanding finding is that perceptions of cleanliness and safety are correlated. Dr Alan Lewis[10] ranked the perceptions of cleanliness 1-31 and compared these with the rankings of safety using the Spearman Rank Correlation Coefficient. This produced a positive correlation of 0.7, which is highly significant statistically. This means that clean cities are perceived as safer or, put another way, dirty cities are unsafe places, which fits with the 'broken windows' theory. It strongly suggests that littering is related to broader structural issues across the EU. There is one noticeable exception to this relationship in the case of Amsterdam which was ranked 23rd (out of 31 cities) for cleanliness yet was perceived as a relatively safe place (8th of 31). Casual observation suggests that things have changed since 2005, as littering has significantly reduced in Berlin and Amsterdam in particular.

Contrary to these findings, however, Keep America Beautiful[11] concluded about 85% of littering is the result of individual attitudes. Its statistical analysis indicated that only 15% of the variance in general littering behaviour was due to contextual factors. While some types of contexts invited more litter, there was a large amount of variability in the behaviours of individuals within a site.

Other factors also play a role in determining the amount of waste that individuals generate and their ability to dispose of it without giving rise to litter. One key factor is packaging design.

The design of packaging influences the chances of it being littered. Wever[12] presents two empirical studies performed at a university cafeteria. The first study looked at the impacts of placing anti-litter labels on packaging, comparable to health warnings on cigarettes. This study was performed using single-use coffee cups with labels which read "*Throw this cup in the litter bin, otherwise it will still be here 6 months from now*". The presence of the label reduced litter significantly.

The second study looked at the influence of re-closability of soft-drink packaging. The study compared a PET bottle with a screw cap with a carton packaging with a tear-off closure. The PET bottle resulted in significantly less litter. Nevertheless, as with other anti-littering strategies, the litter problem was not eliminated entirely.

10 Dr Lewis carried out the analysis for this project in July 2012

11 KAB (2009a) **Littering Behaviour in America; Results of a National Study,** California, Keep America Beautiful.

12 Wever R (2006): **Influence of Packaging Design on Littering Behaviour**, Proceedings of the 15th IAPRI World Conference on Packaging, Tokyo, Japan, October 4-5, 2006, International Association of Packaging Research Institutes

Hence litter reduction through packaging design should be seen as an addition to the tools available for reducing littering rather than a replacement for them.

A2.2.3 Facilities

Lewis *et al* (2009a)[13] stress the relationship between the amount of litter and the number of bins provided. According to a UK survey, 37% of respondents believe that a lack of bins justifies littering and 91% of the public believe increasing the number of bins is the most effective way to reduce litter. Many other studies have also found that the presence of receptacles impacts the incidence of litter, and these findings date back many years. For example, Finnie (1973)[14] used data from Philadelphia, USA, to calculate the probability of people littering in certain contexts. The results found that there was a 34% chance that people would litter in an area with receptacles, while there was a 52% chance that people would litter in an area without receptacles. In addition, it was found that the number, the location and the design of receptacles impact the incidence of litter. Despite the fact that the study is relatively old it is in line with more recent research which indicates that the presence of receptacles reduces littering.

Keep America Beautiful[15] found that most littering occurs at a considerable distance from a receptacle. At the time of improper disposal, the average estimated distance to the nearest receptacle was 29 feet (nine metres). The observed littering rate, when a receptacle was 10 feet or closer, was 12%. The likelihood of littering increased steadily as the distance of the receptacle increased. One of the strongest predictors of cigarette butt littering, for example, is the number of available ash receptacles, either as stand-alone or integrated into a trash can. For every additional ash receptacle, the littering rate for cigarette butts decreases by 9%. Cigarette litter is most common at 'transition points', areas where a smoker must extinguish a cigarette before proceeding, such as outside retail stores, hotels, office buildings; before entering beaches, parks or other recreation areas; and at roadside rest areas, parking lots, bus shelters, and train platforms.

Contrary to these findings, Williams *et al* (1997)[16] observed that in the Australian context receptacles sometimes had little effect on littering behaviour. They found that littering occurred even if a receptacle was within five metres. This was particularly the case for cigarettes.

A UK study concluded that bins should be planned using a case-by-case approach. Looking at pedestrian flows and patterns of use in conjunction with information about local land use and adjacent building types can identify hotspots where there may need to be more permanent bins, and hot times where there may need to be more frequent collections, or larger bins installed temporarily. Clear signage on and around bins is

---

13 Lewis et al (2009a): *op cit*

14 Finnie (1973): *Field Experiments in Litter Control*, Environment and Behaviour, Vol.5 No.2, pp123-144

15 KAB (2010): **Litter in America**, California, Keep America Beautiful. available at: http://www.kab.org/site/DocServer/LitterFactSheet_BEHAVIOR.pdf?docID=5181

16 Williams *et al* (1997): **Understanding Littering Behaviour in Australia**, Beverage Industry Environment Council, Littering Behaviour Study

also important so people know what to put where, as well as being aware of the bins in the first place[17].

The study also concluded that well designed, managed and maintained public spaces tend to be used in a positive way, encourage pro-social behaviour and generate positive social, economic and environmental value for local areas. However, the role of design in ensuring ease of management and maintenance is often overlooked. On the other hand poor quality public spaces which are badly designed, managed and maintained can contribute to, or exacerbate anti-social behaviour such as graffiti, littering and fly-tipping and result in fewer people using those spaces.

Research has also been carried out in the Netherlands on the optimal location, size and type of bins. Guidelines have been drafted to aid public authorities[18]. Guidelines for the design of public space have also been developed. The design of public space determines how easily litter occurs and the ease with which it can be cleaned. The guidelines have been developed to take litter into account when designing a square, a park, a playground, etc. The guide[19] includes a checklist and a collection of case studies for different types of area (residential area, city, industrial area, main roads,…); planning phase (preliminary design, draft or final design, tender specifications, management phase) and object type (waste infrastructure, park, playground, street furniture, car park, water, etc.).

A2.2.4 Attitudes and Perceptions

General Attitudes to Littering

In the context of this study, it is important to examine how littering attitudes amongst individuals differ between EU countries and to understand the basis for these differences, as this could influence the transferability of instruments to prevent littering between different Member States. The Öko Institut attempted to carry out an assessment of the behaviours of citizens in different countries with regard to littering, but concluded that "there was no clear information (e.g. country-specific social structure analysis) available concerning conducive and limiting factors in the different countries".

The European Values Study (EVS), hosted by Tilburg University, comprises a database of questionnaire responses from representative samples of European countries (both inside and outside the EU). The 2008 survey (the most recent readily available) contained two questions relevant to litter:

- the first asks whether dropping litter in public places can be justified or not; and
- the second asks: 'How many of your compatriots throw away litter in a public place?'

---

17 Lewis et al (2009a): *op cit*

18 Nederland Schoon (2005): Litter Bins in Public Spaces - Guidance on Design, Placement, Emptying and Maintenance, 2005 (in Dutch).

19 Ministry of Economic Affairs (nd): Design guide litter, online tool developed by a Commission of the Ministry of Economic Affairs

The first question is a proxy for litter dropping and the second is a measure of social norms (see Section 3.2.3). Across the countries surveyed in the EVS, 69% of respondents felt that dropping litter in a public place was never justified. The highest-performing countries in the 'Never Justified' category (over 80% agreement) were Malta, Croatia, Latvia, Romania and Denmark. The worst (below 50% agreement) were Belarus, Slovakia, Finland and Sweden. Figure A2.1 illustrates these data.

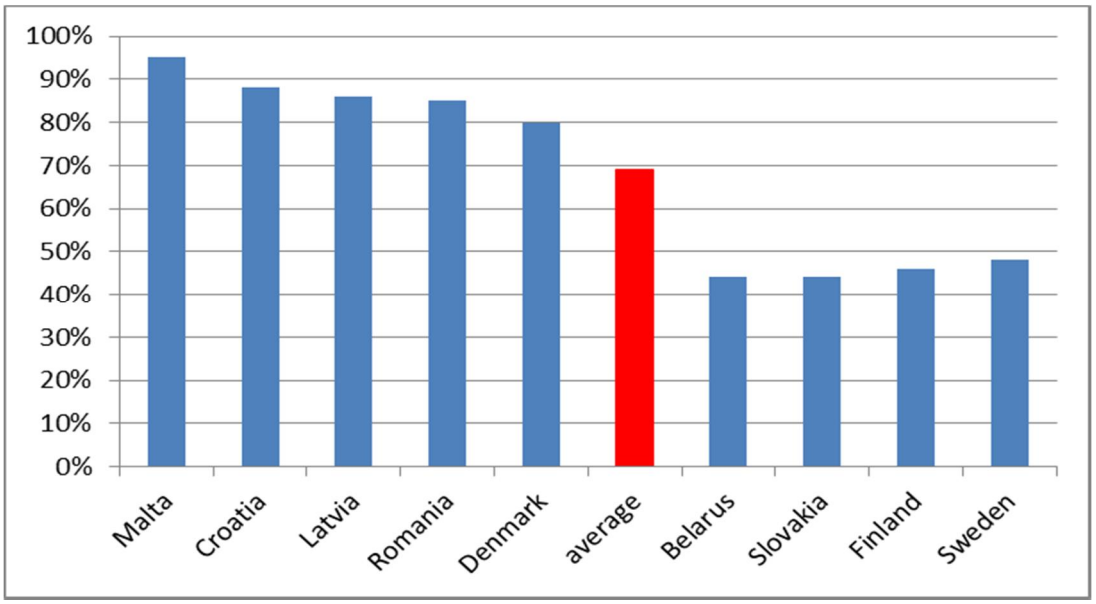

Figure A2.3: Percentage of Respondents agreeing that 'dropping litter in public places can never be justified' (highest five and lowest four responses)
Source: European Values Survey (2008)

Overall, 15% of respondents claimed that almost all of their compatriots throw away litter in public places. The highest number by a long way is Hungary, with a figure of 77%. Other countries with lower but significantly negative social norms are Turkey, Northern Ireland, Greece, Finland and Belarus (28% to 23%). The best performing countries are Denmark, Belgium, Latvia and the Netherlands (all on 4%), France (6%), and Austria (9%). The data are illustrated in Figure A2.2.

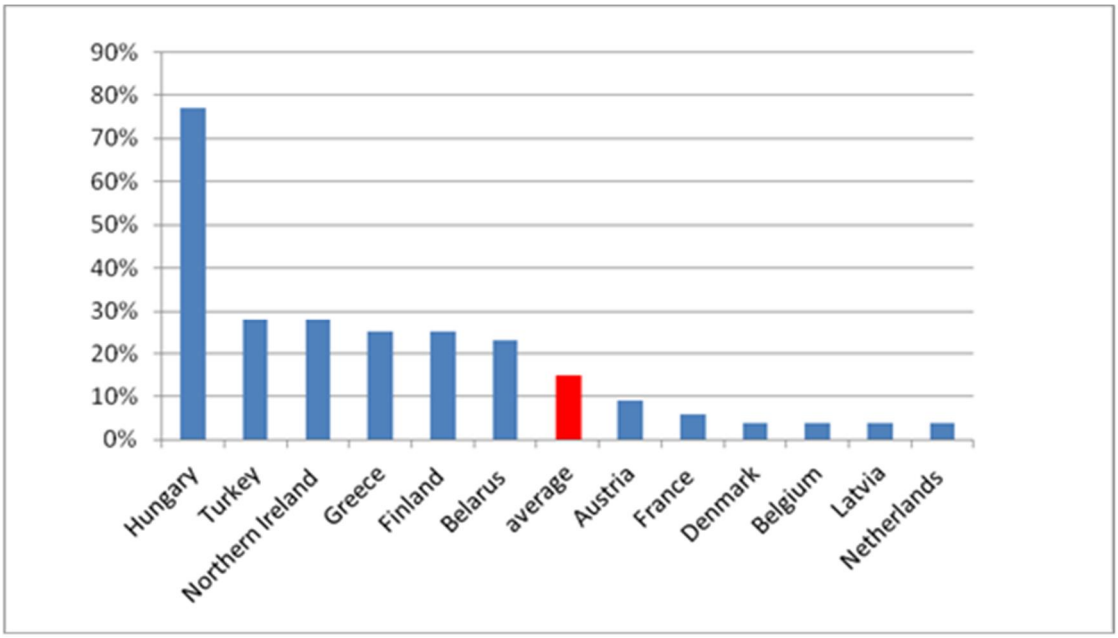

Figure A2.4: % Respondents agreeing that 'almost all of their compatriots throw away litter in public places' (highest six and lowest six responses)
Source: European Values Survey (2008)

A more sophisticated analysis employing data from the EVS and the World Values Survey (WVS) has been attempted by Torgler *et al*[20]. The report shows that answers to the justified littering question are associated in predicable ways for some countries, but not others. For example, in Belgium, Denmark and the Netherlands a belief that littering is not justified is coupled with positive social norms; in general, these correlations are not evident in Central and Eastern European countries.

If littering is related to social-structural factors one would also expect it to be related to other actions where civic duty is lacking e.g. tax evasion. Table A2.1 (over page) presents estimates of tax evasion in OECD countries. It shows that tax evasion is highest in Southern European countries: Greece, Italy, Portugal and Spain with Belgium, Sweden, Norway and Finland not far behind. There is some overlap with the littering data shown in Figures A2.1 and A2.2 above, as there are below average social norms inhibiting littering in Greece and Finland and condemnation of littering is below average in Finland and Sweden.

At its starkest there are two competing models based on *homo economicus* and *homo realitus*. *Homo economicus* is a self-interested individual: he/she will drop litter unless a litter bin is under their nose and will evade tax given the opportunity. To curb this behaviour, fines and detection rates must increase. *Homo realitus* in contrast has a sense of moral and civic duty: tax compliance is voluntary; dropping litter is avoided as it spoils the environment. Here the driving force is one which nurtures voluntary compliance, offering carrots rather than proffering sticks.

[20] Torgler et al (2009): *Environmental and Pro-social Norms: Evidence on Littering*, B.E. Journal of Economic Analysis and Policy, volume 9, part1. http://bepress.com/bejeap/vol9/iss1/art18.

Table A2.1: Tax Evasion in OECD Countries 1989/90 to 2002/3							
Country	**Average % Evasion**						
	1989/90	**1991/92**	**1994/95**	**1997/98**	**1999/2000**	**2001/1**	**2002/3**
Greece	22.6	24.9	28.6	29.0	28.7	28.5	28.3
Italy	22.8	24.0	26.0	27.3	27.1	27.0	26.2
Portugal	15.9	17.2	22.1	23.1	22.7	22.5	22.3
Spain	16.1	17.3	22.4	23.1	22.7	22.5	22.3
Belgium	19.3	20.8	21.5	22.5	22.2	22.0	21.5
Sweden	15.8	17.0	19.5	19.9	19.2	19.1	18.7
Norway	14.8	16.7	18.2	19.6	19.1	19.0	18.7
Finland	13.4	16.1	18.2	18.9	18.1	18.0	17.6
Denmark	10.8	15.0	17.8	18.3	18.0	17.9	17.5
Germany	11.8	12.5	13.5	14.9	16.0	16.3	16.8
Ireland	11.0	14.2	15.4	16.2	15.9	15.7	15.5
Canada	12.8	13.5	14.8	16.2	16.0	15.8	15.4
France	9.0	13.8	14.5	14.9	15.2	15.0	14.8
Australia	10.1	13.0	13.5	14.0	14.3	14.1	13.8
Netherlands	11.9	12.7	13.7	13.5	13.1	13.0	12.8
New Zealand	9.2	9.0	11.3	11.9	12.8	12.6	12.4
UK	9.6	11.2	12.5	13.0	12.7	12.5	12.3
Japan	8.8	9.5	10.6	11.1	11.2	11.1	11.0
Austria	6.9	7.1	8.6	9.0	9.8	10.6	10.8
Switzerland	6.7	6.9	7.8	8.1	8.6	9.4	9.5
Source: Schneider, F: (2005) *Shadow Economies around the World: What do we Really Know?* European Journal of Political Economy volume 21, pp 598-642.							

The complexity of attitudes to littering by individuals is supported by other research. For example, according to one Australian study, the simple characterisation of 'people who litter' and 'people who use bins' is not the best way to distinguish disposal behaviours[21]. In many cases, there appear to be greater differences between different sorts of littering and binning behaviour than there are between people who litter and those who use bins. In the survey results for this study three quarters of the respondents said that it was 'never' acceptable to litter. However, four out of every five respondents indicated that they had littered at some time in their lives. Findings suggest that people might find certain types of littering acceptable and might not even consider them to be littering.

Who Litters?

There is some evidence from the European Values Survey for age variations in the responses, with older people less likely to view littering as acceptable. 58% of respondents between the ages of 15-29 believed that it is never justified to throw litter away in a public place, compared to 69% of 30-49 year olds and 76% of those aged 50 or over. There is some indication that males feel littering is more acceptable than females. Both these findings fit with other literature and are very persuasive, given the large sample size and international scope of the EVS.

[21] Williams et al (1997): **Understanding Littering Behaviour In Australia**, beverage Industry Environment Council

Much of the detailed research into who litters and why has been undertaken in the USA, Canada, Australia and the UK and therefore needs to be assessed in the light of the different attitudes across Europe discussed above. The literature identifies differences in attitudes towards littering by different groups in society. For example, a 2006 survey in Georgia, USA[22] found that men were more likely to drop litter than women, and that young people were more likely to do so than the old. A similar survey in Tennessee[23], carried out for the Tennessee Grocers and Convenience Store Association in 2007, supported these conclusions in line with the findings of a 2006 study from the University of Memphis[24].

Keep America Beautiful[25] also concluded that individuals under 30 are more likely to litter than those over 30, with those aged 19 and below more likely to litter than any other age group. Forbes explains that "although gender is not a major predictor of littering behaviour, the findings indicate that young males are more likely to be gross litterers".

Data collected in a UK study[26] supports the American evidence by pointing out that:

- men are slightly more likely to drop litter (40%) than women (35%);
- people over the age of 44 and under the age of 15 are much less likely to drop litter than those in between; the 15-34 age group are the most persistent litterers;
- people under 25 were most likely to drop litter when in a group of their peers, while those over this age were most likely to drop litter when they were alone; and
- **students and those currently unemployed** had higher than average littering rates, while those with tertiary and post-graduate qualifications had lower than average littering rates.

Furthermore the UK study of 2008 found that:

- 20% of respondents admitted to dropping litter in the previous year, with more men than women, and more in the 18-24 age group than those over 65 admitting to littering;
- people were significantly more relaxed about dropping litter in urban areas than in the countryside;
- those **without a sense of community** were 10% more likely to litter; and
- young people litter more when in groups.

The study found that 42% of smokers, but only 16% of non-smokers, think it is acceptable to drop cigarette litter. This is particularly relevant given the high

22 Responsive Management (2006): **Georgia Residents' Opinion on Litter and Anti-littering programs in Georgia**, study conducted for the Georgia Governor's Office, downloaded from http://www.litteritcostsyou.org/docs/PK_AttitudeSurveyReport.pdf

23 Beck (2007): **Tennessee 2006 Visible Litter Survey**, downloaded from http://www.stoplitter.org/2006%20Tennessee%20Litter%20Survey%20-%20Final.pdf

24 Frode et al (2006): **Public Attitudes Toward Littering in Tennessee**, downloaded from http://www.ktnb.org/Mulitimedia/ktnb-litter-survey-April-2006.pdf

25 KAB (2009c): **Litter America, Executive Summary, 2009** National Litter Research Findings and Recommendations

26 Lewis et al (2009a): *op cit.*

proportion of cigarettes and cigarette filters in marine litter. According to Forbes[27] "1998 survey data suggest that the top five predictors of littering behaviour are **being young, smoking, eating fast food at least twice a week, driving more than 50 miles a day, and going out to bars or other night-time entertainment at least once a week**".

In a more sophisticated analysis, Keep Britain Tidy defined five distinct segments of people who litter, according to their attitudes and behaviour. These are shown in Box A2.1.

Box A2.1: Segmentation of People Who Drop Litter

- People who were **beautifully behaved** comprised 43% of the litter dropping population. They dropped apple cores and small pieces of paper, but little else, and quite often did not see this as a problem. Members of this group were more likely to be female, non-smokers, aged 25 and under;
- **Justifiers** were the second biggest group. They comprised 25% of the total litter dropping population. They justified their behaviour by saying that 'everyone else is doing it' and also blamed the lack of bins for their littering. Justifiers would be embarrassed if someone caught them littering and would pick up the item. They thought that people who littered were lazy. Justifiers were a predominantly male segment. They tended to be smokers and were aged 34 and under;
- The **Life's Too Short** segment were aware that dropping litter was 'wrong' but had more important things to worry about,. **Am I Bothered?** were completely unaware of the consequences of dropping litter and even if they were, would not care. Both groups would not feel guilty if someone caught them littering and would not offer to pick the item up. In some cases, they might be considerably more verbose, aggressive even. They would, however, consider it rude if someone dropped litter in front of them. This group was more likely to contain young male smokers;
- Members of the **Guilty** segment comprised 10% of the total litter dropping population. They knew that dropping litter was 'wrong' and felt guilty when doing so, but carrying it was inconvenient and so they went about littering in a furtive manner. Members of this segment will litter when others are not around to watch them, in the car or at public gatherings. they would feel extremely guilty if someone caught them littering and offer to pick the item up immediately. They regarded people who litter as lazy and inconsiderate.. It was a predominantly female segment, was more likely to be non-smoking and aged 25 and under;
- **Blamers** constituted 9% of the litter dropping population. They blamed their littering on the council for their inadequate bin provision. They also blamed fast food operators, teenagers and manufacturers for over packaging food and other goods. Members of this group would be embarrassed if someone caught them littering and pick it up while making excuses about their behaviour. They thought that people who littered were lazy, but if there weren't any bins, or if the bins were overflowing or full then it was okay. This was a predominantly young, male, smoking segment

Source: ENCAMS (2007): **People Who Litter**. London, Environmental Campaigns Ltd (ENCAMS)

Why Do People Litter?

The motivations behind littering include social norms as well as a lack of awareness about the consequences and the general impact of littering. People who dispose of their litter in designated bins incur a personal cost that could have been avoided by simply leaving the rubbish behind. This voluntary compliance shown by their attitude

[27] Forbes (2009): **Reducing Litter on Roadsides; A Synthesis of Highway Practice,** NCHRP Synthesis 394, Washington, D.C, Transportation Research Board.

is, according to one study[28], primarily driven by social norms or preferences for environmental protection. Differing social norms are presumed to be one of the main reasons for the lack of voluntary compliance with regulations for the public good. As Torgler[29] noted:

> *"Prevailing social norms tend to generate increased individual cooperation in public good situations and, in some instances, in private good situations as well."*

There is a growing literature substantiating the view, simply put, that when littering is 'normal' more litter is dropped[30]. This is supported by research into how social norms affect other aspects of behaviour, such as the payment of taxes. Box A2.2 (over page) summarises recent research in this area.

A UK survey[31] identified a number of attitude-related reasons why people litter, including:

- it is seen as someone else's responsibility (i.e. someone else, generally the local authority, will clear up the litter);
- it is not really littering (e.g. because the litter is biodegradable); or
- laziness.

The issue of dropping biodegradable materials being seen as 'not littering' is particularly problematic with regards to marine litter. Degradation in seas happens under different conditions than ambient degradation on land (e.g. cooler temperatures). Without clarification of what is meant by 'biodegradable', littering might be adversely affected if consumers start to discard such plastics into the environment, assuming that the bags will easily decompose and disappear. In order to avoid misleading assumptions it is vital to assess whether the promised biodegradability occurs in the (marine) environment which would thus contribute to a reduction of marine litter.

Box A2.2: Social Norms and the Payment of Taxes

In a similar question to the 'justified littering' question in the European Values Survey, Alm and Torgler[32] investigated responses to a question in the World Values Survey (WVS) which asks whether cheating on tax 'if you had the chance' can be justified or not on a scale of '1' (never justified) to '10' (always justified). Their results show that 20% of the total variance of the shadow economy across 17 countries can be explained by variations in tax morale.

A number of implications can be drawn from this evidence. In countries where tax authorities are inefficient and opportunities for evasion are rife, less tax is collected. Something similar might be said

28 Torgler et al (2009): *Environmental and Pro-social Norms: Evidence on Littering*, B.E. Journal of Economic Analysis and Policy, volume 9, part1. http://bepress.com/bejeap/vol9/iss1/art18

29 Torgler et al (2008): *op cit*

30 Cialdini et al (1990): *A Focus Theory of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places*, Journal of Personality and Social Psychology, vol 58 no. 6, pp1015-1026; Ramos and Torgler (2012): *Are academics messy? Testing the Broken Windows Theory with a field experiment in a work environment* (under review).

31 Lewis A et al (2009a): *op cit.*

32 Alm and Torgler (2006): *Cultural Differences and Tax Morale in the United States and Europe*, Journal of Economic Psychology, volume 27 part 2, pp224 – 226.

Box A2.2: Social Norms and the Payment of Taxes

about littering: when littering is not condemned by citizens and social norms inhibiting littering are weak, it is likely that more littering occurs; where fines are not in evidence it is likely that more littering occurs. (In this context, it is notable that fines for littering are comparatively rare and there is no legal duty to clean up in some European countries).

In an experimental study[33], Lewis, Carrera, Cullis and Jones (2009) compared hypothetical tax evasion decisions from among a sample of UK and Italian students. Italian respondents were more likely to evade (as were males and students studying economics). In the experiment, as in real life, many respondents, particularly non economists, did not see tax evasion as a calculated gamble, as the social norm was to comply. It is difficult to explain these cultural variations in terms of the differing tax burdens or tax systems of the two countries as they are broadly similar.

Belief in the integrity of government (and relevant government departments) and participatory democracy are at the heart of civic duty and tax compliance. A similar belief may be important in the case of littering. For sticks to be effective there must be a consistent political will backed by citizen support; again, it is likely that similar requirements apply in the case of littering. Many tax authorities focus on recovering taxes through their investigations and the imposition (or threat) of audits and fines[34]. Some contemporary tax authorities only use sticks as a last resort, treating tax payers as clients rather than adversaries[35] (Braithwaite and Wenzel 2008). The softer approach is one which recommends that tax compliance is associated with a positive tax morale

Littering can also be influenced by the perceived likelihood of being seen or caught. For example, Keep Britain Tidy noted that motorists throw litter out of their cars, thinking that they will not be seen[36].

Reasons for littering appear to differ between different groups of litterers. For example, Keep America Beautiful37 identified a number of reasons why smokers litter. Many smokers see cigarette butts as small and insignificant pieces of litter. They tend to overlook the consequences of littering. Similarly, cigarette litter research in Australia found that many smokers:

- do not believe littering their cigarette butts is inappropriate behaviour;
- consider dropping butts into gutters or storm drains as a safe way to extinguish a cigarette[38]; and
- blame their littering on a lack of well-placed bins for cigarette butts.
- Factors Influencing Workplace Littering on Land

We identified only limited research into factors influencing littering involving commercial/business waste and litter arising from the waste management chain. For

[33] Lewis A *et al* (2009b): *Individual, Cognitive and Cultural Differences in Tax Compliance: UK and Italy Compared*, Journal of Economic Psychology, volume 30, part 3, pp431-445.

[34] Slemrod (2007): *Cheating Ourselves: The Economics of Tax Evasion*. Journal of Economic Perspectives, volume 21 part 1, pp25-48.

[35] Braithwaite and Wenzel (2008): **Integrating Explanations of Tax Evasion and Avoidance**. In Lewis (ed): Psuchology and Economic Behaviour, Cambridge, Cambridge University Press..

[36] ENCAMS (2007): **People Who Litter**. London, Environmental Campaigns Ltd (ENCAMS)

[37] KAB (2009b): **Cigarette Littering Misconceptions,** available at: http://preventcigarettelitter.org/why_it_matters/misconceptions.html

[38] McGregor Marketing (1998): **Please Bin Your Butts: A Comprehensive Study Into Cigarette Butt Litter,** Keep Australia Beautiful.

example, a 1993 study by the US EPA[39], working with the Society of the Plastics Industry, identified the following causes of releases of plastic pellets into the aquatic environment from the plastics industry:

- lack of recognition of the need to avoid plastic pellet losses, due to poor communication along the supply chain;
- lack of employee awareness of the environmental impacts of spillages and their responsibility for controlling pellet releases;
- inadequate containment facilities, to prevent spilt pellets entering the aquatic environment;
- careless routine operations (e.g. damage to packages through improper operation of forklift trucks);
- inadequate housekeeping practices (if pellets are not quickly picked up after a spillage they can rapidly be scattered and may enter the aquatic environment);
- easily damaged and leaky packaging;
- improper shipping practices; and
- lack of recycling.

Although this study was carried out in the USA, the prevention programme developed as a result has been used as a model by industry associations in the EU, indicating that its findings are considered widely applicable.

These are similar to the factors affecting littering by individuals, discussed above. They include context (e.g. inadequate housekeeping practices), facilities (e.g. inadequate containment facilities) and attitudes. This is not surprising; it is likely that the behaviour of people at work is similar to their behaviour outside work, so that similar factors will influence littering of business and commercial waste by people.

Although not directly related to littering in the workplace, a company survey for the UK Environment Agency[40] identified a number of behavioural characteristics amongst companies that could affect littering by employees. For example, most companies of all kinds claimed to encourage staff to recycle (85% of those questioned) and to comply stringently with environmental regulations (84%). However, more specific measures to ensure that such requirements are followed are less widespread. For example, only 42% had accredited environmental systems and only 28% had corporate social responsibility (CSR) policies. The survey also highlighted divisions by size: although environmental management systems and CSR are commonplace amongst large organisations (around 72%), they are still rare amongst small companies (15%).

39 EPA (1993): **Plastic Pellets in the Aquatic Environment Sources and Recommendations**, available online at: *http://water.epa.gov/type/oceb/marinedebris/upload/2009_11_23_oceans_debris_plasticpellets_plastic_pellets_summary.pdf*

40 Ipsos Mori (2012): **Influencing Business Behaviour: Enabling the Wide-Scale Adoption of Electronic Duty of Care Within the UK**. Report for the Environment Agency, downloaded from: http:/www.environment-agency.gov.uk/static/documents/Business/edoc_Market_Research_Report.pdf

A2.3 Factors Influencing Littering at Sea

A2.3.1 Introduction

In general, the literature makes little reference to 'littering' in the marine context. It is difficult to be certain that items which end up in the sea or upon the seafloor are due to littering. Other causes may include planned waste disposal (although the introduction of the MARPOL Protocol in 1978, specifically Annex V, prohibits "the disposal into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags"), accidents etc. Hence the term 'debris' is also used to refer to all types of material which are unwanted in the marine environment. Ports tend to refer to 'waste' rather than litter, which is regarded as a generic term.

Compared to observation on land, monitoring the release and subsequent quantification of ship-based litter is notoriously difficult, relying upon use of suitable vessels and weather conditions. It is theoretically possible to estimate the types and quantities of solid waste generated by ships and pleasure craft by multiplying the number of people at sea in a given activity by the average amount of solid waste produced by that activity. The results could then be extrapolated to give the total amount of litter in the marine environment (see, for example, Dixon and Dixon[41]). However, the method is limited by the assumptions made concerning the number of ships and pleasure craft using the sea, the size of the ships and crew and the type, quantity and fate of materials generated. The method requires extensive preliminary research and is not reliable and does not produce a reliable estimate.

A2.3.2 Who Litters at Sea and Why?

Only very limited information is available about who litters at sea and the reasons for littering, and few recent studies appear to have addressed this issue:

- Katsanevakis[42] notes that merchant and cruise ships are still known to dump rubbish at sea. For example typical cruise ship debris items (small containers of shampoo, conditioner, body lotion, plastic cups etc) are still found in beached litter[43] [44];

- a study in the North Sea by Horsman[45] estimated that each crew member on a trading vessel dumps 0.2 cardboard boxes, 0.3 plastic items (6-pack yokes, wrappings, bags), 0.2 bottles and 3.2 tins at sea each day. It is unclear from the

41 Dixon and Dixon (1983): *Marine Litter Distribution and Composition in the North Sea.* Marine Pollution Bulletin, volume 14, issue 4, pp 145 – 148.

42 Katsanevakis and Katsarou (2004): *Influences on the Distribution of Marine Debris on the Seafloor of Shallow Coastal Areas in Greece (Eastern Mediterranean).* Water, Air and Soil Pollution, volume 159, pp 325 – 337.

43 Wallace (1997): *A Strategy to Reduce, Control, and Minimise Vessel-Source Marine Debris*, in: Marine Debris – Sources, Impacts and Solutions, Coe, J.M *et al,* New York, NY: Springer; pp. 277-286.

44 Gregory (1999): *Plastics and South Pacific Island Shores: Environmental Implications*. Ocean and Coastal Management, volume 42, pp 603-615.

45 Horsanman (1982): *The Amount of Garbage Pollution from Merchant Ships*. Marine Pollution Bulletin, volume 13, pp 167-169.

study to what extent this is individual action by crew members (littering) or deliberate (illegal) waste disposal and whether the ship owners encourage or penalise such action;

- a Finnish study[46] of the Gulf of Bothnia and the Åland Islands, as found that most of the litter that could be identified originated from cruise liners transiting between Finland and Sweden and recreational boating. It is not clear, though, if this was accidentally dropped by passengers or crew or deliberately disposed to sea. In the western Gulf of Finland, the origin of the litter could be recognized from the printed markings on the individual items about 30 percent of the time – it was primarily from cargo ships; and

- illegal waste disposal at sea is recognised to be a problem in the Caribbean due to a lack of adequate reception facilities for most ports in the region[47] (UNEP, 2005) and a particularly acute problem for most of the small island developing States, whose ports are frequently visited by cruising ships.

Only one study specifically considered reasons for littering. A study of reports from observers on foreign vessels operating in the Australian fishing zone during the early 1990s noted that around half of the vessels carrying observers did not comply with MARPOL provisions. The reasons for non-compliance included:

- lack of knowledge of MARPOL regulations;
- the attitude of the captain and/or crew; and
- poor waste management practices either due to a lack of facilities on board or inadequate facilities at port[48].

These findings are supported by a 1995 report[49] by the UK Maritime and Coastguard Agency, which recommended that that there was a need for a "mariners" waste handbook which detailed good practice.

A2.3.3 Facilities

Much reference is made in studies on of sea based sources of litter to the adequacy of reception facilities at ports for waste[50]. Directive 2000/59/EC on port reception

46 Tuomisto (1994): **The Effects of Marine Litter on Marine Species and Litter in the Finnish Sea Areas**. Graduate study, Helsinki University, Laboratory of Hydrobiology (in Finnish).

47 UNEP (2005a): **Marine Litter and Abandoned Fishing Gear**. UNEP Regional Seas Programme, Report to the Division of Ocean Affairs and the Law of the Sea, Office of Legal Affairs. UNHQ. Regional Seas Coordinating Office, UNEP, Nairobi.

48 Jones (1995): *Fishing Debris in the Australian Marine Environment*, Marine Pollution Bulletin volume 30, part 1, pp 25–33.

49 Maritime & Coastguard Agency (1995): Survey of UK Reception Facilities for Oil and Garbage. Project 352. Referenced in Fanshawe *et al.*(2002): **The Impacts of Marine Litter - the Marine Pollution Monitoring Management Group**, Report of the Marine Litter Task Team (MaLiTT), May 2002. Available at: http://www.scotland.gov.uk/Uploads/Documents/Impacts%20of%20Marine%20Litter.pdf

facilities for ship-generated waste and cargo residues sets out requirements for litter provision at ports. However, it is not clear what pressure there is upon ships from ports to minimise their waste, and to what degree this may affect illegal waste disposal at sea, or littering. In the UK, for example, the MARPOL North Sea 'Special Area' designation has affected port regulations on the amounts of waste that should be landed by ships and the subsequent requirement for waste reception facilities (as part of the Port Waste Management Plan). Up to 4 m^3 per ship can be landed, within a Mandatory Waste Fee of £42.83. Anything more must be disposed of at market rates following negotiation with a waste contractor. International catering waste is not allowed in these facilities.

A legal requirement is that ships (or agents acting on their behalf) must advise the port up to 24 hours in advance of arrival of the amount of waste they intend to land by filling in an online waste form. The port owner is obliged to report vessels that do not complete the form to the Maritime and Coastguard Agency, which may target such ships for inspection; onward destination ports/terminals will also be warned of their non-compliance.

A lack of facilities has also been identified as an influencing factor in littering by fishermen. The reasons why fishermen abandon or discard fishing gear at sea have been identified by FAO/UNEP[51] as:

- abandonment of gear due to illegal fishing or too much gear for time; or
- discarding gear due to too much gear for space, discarding chosen over onshore disposal or because gear is damaged.

The lack of convenient harbour-side collection facilities can result in fishermen having to dispose of unwanted gear in municipal waste facilities. This can involve both time (with associated costs) and charges imposed for disposal, if indeed such disposal is permitted at all. Therefore, there may be strong incentives to deliberately discard gear at sea, or to illegally dump it at other land-based locations. Even where convenient shore side facilities are provided for collection and disposal of unwanted gear, if costs are set too high there may still be some economic incentive for fishermen to discard unwanted gear at sea.

It appears likely that similar reasons of cost and convenience lie behind littering from commercial activities, both at sea an on shore. However, the lack of research on these types of littering makes this hard to confirm.

[50] For example UNEP (2005a): **Marine Litter and Abandoned Fishing Gear**. UNEP Regional Seas Programme, Report to the Division of Ocean Affairs and the Law of the Sea, Office of Legal Affairs. UNHQ. Regional Seas Coordinating Office, UNEP, Nairobi.

[51] FAO/UNEP (2009) **Abandoned, lost or otherwise discarded fishing gear,** Rome, available at: ftp://ftp.fao.org/docrep/fao/011/i0620e/i0620e.pdf

A2.4 Implications for the Selection of Measures

A2.4.1 Introduction

The research into target groups for littering has a number of implications for the selection of measures to prevent littering. Because the research focuses on target groups in terms of individuals, the implications are clearest for measures targeted at individuals.

The lack of research findings on reasons behind littering linked to commercial and business activities, though, means few conclusions can be drawn on targeting measures at these groups.

A2.4.2 Targeting of Particular Groups of Individuals

Keep Britain Tidy, in the UK, has used market segmentation (described in Box A2.1) to target its anti-littering activities by prioritising the groups to be addressed and developing an appropriate strategy that met their requirements[52]. Information was obtained about the preferences of each target group – the types of newspapers and magazines they read, the television programmes they watched, etc. These profiles and the results of an annual litter survey are used to decide who to campaign to, about what, and how.

Ways of targeting younger people, who represent a clear market segment for focused messaging and campaigns, have been suggested in the USA. Research from the US highlights the need to actively involve young people in clean-up and remediation activities. Involving individuals in clean-up activities can help to raise their awareness about litter as an issue, and increase their commitment to prevent litter[53].

Keep Britain Tidy[54] examined ways to develop an effective anti-litter campaign targeted at 13-16 year olds. It reviewed existing advertising, as well as semiotics; language, images, etc. which may capture the imagination of this age group. It claims that for this age group it may be too big a challenge to make binning litter cool, as there are so many deeply entrenched attitudes surrounding this (goodie-goodies, geeks, etc). However, tackling the problem from the other angle, by making it unattractive to drop litter may prove more successful.

Campaigns against other aspects of anti-social behaviour also provide examples of targeting particular groups. For example, the UK Bike Awareness campaign, 'Think Bike, Think Biker', encourages safe driving and road awareness by both motorcyclists and drivers of other vehicles. It promotes a positive image of motorcyclists identifying riders as real people with lives, families and friends. The campaign reflects the diversity of the riding community and gives the riders' real names and

---

52 ENCAMS (2007): People Who Litter. London, Environmental Campaigns Ltd (ENCAMS)

53 Schultz and Stein (2010): **Litter in America**, 2009 national litter research finding and recommendations. Executive Summary

54 Rowland (2003): **Semiotic Development of ENCAMS Anti-Litter Campaigns**, downloaded from http://keepbritaintidy.org/ImgLibrary/youth%20litter_semiotics_657.pdf

home towns in order to bring local relevance to the message. Similarly, UK campaigns against drink-driving target male drivers, delivering messages about the risk of loss of livelihood and reputation as a result of drink-driving. For younger drivers, famous faces have been used. For example, Michael Schumacher and Rafael Nadal have contributed to drink-drive campaigns.

Often, public awareness efforts are directed towards children, since they are responsive and easily accessible, and it is believed that they can influence adult attitudes[55]. UNEP's Regional Seas programme has targeted children by printing leaflets designed with pictures and quizzes. Other initiatives targeted at young people include paper and plastic collection campaigns in primary and high schools as well as used cooking oil collection.

A2.4.3 Integrated Approaches

In general, the literature reviewed calls for an integrated, long-term approach to tackle the litter problem effectively. For example, Ten Brink *et al*[56] conclude that deposit/refund systems and taxes are likely to be more effective if they are incorporated into a broader litter prevention strategy. This may include activities such as monitoring, research, education and provision of facilities and resources. Thompson *et al*[57] call for a 'paradigm shift' in order to effectively address the problem of marine litter; the range of available management measures needs to be broadened. Currently, measures are predominantly 'end of the pipe' responses, rather than preventive. They do not address issues of waste generation and disposal.

Some studies indicate[58] that anti-litter behavioural campaigns have little lasting effect unless they are part of a more comprehensive strategy. This may require many different activities such as education, convenience, attitude, social norms, clean-ups, design, etc[59]. Integration of strategies across regions or countries may increase efficiency.

For example, children participating in paper collection campaigns may become aware of the importance of paper recycling but they will know little about why it would be important to selectively collect waste and what the impacts might be. Therefore, these campaigns would need to be accompanied by education, but also be maintained for a longer time period and coordinated horizontally as well as geographically to allow for greater cohesion. Connecting these initiatives would allow for easier

55 UNEP (nd): **Public Education, East-Asia and the Pacific**, downloaded from http://www.unep.or.jp/ietc/estdir/pub/msw/ro/Asia/Topic_j.asp, last accessed 17 May 2012

56 Ten Brink, et al (2009): **Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter,** Institute for European Environmental Policy (IEEP), Brussels, Belgium, and Sheavly Consultants, Virginia Beach, Virginia.

57 Thompson et al (2011): **Marine Debris: Defining A Global Environmental Challenge**, prepared for STAP.

58 Cialdini et.al. (1990): **A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places**, Journal of Personality and Social Psychology, vol 58, no.6, pp. 1015-1026; Ramos and Torgler (2012): *Are academics messy? Testing the Broken Windows Theory with a field experiment in a work environment* (under review).

59 UNEP (nd): **Public Education, East-Asia and the Pacific**, downloaded from http://www.unep.or.jp/ietc/estdir/pub/msw/ro/Asia/Topic_j.asp, downloaded 17 May 2012

comparison of effectiveness and coordination of the data collected. It may also enable economies of scale in terms of design, operation and publicity.

The 'Use More – Waste Less' campaign launched by the Danish Environment Ministry in the second half of 2010 is an example for integrating various elements within one campaign. In order to encourage waste reduction the initiative included elements such as a website, Facebook profile, cooperation with network partners, events, press releases, etc. The campaign has been reviewed and the key findings are described below in Box A2.3.

Box A2.3: The 'Use More – Waste Less' Campaign

The impact evaluation of the campaign involved three elements:

- a total of 1 578 quantitative interviews with Danes in the target group (15-75 years). This intended to measure public awareness of waste prevention as well as the effect of the campaign;
- five qualitative interviews undertaken with network partners who participated in the campaign. This part of the study was designed to provide a picture of the effect of network partners' efforts, and to evaluate cooperation with network partners and their incentive to participate in the campaign; and
- a development workshop aimed to provide input for a follow-up campaign, which is expected in 2012. The workshop was attended by representatives from the Environmental Protection Agency and selected partners.

Based on the analysis, the evaluation team made the following recommendations for future campaigns:

- PR effort is extremely important to spread information widely about a 'low interest' topic such as waste prevention;
- social networks work well to draw attention to a campaign among those who already have some kind of interest in the subject;
- there is great potential to use interested groups as 'ambassadors' to promote the campaign further, acting leading figures in the campaign, and help to ensure that more people become engaged;
- there is also a potential for linking campaign messages to channels which have a close connection to the subject and are where people would look for information (e.g. messages on garbage trucks or events). You should not expect target groups seek out information themselves;
- cooperation between the authorities and other partners must increasingly be exploited so that the group as a whole is able to communicate more broadly to the target audience and ensure greater impact than each can achieve alone.

Source: Miljostyrelsen (2011): ***Effektevaluering af kampagnen 'Brug mere – spild mindre'****. Copenhagen, Miljostyrelsen, 13 July 2011. Downloaded from: http://www.mst.dk/NR/rdonlyres/69D1FFA4-91B9-4CBB-ADED-AB167D46A8A4/0/Evalueringaf_Brugmerespildmindre_13juli2011.pdf*

As a result of research into the effectiveness of anti-litter campaigns, Keep Britain Tidy has recommended that a range of coordinated measures is necessary to tackle litter:

- streets should be cleaned to a consistently high standard at all times of day and night;
- there should be bins in the right places, and information about alternative disposal options and what to do with litter in the event of a bin not being available;

- education and awareness raising campaigns should challenge attitudes towards litter and must be backed up by effective enforcement; and
- for some litter droppers, enforcement is the only thing that will change their behaviour.

Examples from campaigns against other aspects of anti-social behaviour also indicate the value of a holistic approach. For example, the UK's 'Graffiti Hurts' group[60] indicates that a range of measures can be combined to address the problem of graffiti. These include proper and rapid removal of graffiti, installing lighting, keeping neighbourhoods tidy, educating about and enforcing anti-graffiti laws, controlling access to various areas (rooftops, etc.), stepping up security, avoiding showing graffiti in the media and adopting a mural wall. According to the organisation, murals are rarely defaced by graffiti and instil a sense of pride among those who live nearby. A community mural is generally seen to reduce or even eradicate incidents of illegal graffiti and it also brightens up the area.

Campaigns need constant updating and refining, as they become less effective over time. In the UK, for example, it is thought that the traumatic images and scare tactics of previous campaigns against drink-driving are no longer effective, and a different approach has now been adopted.

A2.4.4 Changing Social Norms

Social norms which encourage environmentally friendly behaviour result in a very cost effective way of keeping litter levels low. However, moulding social norms is not something which can be easily achieved. A report by the UK House of Lords found that a whole range of measures – including some regulatory measures – will be needed to change behaviour in a way that will make a real difference to society's biggest problems[61].

The concept of pro-social behaviour is widely practiced in daily life. Several theories explain conditional cooperation in terms of reciprocity. In addition, the concept of conformity has been used to explain conditional cooperation. Conformity refers to the motivation of individuals to fulfil social norms and, therefore, acting according to society's rules[62]. In an environmental context, conformity means, for example, that if many individuals don't throw litter in a public place, other individuals feel obliged to do likewise

A critical mass of cooperative individuals is required to induce a positive dynamic process of conditional cooperation that assures that the cooperative equilibrium is reached. On the other hand, a society which has many non- compliant individuals will inherit a weak social norm. In the case of littering, this can lead to a "littering trap".

---

60 Graffiti Hurts (2003): **Graffiti prevention**, Creating a Community Mural downloaded from http://www.graffitihurts.org/pdf/mural.pdf

61 House of Lords (2011): **Behaviour Change**. Report of the Science and Technology Select Committee. London, HMSO, 19 July 2011

62 Torgler et al (2009): *Environmental and Pro-social Norms: Evidence on Littering*, B.E. Journal of Economic Analysis and Policy, volume 9, part1. http://bepress.com/bejeap/vol9/iss1/art18.

This is supported by research in other fields of behaviour. For example, studies carried out by Christakis and Fowler[63] found that relationships and social networks are a strong determinant of behaviour. They found that smoking behaviour (with a focus on smoking cessation) spreads through close and distant social ties. Groups of interconnected people stopped smoking in concert and people were more likely to quit smoking if people close to them also quit at the same time. In an earlier study[64,] they found that obesity was influenced by those around you. They suggested that social networks facilitate the spread of obesity. However, this finding is contended by Cohen-Cole and Fletcher (2008)[65]. While they do not completely rule out the possibility of induction and person-to-person spread of obesity, they suggest that shared environmental factors can cause the appearance of social network effects.

A study in the Netherlands by De Kort[66] on activation of pro-social norms used trash can design as a way of activating social norms against littering. The study concluded that it is important to provide some sort of prompt, at or near the littering site, to help activate individuals who already have anti-littering norms. Interestingly, the study indicated that older age groups had stronger personal norms against littering than younger age groups, who may therefore be less susceptible to such an approach.

Lewis *et al*[67] chose a similar experimental approach to assess the impact of educational materials on littering behaviour. The experiment took place in a cinema, a venue that could be closely controlled, yet still be an accurate representation of normal life. Managers reported that the social norm in a cinema is to litter, due to the fact that it is often seen as part of the service. As the time and effort required of patrons to dispose of litter correctly on the way out of the cinema is minimal, the researchers hoped that by making a relatively minor psychological intervention they might change behaviour.

For each film viewing that was monitored, one of three interventions was used. These interventions were in the form of flyers. The first simply advertised a forthcoming film – the "control" condition; the second contained the same information plus a direct appeal, which read:

> *Contrary to what people might think it is not OK to litter in this cinema. Thank you;* while in the third this wording was replaced with: *Please help us to keep your cinema tidy by using the bins outside the auditorium. Thank you.*

The data shows that simple interventions, whether "direct" or "polite", coupled with accessible bins, reduced litter by nearly a third (32.2%).

---

63 Christakis and Fowler (2008): *The Collective Dynamics of Smoking in a Large Social Network,* The New England Journal of Medicine, 2008, issue 358, pp. 2249-58.

64 Christakis and Fowler (2007): *The Spread of Obesity in a Large Social Network over 32 Years,* The New England Journal of Medicine 2007, issue 357, pp.370-379

65 Cohen-Cole and Fletcher (2008): *Is Obesity Contagious? Social Networks vs. Environmental Factors in the Obesity Epidemic,* Journal of Health Economics, Volume 27, Issue 5, September 2008, Pages 1382-1387

66 De Kort (2008): **Persuasive Trash Cans Activation of Littering Norms by Design**, Sage Publications, Eindhoven University of Technology

67 Lewis A et al (2009a): *op cit*

Similarly, research by Keep Britain Tidy[68], indicated that teenagers were happy to admit to littering and appeared to have a total lack of guilt regarding littering. They were more likely to litter when in groups, but less likely to litter with their parents as this is the social norm. Littering is often seen as a cool thing to do. It is a form of rebellion. Therefore, a drive towards educating younger members of the public is not as simple as just telling them that dropping litter is bad. There needs to be a fundamental change of narrative to ensure dropping litter is not just driven by behaviour but by the fundamental values underlying behaviour. This is one of the reasons why early education in environmental awareness is important. Campaigns in environments such as schools and training grounds, where children and young adults interact with each-other can be especially beneficial as the group behaviour can influence the individual.

One study also found that environmental morale, and thus pro-environmental social norms, is strongly correlated with several socio-economic and environmental variables[69]. In poor socio-economic conditions individuals are more likely to focus on providing for their basic needs and environmental awareness is established once these needs have been met. Pro-social behaviour occurs voluntarily and is linked with public as well as private goods.

Research in the Netherlands[70] compared different ways to trigger norms to prevent household waste being deposited next to waste containers. Six measures were tested, and four of these proved to have a significant effect:

- ***descriptive norm***: placing a sign that states: "Help us keeping it clean: almost all residents don't deposit garbage next to the waste container". A descriptive norm is a description of 'normal behaviour'. People don't like to be different, so if they receive the message that everybody keeps the container area clean, they will be encouraged to also keep it clean. This reduced the frequency (number of days waste was dumped) by 40% and the amount of waste by 22%;

- ***regulatory***: placing a sign that states: "Don't put garbage next to the waste container: it can cost you money. X number of residents have been sanctioned". This reduced frequency by 50% and the amount of waste by 23%. It indicates that even the threat of possible sanctions can be effective;

- "***foot in the door***": a tactic that involves getting a person to agree to a large request by first setting them up by having that person agree to a modest request. Residents were asked to accept a sticker "For a clean neighbourhood", which most residents did. Putting garbage next to the container would be in conflict with their

[68] ENCAMS (2004): **I'm Just a Teenage Dirtbag, Baby!,** Wigan, ENCAMS, available at: http://www.keepbritaintidy.org/ImgLibrary/Teenage%20Dirtbag_609.pdf

[69] Torgler et al (2009): *Environmental and Pro-social Norms: Evidence on Littering*, B.E. Journal of Economic Analysis and Policy, volume 9, part1. http://bepress.com/bejeap/vol9/iss1/art18

[70] Dijksterhuis and Vanbaaren (2010): **Voorbij Bijplaatsingen, gedracht sinterventies voor het effectief terugdringen van bijplaatsingen bij afvalcontainers**, downloaded from http://www.samenwerkenaaneenschonernederland.nl/images1/acm35/bestanden/Rapportage%20Voorbij%20Bijplaatsingen_0.pdf

earlier commitment, so people who accepted the sticker were more likely to keep the area clean (35% reduction in frequency, 24% less waste); and

- ***clean keeps clean***: keeping the waste container area clean (18% lower frequency, 30% less waste).

The measures that did not have a significant effect were:

- the installation of a ***mirror*** (facing people with their own misbehaviour)
- ***injunctive norm***: a description of what should be 'normal' behaviour. In the experiment, a sign was put with the statement "Please don't put garbage next to the container. This keeps the neighbourhood tidy" and with a picture of a man dumping garbage crossed out in red.

Results from campaigns against other aspects of anti-social behaviour indicate that social norms can be altered, but only through a long-term approach[71]. For example, information from the UK on-line community, 'drinkdriving.org'[72], shows that from 1988 to 1994 the number of drink-driving accidents in the UK fell by 74%. It is suggested that this decline is a result of dramatic advertising campaigns and increased use of breathalysers and penalties. Statistics also show that even though the number of accidents has been rising since 1994, they have not yet reached the 1988 level. The sustained, multi-pronged approach to the campaign has gradually had an impact on social norms and public morality. It is claimed that the impact of the campaign can be credited to a combination of effective marketing pitched to target audiences, law enforcement and media coverage.

Behaviour change theorists have found that increasing knowledge or awareness about the need to change behaviour does not result in a change in behaviour if implemented on its own[73]. For example, anti-smoking campaigns focusing on health risks to smokers have limited effect; most smokers know the dangers but still smoke. Therefore, contemporary campaigns now increasingly target other issues, such as social aspects (family and friends) or whether we have the self-efficacy to change.

A2.4.5 Approaches Suggested in the Literature

A review by UNEP[74] of Regional Action Plans (RAPs) on the management of marine litter found that, although working independently, RAPs have developed a number of similarities in their approaches to marine litter management. The main similarities are:

- all considered integrated waste management efforts to be an important feature of their RAPs;

---

71 Taylor (2008): **Lessons from the Drink Driving Campaign**, Guardian online article, downloaded from: http://www.guardian.co.uk/responsibledrinking/road.safety

72 Drink Driving (2012): **Drink Driving Statistics in the UK**, downloaded from http://www.drinkdriving.org/drink_driving_statistics_uk.php

73 Coffman (2003): **Lessons in evaluating communications campaigns: Five case studies**. Cambridge, MA, USA: Harvard Family Research Project. Available at: http://www.mediaevaluationproject.org/HFRP2.pdf

74 UNEP (2009): **Marine Litter: A Global Challenge**. UNEP: Nairobi

- most acknowledged that existing legislation could be an umbrella for addressing marine litter issues, with some modifications;
- most acknowledged that existing laws needed to be better enforced;
- all mention education and outreach as an important strategy for dealing with marine litter;
- behavioural changes are needed for this issue to be dealt with effectively;
- almost all acknowledged the need to improve port reception facilities;
- most acknowledged the need for marine litter control programmes to be implemented nationally;
- most mentioned a lack of acceptable marine litter data;
- most mentioned the need for a harmonized marine litter monitoring strategy;
- all mentioned the value in participating in the annual ICC event;
- most mentioned the need for national funding of programmes with some international support;
- all mentioned the need to understand the economic impacts of marine litter; and
- all mentioned the need for the implementation of economic instruments to help control marine litter.

Lewis *et al*[75] examine effective anti-litter measures in NSW, Australia and New York and draw recommendations for the UK from them. The key recommendations are that:

- there should be a national body responsible for coordinating anti-littering initiatives, campaigns and programmes to eliminate duplication and allow best practices to be transferred;
- educational campaigning should be long-term, with consistent messages;
- bins and ashtrays should be provided at carefully-selected strategic sites and emptied regularly;
- a national deposit/refund scheme should be introduced to reward people for not dropping litter and to encourage them to pick it up;
- litter and littering behaviour should be taken into account in designing public spaces;
- there should be greater consistency in the application of penalties for littering; such penalties become more effective if authorities actively catch and fine litterers or target the worst repeat offenders; and
- community engagement is essential, both in cleaning and educational campaigns.

The importance of design is supported by De Kort[76], who notes that the idea that design has potential to change behaviour is certainly not new and has been a fervent belief of many designers and architects. Most of them have intuitively incorporated psychological principles of persuasion into their designs. However, much potential remains unused and could be stimulated by explicitly bringing together architecture, product design, and environmental and social psychology, thereby engendering more powerful and targeted persuasive effects.

---

75 Lewis A et al (2009a): **Litterbugs: How to deal with the problem of littering.** Policy Exchange: London

76 De Kort (2008): **Persuasive Trash Cans Activation of Littering Norms by Design**, Sage Publications, Eindhoven University of Technology

The use of Community-Based Social Marketing (CBSM) has been suggested by McKenzie-Mohr[77] as the most effective way to achieve effective behavioural change. This involves:

- selecting the behaviour to target;
- identifying the barriers and benefits to the selected behaviour;
- developing a strategy that reduces the barriers to the behaviour to be promoted while simultaneously increasing the behaviour's perceived benefits;
- piloting the strategy; and
- evaluating the implementation of the strategy and on-going evaluation once the strategy has been implemented.

A study on waste prevention for the German Umweltbundesamt[78] makes the following recommendations:

- adapt the provision of information to the needs of specific target groups;
- enable the exchange of experiences of participants and stakeholder (producers, retailer, consumers, government, etc.) in the areas of waste prevention and resource management; and
- waste reduction cannot be solved as an isolated problem. It depends on the creation of appropriate conditions, the use of legal tools and economic incentives, together with information and motivational programmes.

The study notes that the success of waste prevention activities can be difficult to measure, reports rarely contain information on expected success of quantitative measures. Specific details of the avoided waste are usually found only on particular activities in specific companies. Therefore, a focus should be on the development of appropriate, meaningful benchmarks, which could also reflect a shift in waste generation into other regions by the import of semi-finished goods/products.

For ***cigarette litter***, the UK Department of the Environment recommends seven key steps for local authorities, which could also apply to litter in general:

- ashtrays – choose the right ashtray to suit your context and needs;
- signage – provide clear, consistent anti-littering signage;
- cleansing – clean up littered cigarette ends;
- partnerships – work with local organisations;
- leadership – walk the talk and be a leader in your community;
- educate – change the cigarette littering behaviour of smokers; and
- enforcement – use the legislation and powers available where appropriate.

There are also lessons from campaigns against other forms of anti-social behaviour. For example, a study on encouraging people to stop smoking suggested that online social networking, forums or blogs could influence behaviour. A combination of shared goals and peer pressure within closely connected groups could aid in achieving

[77] McKenzie-Mohr (2011): **Fostering Sustainable Behavior: An introduction to community-based social marketing** (3rd ed.). Gabriola Island, BC: New Society

[78] Umweltbundesamt (2010): **Development of Scientific and Technical Foundations for a National Waste Prevention Programme**, Berlin, Federal Environment Agency (Umweltbundesamt), downloaded from: http://www.uba.de/uba- info -medien-e/4 044.html

goals[79]. Large groups can sub-divide into smaller groups so as to cater for individual goals and also to create closer relationships with the others involved. For example, a large environmental group could be sub-composed of smaller groups such as a recycling group.

[79] Social Media Trader (2008): **Quit Smoking with Social Networks**, downloaded from http://socialmediatrader.com/smoking-and-social-networks/

ANNEX 3: MEASURES TO PREVENT LITTERING AND TEMPLATE FOR ASSESSING FEASIBILITY

Table A3.1: Behavioural Measures targeted at individuals						
Measure	**Responsible Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**	**Data on Cost/ Effectiveness?**
Educational /Awareness Raising Measures						
The Fun theory	Volkswagen	International	Includes litter	Competition to create a fun behavioural changing invention	Research and Development; Education, Communication and Outreach	no/no
Kick the Trash	McDonald's	Germany / International	All	On-line interactive game	Investment in infrastructure (IT game); Education, Communication and Outreach	no/little
Love Clean London Campaign	Local authorities	UK, London	Litter/ graffiti	Phone app.	Collection, Awareness, Education, Communication and Outreach;	some/ some
End of Plastic Bags in the Czech Republic	Boxo Ltd.	CZ	Plastic bags	Education, awareness raising	Education, Communication and Outreach	no/no
Go Plastic Bag Free	Marine Conservation Society	UK	Plastic bags	Guidance to communities on how to set up plastic free areas	Education, Communication and Outreach	no/little
GRIMPOLA	Ecomar	Spain	Marine litter	Training, environmental education	Education, communication and outreach	no/little
Litter Less (CZ)	Tereza	CZ	All	Clean-up, awareness raising, education	Education, Communication and Outreach	yes/no
Mediterranean EnDangered - Expedition MED	Mediterranean EnDangered	Mediterranean	Marine litter	Scientific and educational programme through four expeditions in the Mediterranean	Education, Communication and Outreach, Research, Waste monitoring, and Litter monitoring	no/no
The WI packaging campaign	The Womens Institute	UK	Packaging (super-market)	Events, awareness raising	Education, Communication and Outreach	no/no
Mimando Nuestro Mar (Pampering our seas)	Fundación Global Nature	Tenerife	Marine litter	Briefings, exhibitions, leaflets and stickers	Education	no/no
Think Before You Throw Campaign	Cornwall Waste Action and West Cornwall Friends of the Earth	UK, Cornwall	Litter on beaches (especially plastics)	Community projects: clean-up, art, composting	Education, Communication and Outreach	no/no
Baltic Marine Litter (MARLIN)	Keep Sweden Tidy Foundation	Coasts and Baltic Sea	Marine litter	Awareness raising, litter monitoring, categorising and comparing	Education, Communication and Outreach; stakeholder coordination; litter monitoring	yes/no
Reducing Disposable Bag Use	COMEOS	Belgium	Plastic bags	Awareness raising, information, events	Education, Communication and Outreach	

Table A3.1: Behavioural Measures targeted at individuals						
Measure	**Responsible Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**	**Data on Cost/ Effectiveness?**
Water Education for Teachers (WET)	San Pelegrino, Italian Ministries, University and Research	Italy and International	Marine litter, plastic	Awareness raising and education in schools	Education, awareness raising	
Plastic Vortex	EcoArt	Italy	Plastic, marine litter	Creative communication and awareness campaign. Also recycling, smart packaging,etc.	Awareness raising	
Keep Sweden Tidy	Keep Sweden Tidy Foundation	Sweden	All	public awareness campaigns, awards and environmental education	Awareness raising	
Bottle Champions	MCS and the Plastics Industry	UK	Plastic waste	Children collect and recycled plastic bottles in exchange for sports strip school made from recycled plastic bottles	Awareness raising	
'Meer im Fokus' (The Sea in Focus)	EUCC – Die Küsten Union Deutschland e.V.	North and North-east coast of Germany	All	Explains to pupils about the marine ecosystem and enhances their awareness of marine pollution.	Awareness raising	
Green Radio	Federal Environment Agency	Germany, International	All	Advice on products with problematic chemical substances, the state of the Baltic Sea and marine litter	Awareness raising	
Reef Guardian Schools	Great Barrier Reef Marine Park Authority (GBRMPA)	Great Barrier Reef, Australia	Marine litter	Creating awareness, understanding and appreciation for the Reef and its connected ecosystems.	Educational, awareness raising	
Halmstad Schools Competing to Reduce Food Waste in Canteens (KliMatsmart)	Municipality of Halmstad, County of Halland	City of Halmstad, Sweden	Food waste	Competition education, awareness raising	Education, Communication and Outreach, awareness raising	yes/yes
Let's Do It with Ferda	Environmental Board (Estonian Ministry for the Environment)	Estonia	All	Awareness raising and education in schools	Education, Communication and Outreach	yes/yes
EcoFellows: Awareness Raising Lessons for the School Children	EcoFellows Ltd.	Tampere region, Finland	All	Awareness raising and education in schools	Education, Communication and Outreach	yes/yes
S.O.S. Plastica	WWF	Mediterranean (IT, FR, ES, GR)	Plastic waste/ marine litter	Boaters provide info, photos, coordinates of large areas of floating litter	Litter monitoring	no/no

Table A3.1: Behavioural Measures targeted at individuals						
Measure	**Responsible Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**	**Data on Cost/ Effectiveness?**
The Green Guide to Coastal Boating	The Green Blue	UK	Marine litter	Raising awareness and prevention of waste from entering the aquatic environment	Education, Communication and Outreach;	
Recreational Angling Code of Conduct	Welsh Federation of Sea Anglers	Wales	Recreational fishing litter	Raising Awareness and Prevention of waste from entering the aquatic environment	Education, Communication and Outreach;	
Posters/Websites etc.						
Don't be a Tosser Campaign	Department of Environment and Conservation, NSW	Australia, New South Wales	All	Radio, TV, posters	Regulatory measures (fines); Education, Communication and Outreach	some/ some
Waste Separation - A Natural Reflex	Foundation Plastics Europe Poland	Poland	Plastic waste/ packaging waste	Posters	Education, Communication and Outreach	no/no
Mermaids Tears	Surfers Against Sewage	UK	Plastic waste	Awareness about the impacts of plastic pellets	Education, Communication and Outreach	no/some
RecycleNow	WRAP	UK	General litter	Info, leaflets, awareness raising	Education, Communication and Outreach	no/no
Return to Offender	Surfers Against Sewage	UK	Marine litter	Awareness raising	Litter monitoring/ Education, Communication and Outreach	no/some
Local Beach – Global Garbage	Lighthouse Foundation	International (with a Brazilian emphasis)	Marine litter	On-line awareness raising, stickers, logos, etc	Education, Communication and Outreach	no/no
Bag It and Bin It – Don't Flush!	Marine Conservation Society	UK	Bathroom waste	Posters, leaflets, awareness raising	Education, Communication and Outreach	no/yes
Chewing Gum Action Group.	Chewing Gum Action Group (CGAG)	UK	Chewing gum	Advertising campaign, awareness raising	Collection; Litter monitoring	no/some
Don't Let Go!	Marine Conservation Society	UK	Balloons	Posters, leaflets, awareness raising	Education, Communication and Outreach	no/yes
Keep Britain Tidy Poster Campaigns	Keep Britain Tidy	UK	All	Posters	Education, Communication and Outreach	no/little
Litter Awareness Campaign	Arriva Trains Wales	Wales	Litter at train stations	Posters	Education, Communication and Outreach	no/no
Meere ohne Plastik (Seas without Plastic)	Nature And Biodiversity Conservation Union	Germany	Marine litter (plastic)	Provision of info, training, guidance. Coordination of clean-up	Collection; Education, Communication and Outreach; Litter monitoring; Stakeholder coordination	no/little
Abtauchen - Sporttaucher für saubere Meere	Nature And Biodiversity Conservation Union	Germany	Marine litter	Brochure to raise awareness, provides examples of diver clean-ups.	Education, Communication and Outreach	no/no

Table A3.1: Behavioural Measures targeted at individuals						
Measure	**Responsible Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**	**Data on Cost/ Effectiveness?**
(Submerge – Sport Divers for Clean Seas)						
Segler setzen fuer saubere Meere (Sailors' Action for Clean Seas)	Nature And Biodiversity Conservation Union and the German Sailing Association	Germany	Marine litter	Brochure with info on marine litter for sailors	Education, Communication and Outreach, Litter Monitoring	no/no
I want Clean Seas and Beaches	HELMEPA-Junior, and Wind	Greece	Marine litter	Information leaflet and computer game for children	Education, Communication	
'Meeresmuell'	Federal Environment Agency of Germany	North Sea and Baltic Sea coast	Marine litter - emphasis on plastic waste	A webpage entirely devoted to 'sea-trash' and its consequences.	Education, Communication, awareness raising	
AUSMEPA website	Australian Marine Environment Protection Association (AUSMEPA)	Australia	Marine litter	Free educational resources to help teachers with classes on marine environmental issues.	Educational, awareness raising	

Table A3.2: Behavioural Measures Targeted at the Workplace					
Measure	**Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**
Apprenticeship in Sustainable Resource Management	The Energy & Utility Skill (EU Skills)	UK	All	Apprenticeship covers various aspects of management of waste and recyclables at operator and supervisory levels.	Education
Waste Awareness Certificate	Chartered Institution of Wastes Management (CIWM)	UK	All	One-day waste awareness course for companies (shop floor workers, managers, office staff, cleaners, contractors, etc.).	Educational,
Training Programmes for Local Authorities	Waste Resources Action Programme (WRAP)	UK	All	Programmes cover various aspects of planning, delivery and monitoring of waste management.	Training
Tackling Fast Food Related Litter Workshop	Keep Britain Tidy	UK	Fast food related litter	Provides knowledge and tools to tackle the problems associated with food and drinks related litter.	Training
Effectiveness of Street Cleansing on the Front Line	Keep Britain Tidy	UK	All	Provide street cleansing employees with training	Training
Local Environmental Quality Monitoring	Keep Britain Tidy	UK	All	Training in practical surveying and grading issues associated with monitoring local environmental quality.	Training
Using Apps to Gain Efficiencies in Improving Local Environmental Quality	Keep Britain Tidy	UK	All	Training in integration of mobile technology to increase efficiency.	Training
Designing an Effective Front Line Street Cleansing Service – Best Practice Guide	Keep Britain Tidy	UK	All	Training - Best Practice Guide In relation to street cleansing.	Training -Best Practice Guide
AECO Guidelines	Association of Arctic Expedition Cruise Operators (AECO)	Artic	Marine litter	Ensures that expedition cruises and tourism in the Arctic is carried out with consideration for the environment, culture, etc.	Educational, awareness raising
Western Australia guidance manuals	The Department of Western Australia	Western Australia	All	Guidance manuals on environmental protection when working with waste. e.g. Truck to Truck Transfers and Controlled Waste Treatment or Disposal Site.	Educational, awareness raising
Reception and Waste Handling Plan for Ships and Cargo Residues, Guide for Port Users and Vessels	The Port Authority of Malaga.	Spain	Marine litter	Guide on the proper waste management in the harbour area to prevent marine litter	Awareness raising
Operation Clean Sweep	American Chemistry Council and the Plastic Industry Trade Association, British Plastics Federation	UK/EU/USA	Plastic pellets	Guidance to plastics industry on reducing loss of pellets	Education, Communication and Outreach;

Table A3.2: Behavioural Measures Targeted at the Workplace					
Measure	**Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**
Sectoral Guidelines for Marine Litter Management on Passenger Ships	UNEP	International	Litter from passenger ships	Guidelines on how to reduce litter	Communication
Global Declaration for Solutions on Marine Litter	Representatives of plastics organizations from around the globe	International	Plastic	Outlines steps for industries to take and suggests approaches and platforms for global cooperation and future partnerships	Other - national waste strategy
ProSea Marine Environmental Awareness course	ProSea	International	From marine industry	A 2-days course based on the IMO model course 'marine environmental awareness' for the marine business' sea and shore staff	Education,

Table A3.3: Economic Incentives and Disincentives					
Measure	**Organisation**	**Coverage**	**Type of Litter/ Waste**	**Main Method/ Activity**	**Type of Initiative**
Disincentives					
Packaging Tax	Governments of Germany, Netherlands,	Germany, Netherlands	packaging materials	Tax levied on packaging material	Market-based measure
Plastic Bag levy	Government of Ireland	Ireland	Plastic bags	Single-Use plastic Carrier Bag levy (compostable and conventional)	Market-based measures: product tax
Beverage Packaging Levy	Government of Finland	Finland	Beverage packaging	Single-use beverage containers	Market-based measures: product tax
Single Use Carrier Bags Regulations	Welsh Government	Wales	Plastic bags	Charge per single-use bag (paper/plastic/etc)	Market-based measures: product tax
Germany Packaging Deposit Scheme	Federal German Government	Germany	Single-use packaging (including cans and plastic bottles)	€0.25 charge on the sale of beer and soft drinks sold in single-use packaging.	Market-based measure
Pic-Nic Tax	Belgian Government	Belgium	Single use products	Charge per single-use product	Market-based measures: product tax
Plastic Bag levy	Irish Government	Ireland	Plastic bags	Levy on single use plastic carrier bags (both compostable and conventional)	Market-based measures: product tax
Bulgarian Plastic Bag Tax	Bulgarian Government	Bulgaria	Plastic bags	Tax on use plastic carrier bags	Market-based measures: product tax
Plastic Bag levy	Government-Northern Ireland	Northern Ireland	Plastic bags	Levy on single use plastic carrier bags	Market-based measures: product tax
Single Use Carrier Bags Regulations	Welsh Government	Wales	Plastic bags	Charge on single-use bag (paper/plastic/etc)	Market-based measures: product tax
Incentives					
We Have Cooked it: Give it Back!	MOL, Hungarian Oil Company	Hungary	Waste oil	Exchange used oil for container to hold oil	Education, Communication, collection, [Market-Based measures (exchange)]
Norsk Resirk	Norsk Resirk	Norway	Beverage packaging	Reverse vending, deposit scheme	Market-Based measure; Investment in infrastructure and equipment; Collection
Dansk Retursystem	Dansk Retursystem	Denmark	beverage packaging	reverse vending scheme	Market-Based measure; Investment in infrastructure and equipment; Collection
Singapore 'Litter Free'	National Environment Agency (NEA)	Singapore	All	Awareness raising at events, prize draw, posters, logo	Education, Communication and Outreach; collection

Table A3.4: Preventive Measures						
Measure	**Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**	**Data on Cost/ Effectiveness ?**
Ashtray Cones	Local authorities/ coastal authorities	Popular in ES, PT, IT, NL	Cigarette litter	Provision of ashtray cones for use on beaches	Investment in infrastructure and equipment; Education, Communication and Outreach	no/little
Fishing for Energy	NOAA and various partners	US	Fishing gear	Installation of fishing gear bins, gear then converted to energy	Collection; Education, Communication and Outreach; Stakeholder coordination	no/some
Gum Target	Meteora Limited	UK	Chewing gum	Gum bins	Collection; Investment in infrastructure and equipment (gum sheet bins)	no/little
Litter Collection Campaign in Gyimes	Pogány-Havas Micro Regional Association	Romania,	Paper and plastic bottles	Provision of designated bins in schools	Collection; Education, Communication and Outreach	some//no
No Butts on the Beach	SAS, British naturists and MCS	UK	Smoking litter	Provision of butt bins	Investment in infrastructure and equipment; Education, Communication and Outreach	no//no
Reel In and Recycle	Boat US Foundation	US	Abandoned, lost or discarded fishing gear	Provision of recycle bins	Collection	some // some
The City of Leiden gives the City Population a Yellow Bag	City of Leiden	City of Leiden	Domestic & commercial waste	Stronger garbage bags that are less vulnerable to birds (e.g. seagulls) tearing them open	Investment in infrastructure and equipment, collection	no/no
Ban on Non-Reusable Cups and Tableware	City of Main	City of Main, Germany	Plastic cups and tableware	Ban on non-reusable cups and tableware	Command & control	some/yes
Checklist-Packaging that Prevents Litter	TU Delft, Nederland Schoon	Netherlan ds	Packaging waste	Design guidelines for packaging/ products	Research and development	no/no
Tragamovi l	Tragamovil	Spain	Telephone equipment	Recycling telephony and clean up	Awareness raising; collection	
The ECONYL project	Aquafil Group.	Slovenia	Fishing nets and other waste composed of Nylon 6	The project uses waste nylon 6 products to make new nylon 6. It is a move towards closed-loop production.	Collection	

Table A3.5: Behavioural/ Preventive Measures						
Measure	**Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**	**Data on Cost/ Effectiveness?**
Plastic Bag Ban	San Francisco city	USA	Plastic bags	Ban on non-biodegradable single use plastic carrier bags (large supermarkets and pharmacies). Charge on paper or compostable bags	Regulatory measures (ban); Market-Based measures (charge)	no/no
Plastic Bag Ban	South Australian Government	South Australia state	Plastic bags	Ban	Regulatory	no/some
Butt FREE City	Butt Free Australia	Australia	Smoking litter	Personal ashtrays, leaflets, fines, etc	Education, Communication and Outreach; Investment in infrastructure and equipment (ashtray)	no/some
Clean Beaches Campaign	ECOMB	USA, Miami	Marine litter/ beach	Media campaign, distribution of bags for beach goers, monitoring litter	Education, communication, outreach; litter monitoring; Investment in equipment (bags)	yes/little
Paper Collection for Schools	INEST and Green Bridge Region waste management Ltd	Hungary	Paper	Provision of designated waste containers	Collection; Education, Communication and Outreach	no// some (little)
circOliamo	COOU – Consorzio Obbligatorio degli Oli Usati	Italy	Lubricating oils	Education, clean-up	Education, Communication and Outreach	no//no
Dedicated to Those who Love the Sea	Coastal Conservation Agency – Sardinia	Sardinia	Marine litter / all	Distribution of ashtrays and leaflets	Investment in infrastructure and equipment; Education, Communication and Outreach	no//no
Burgerschouw	Gemeente Schoon	The Netherlands	All	Residents screening the neighbourhood for litter in cooperation with the municipality	Outreach; collection	yes/little
Design Guidelines Litter for Public Space	Stichting Schoon	the Netherlands	All	Guidance on designing the environment so that it doesn't 'attract' litter and is easy to clean	Design of public space	?
Car Registration number on McDrive packaging	McDonald's	Vicinity of some McDonald's restaurants in the Netherlands	Packaging	The car registration number is printed on McDrive packaging to deter litterers.	Regulatory, Education, Communication and Outreach	No costs/yes

Table A3.5: Behavioural/ Preventive Measures						
Measure	**Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**	**Data on Cost/ Effectiveness?**
Integrated Approach to Littering in Belgian Municipalities	Fost-Plus	Belgium	All	5 pillar approach, including communication, infrastructure and enforcement	Investment in infrastructure and equipment; Education, Communication and Outreach, Command & control	?
Project Marine Clean	CIP Eco Innovation	Slovenia	Marine litter, packaging litter	Provision of marine litter removing equipment, Edible and biodegradable food packaging, Smart fishing equipment	Clean up, awareness raising, education	
Mobile Recycling Library	Foundation for the Environmental Management of Batteries	Spain	All	Fun, educational activities. Teaches about product life cycle, scarcity of natural resources and the environmental impacts of poor waste management.	Awareness raising	

Table A3.6: Clean-up Measures					
Measure	**Organisation**	**Coverage**	**Type of Litter Targeted**	**Type of initiative**	**Data on Cost/ Effectiveness?**
Clean-up at Sea					
Dive Against Debris	PROJECT AWARE	International	Marine litter	Collection/Litter monitoring	no/some
Project Kaisei	Project Kaisei	International	Marine litter	Research; Collection; Education, Communication, and Outreach	yes/some
Fishing For Litter	KIMO	EU	Marine litter	Collection; Litter monitoring	yes/yes
Szedjük Össze Magunk! (Let's pick it up ourselves!)	Divers Association of Győr (Győri Búvár Sportegyesület)	Hungary, City of Gyor	All	Collection	no/no
Marine Debris Removal Programme	Marine Conservation Alliance Foundation	US	Marine litter	Collection; Litter monitoring	no/some
Coastal Clean-up					
North Devon Beach Clean Series	Surfers Against Sewage	UK	Marine litter	Collection	no /some
Cultura contra la Basura	Costa de la Luz Neighbourhood Association	Spain, Costa de la Luz	All	Collection	no/little
Take 3; a Clean Beach initiative	Take 3	Aus, NSW	Beach litter	Collection; education, Communication and	little/little

Table A3.6: Clean-up Measures					
Measure	**Organisation**	**Coverage**	**Type of Litter Targeted**	**Type of initiative**	**Data on Cost/ Effectiveness?**
				Outreach	
Big Spring Beach Clean	Surfers Against Sewage	UK	Marine litter	Collection/Litter monitoring	no/no
Motivocean Beach Clean Tour	Surfers Against Sewage	UK	Marine litter	Collection	no/some
Clean up the Med	Legambiente	Mediterranean coast	All	Collection	no/no
Forever Fish Campaign – 'Big Beach Clean-up'	Marks and Spencer's and Marine Conservation Society	UK	Marine litter	Collection; Education, Communication and Outreach	yes//some (little)
MyBeach	Stichting De Noordzee	the Netherlands	Marine litter + Beach litter	Collection, Education, Communication and Outreach	evaluation is currently being made
Coastal Clean-up (including clean-up at sea)					
Coastal Cleanup	Ocean Conservancy	International	Marine Litter	Collection	no//some
The Sea of Litter or the Sea of Fish?	Our Earth Foundation and the Foundation "Clean Up the World - Poland"	Poland	Marine litter	Collection; Education, Communication and Outreach	no//no
Ocean Initiatives	Surfrider Foundation Europe	International (including Europe)	Beach litter	Collection; Education, Communication and Outreach	no//some
International Coastal Clean-up	Ocean Conservancy	International	Marine litter	Collection; litter monitoring	no//some (little)
Water Witch	Water Witch	UK	Marine litter	Collection	no/some
Clean-up (non-specific location)					
Big Tidy Up	KeepBritainTidy	UK	All	Collection	no//no
Clean up the World	UNEP	International	All	Collection; Education, Communication and Outreach	no//some (little)
Clean Up Australia Day	Clean Up Australia	Australia	All	Collection; litter monitoring	no //some
Great American Clean Up	Keep America Beautiful	US	All	Collection; Litter monitoring	no//some (little)
Great Nova Scotia Pick-Me-Up (GNSPU) including 'Clean Across Nova Scotia'	Clean Nova Scotia	Canada	All	Collection; Litter monitoring	no//some
National Spring Clean	National Trust	Ireland	All	Collection	no//no
Tavaszi Nagytakaritas (Spring Clean-Up)	Public Waste Removal Services in Budapest (FKF Zrt)	Hungary	All	Collection	no//some (little)
Let's Do It Romania	EcoAssist	Romania	All	Collection	
Let's Clean up Slovenia	Ecologist without borders	Slovenia	All	Litter monitoring	
Love Where You Live	Keep Britain Tidy	England	All	Collection; Litter monitoring	

Table A3.7: Clean-up / Behavioural Measures						
Measure Name	**Organisation**	**Coverage**	**Type of Litter**	**Main Method/Activity**	**Type of initiative**	**Data on Cost/ Effectiveness?**
Blue Flag Award	Keep Britain Tidy	UK, EU wide	Marine litter	Award scheme	Collection; Litter monitoring	no/ no
The Blue Flag Award, Latvia	Foundation for Environmental Education Latvia	Latvia, EU wide	Marine litter	Award Scheme, sustainable development of beaches and marinas	Regulatory measures; Collection/Litter monitoring	
Canoe Patrol of St. Francis	The Catholic Youth Association	Poland -	River litter	Education, clean-up	Collection; Education, Communication and Outreach	no/no
Corona-Save the Beach	Corona (beer company)	Europe	All	Events, art, litter hotel, etc	Collection; Education, Communication and Outreach; Other	no/no
Cumbria Marine Litter Project	Keep Britain Tidy	UK, Cumbria	Marine litter	Quantifying and addressing problem, engaging locals	Waste and litter monitoring; awareness raising; Collection	no/little
European Waste Free Oceans	European Plastics Converters	Europe / European waters	Marine litter	Clean-up using fishing trawls and new technology	Collection; Education, Communication and Outreach	no/no
Forth Coastal Litter Campaign	Forth Estuary Forum	Scotland, Forth Estuary	Beach litter	Clean-up, education, community involvement	Collection; Education, Communication and Outreach; litter monitoring	no/little
Pitch-In Week	Pitch-In Canada	Canada	All	Education, recycling, composting, clean-ups	Collection; Litter monitoring; Education, Communication and Outreach	no/ little
Project Kaisei	Project Kaisei	International	Marine litter	Education, research, clean-up	research; Collection; Education, Communication and Outreach	yes/some
Quality Coast Award	Keep Britain Tidy	UK	Marine litter	Award scheme	Regulatory measures; Collection/Litter monitoring	no /yes
Save Our Shores	Save Our Shores	USA, California	All	Advocacy, education, clean-ups	Collection, Education, Communication and Outreach	no/little
Save the North Sea	Keep Sweden Tidy Foundation	North Sea	All	Awareness raising, research	Education, Communication and Outreach	no/no
Te Szedd! /You Pick!	Ministry of Rural Development	Hungary Romania	All	Clean-up, public can report illegal dumps on website	Collection; Education, Communication and Outreach	no/no
Vac from the Sea	Electrolux	International	Marine litter	Creating a vacuum cleaner from collected litter	Collection; Education, Communication and Outreach	no/no
World Water Day	NABU and the German Olympic Association	Germany	Marine litter	Information provision and coordinated collection and monitoring	Education, Communication and Outreach, Litter Monitoring,	no/no

Table A3.7: Clean-up / Behavioural Measures						
Measure Name	**Organisation**	**Coverage**	**Type of Litter**	**Main Method/Activity**	**Type of initiative**	**Data on Cost/ Effectiveness?**
					Collection, Stakeholder coordination	
CoastWatch	Stichting de Noordzee	the Netherlands	Marine litter/ beach litter	Research project for schools, resulting in clean-up + litter data used by the university & other research institutes	Education, Communication and Outreach, Litter Monitoring, Collection	?
Clean-up by Homeless People	Stichting Dagloon Nijmegen	the Netherlands	All	Providing a day job for homeless people, (ex) drug addicts, etc.	Collection; Education, Communication and Outreach	Yes/?
Contest Cleanest Beach of the Netherlands	Stichting Nederland Schoon	the Netherlands	Marine litter/ beach litter	A yearly award for the cleanest beach of the Netherlands	Award scheme	?
Zwervend langs zee	KIMO NL/BE, Stichting Noordzee, Rijkswaterstaat	the Netherlands	Marine litter/ beach litter	Communication & awareness raising campaign	Education, Communication and Outreach, Litter Monitoring, Collection	Yes/yes
Stop Frustration, Adopt a Waste Location	City of Amsterdam	Two districts in Amsterdam	All	Residents adopt the area's with waste containers and therefore commit to keep the area clean	Accountability of residents	Yes/yes
IBAL Anti-Litter League	Irish Business Against Litter (IBAL)	Ireland	All	Ranks the performance of each local authority to pressurise them into action.	Outreach, clean up	
Danube Day	ICPDR International Commission fo r the Protection of the Danube Region	Slovakia	All	Events to achieve a cleaner, safer river. Festivals on the banks of the rivers; public meetings and fun, educational events.	Clean up, awareness raising	
Cuidemos el Mar	Ecologistas en Acción	Canary Islands, Spain	All	Awareness raising on marine litter and clean-up activities of local beaches on the Canaries	Clean up, awareness raising	
La Mar de Limpia 2011	TFSURF Spain	Spain	Marine litter	Awareness raising on marine litter and clean-up activities	Clean up, awareness raising	

Table A3.8: Measures Targeting Cigarette and Smoking Related Litter				
Measure Name	**Organisation**	**Coverage**	**Main Method/Activity**	**Type of Initiative**
Ashtray cones	Local/ coastal authorities	popular in ES, PT, IT, NL	Provision of portable ashtray cones	Investment in infrastructure and equipment; Education, Communication and Outreach
Butt FREE City	Butt Free Australia	Australia	Personal ashtrays, leaflets, fines,	Education, Communication and Outreach; Investment in infrastructure and equipment
Keep Britain Tidy Poster Campaigns	Keep Britain Tidy	UK	Posters	Education, Communication and Outreach
No Butts on the Beach	SAS, British naturists and MCS	UK	Provision of 'butt bins'	Investment in infrastructure and equipment; Education, Communication and Outreach

Table A3.9 : Measures Targeting Chewing Gum Litter				
Measure	**Organisation**	**Coverage**	**Main Method/Activity**	**Type of Initiative**
Chewing Gum Action Group.	Chewing Gum Action Group (CGAG)	UK	Advertising campaign, awareness raising	Collection; Litter monitoring
Gum Target	Meteora Limited	UK	Gum bins	Collection; Investment in infrastructure and equipment (gum sheet bins)

Table A3.10: Measures Targeting Plastic Bags				
Measure	**Organisation**	**Coverage**	**Main Method/Activity**	**Type of Initiative**
Plastic bag ban	South Australian Government	South Australia	Single-use, thin, polyethylene polymer plastic bags banned	Regulatory
Plastic bag levy	Government, Northern Ireland	Northern Ireland	Single-use plastic carrier bag levy to be brought in in 2013	Market-based measures: product tax
Plastic bag ban	San Francisco city	US	Non-biodegradable single use plastic carrier bag ban (large supermarkets and pharmacies). Charge for other plastic bags	Regulatory measures (ban); Market-Based measures (charge)
Single-Use Carrier Bags Regulations	Welsh Government	Wales	Charge for single-use bag (paper/plastic/etc)	Market-based measures: product tax
Plastic Bag Levy	Irish Government	Ireland	Single use plastic carrier bag levy (compostable and conventional)	Market-based measures: product tax
Bulgarian Plastic Bag Tax	Bulgarian Government	Bulgaria	Tax on use plastic carrier bags	Market-based measures: product tax
Go Plastic Bag Free	Marine Conservation Society	UK	Information and guidance to help communities go plastic bag free	Education, Communication and Outreach
End of Plastic Bags in the Czech Republic	Boxo Ltd.	Czech Rep	Encouragement to use alternatives.	Education, Communication and Outreach

Table A3.10: Measures Targeting Plastic Bags				
Measure	**Organisation**	**Coverage**	**Main Method/Activity**	**Type of Initiative**
Reducing Disposable Bag Use	COMEOS	Belgium	Awareness raising, information, events	Education, Communication and Outreach
Pic-Nic Tax	Belgian Government	Belgium	Charge per single-use product	Market-based measures: product tax

Table A3.11: Measures Targeting other Single-Use Items					
Measure	**Organisation**	**Coverage**	**Main Method/Activity**	**Type of initiative**	**Waste type**
Norsk Resirk	Norsk Resirk	Norway	Reverse vending, Deposit scheme	Market-Based measure; Investment in infrastructure and equipment; Collection	Beverage packaging
Dansk Retursystem	Dansk Retursystem	Denmark	Reverse vending, Deposit scheme	Market-Based measure; Investment in infrastructure and equipment; Collection	Beverage packaging
Pic-Nic Tax	Belgian Government	Belgium	Tax	Market-based measures: product tax	Single use products
Keep Britain Tidy Poster Campaigns	Keep Britain Tidy	UK	Poster campaign	Education, Communication and Outreach	Litter/ take away trash
Kick the Trash	McDonald's	Germany/ international	Online interactive game.	Investment in infrastructure (IT game); Education, Communication and Outreach	Litter
Collection Campaign in Gyimes	Pogány-Havas Micro Regional Association	Romania,	Provision of designated bins in schools	Collection; Education, Communication and Outreach	Paper, plastic bottles
The WI Packaging Campaign	The Women's Institute	UK	Outreach, awareness, events	Education, Communication and Outreach	Packaging-supermarket
Waste Separation - a Natural Reflex	Foundation Plastics Europe, Poland	Poland	Posters	Education, Communication and Outreach	Plastic/ packaging waste

Table A3.12: Measures Targeting Other Types of Litter					
Measure name	**Organisation**	**Coverage**	**Main Method/Activity**	**Type of initiative**	**Waste type**
Don't Let Go!	MCS	UK	Awareness raising / posters	Education, Communication and Outreach	Balloons
Bag It and Bin It – Don't Flush!	MCS	UK	Awareness raising/ posters, stickers, etc	Education, Communication and Outreach	Bathroom waste
We Have Cooked It: Give It Back!	MOL, Hungarian Oil Company	Hungary	Exchange of used oil for plastic bottles to store oil	Education, Communication, collection, [Market-Based measures (exchange)]	Used cooking oil

Table A3.13: Measures Targeting Fishing Gear					
Measure Name	**Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**
Fishing for Energy	NOAA and various partners	US	Fishing gear	Fishing gear bins, gear then converted to energy	Collection; Education, Communication and Outreach; Stakeholder coordination
Fishing For Litter	KIMO	EU	Marine litter (and gear)	Clean-up from boats	Collection; Litter monitoring
Reel In and Recycle	Boat US Foundation	US	Fishing gear	Provision of recycle bins	Collection
Recreational Angling Code of Conduct	Welsh Federation of Sea Anglers	Wales	Recreational fishing litter	Raising Awareness and Prevention of waste from entering the aquatic environment	Education, Communication and Outreach
The ECONYL Project	Aquafil Group.	Slovenia	Fishing nets and other waste composed of Nylon 6	The project uses waste nylon 6 products to make new nylon 6. It is a move towards closed-loop production	Collection

Table A3.14: Measures Targeted at Coastal Locations			
Measure Name	**Organisation**	**Coverage**	**Type of Initiative**
Coastal Clean-up			
North Devon Beach Clean Series	Surfers Against Sewage	UK	Collection
Cultura contra la Basura	Costa de la Luz Neighbourhood Association	Spain, Costa de la Luz	Collection; education, Communication and Outreach
Take 3; a Clean Beach initiative	Take 3	Aus, NSW	Collection; education, communication
Big Spring Beach Clean	Surfers Against Sewage	UK	Collection/litter monitoring
Motivocean Beach Clean Tour	Surfers Against Sewage	UK	Collection
Clean up the Med	Legambiente	Mediterranean coast	Collection
Forever Fish Campaign – 'Big Beach Clean-up'	Marks and Spencer's and Marine Conservation Society	UK	Collection; education, communication
Vacances Propres	Vacances Propres	France	Clean-up activities in tourist destinations
Clean Coast Ireland	An Taisce	Ireland	Involves communities in beach management and encourages guardianship of their coastline.
Save our Seas Campaign	Malta Surf Association and Surfrider Foundation	Malta	Beach clean
Clean Coast Programme	Tidy Northern Ireland	Northern Ireland	Community groups adopt a stretch of coastline and carry out clean up and management work to improve the beach environment.
Coastal Cleanup	Ocean Conservancy	International	Collection
The sea of litter or the sea of fish?	Our Earth Foundation and the Foundation "Clean Up the World - Poland"	Poland	Collection; education
Ocean Initiatives	Surfrider Foundation Europe	International	Collection; education
International Coastal Clean-up	Ocean Conservancy	International	Collection; litter monitoring
Preventive Measures Used on the Coast			
No Butts on the	Surfers Against Sewage,	UK	Provision of butt bins

Table A3.14: Measures Targeted at Coastal Locations			
Measure Name	**Organisation**	**Coverage**	**Type of Initiative**
Beach	British naturists and MCS		
Ashtray cones	Local /coastal authorities	popular in ES, PT, IT, NL	Provision of ashtray cones
Behavioural Measures on the Coast and Offshore			
Local Beach – Global Garbage	Lighthouse foundation	International (with a Brazilian emphasis)	On-line awareness raising, stickers, logos, etc
Mermaids Tears	Surfers Against Sewage	UK	Awareness about the impacts of plastic pellets
Mimando Nuestro Mar (Pampering our Seas)	Fundación Global Nature	Tenerife	Briefings, exhibitions, leaflets and stickers
Return to Offender	Surfers Against Sewage	UK	Awareness-raising
Think Before You Throw Campaign	Cornwall Waste Action; Friends of the Earth	UK, Cornwall	Community projects: clean-up, art, composting
Behavioural and Clean-Up Measures on the Coast			
Corona- Save the Beach	Corona (beer)	Europe	Events, art, litter hotel, etc
Forth Coastal Litter Campaign	The Forth Estuary Forum	Scotland, Forth Estuary	Clean-up, education, community involvement
Quality Coast Award	Keep Britain Tidy	UK	Award scheme
Blue Flag Award	Keep Britain Tidy	UK	Award scheme
Save our Shores	Save our Shores	USA, California's central coast	Advocacy, education, clean-ups

Table A3.15: Measures Targeted Off-Shore			
Case study Name	**Organisation**	**Coverage**	**Type of Initiative**
Clean-up Off-shore			
Dive Against Debris	PROJECT AWARE	Internatioanl	Collection/Litter monitoring
Project Kaisei	Project Kaisei	International	Research; collection; education,
Fishing For Litter	KIMO EU	EU-wide	Collection; Litter monitoring
Szedjük össze magunk! (Let's pick it up ourselves!)	Divers Association of Gyor (Győri Búvár Sportegyesület)	Hungary, City of Gyor	Collection
Marine Debris Removal Programme	Marine Conservation Alliance Foundation	US	Collection; litter monitoring
Project Mar	LPN -Liga Para a Preteccao da Natureza	Portugal	subaquatic clean-up activities, raising public awareness
Project Pescal	Council of the Sea, the National Fisheries Association and the Ocean Technology Center (Cetmar).	Spain	to collect trash from the seabed, including lost fishing gear, and to promote clean fishing grounds.
Water Witch	Water Witch	UK	Collection
Preventive Measures Targeted Offshore			
Fishing for Energy	NOAA and various partners	US	Fishing gear bins, gear then converted to energy
Reel In and Recycle	Boat US Foundation	US	Provision of recycling bins
Provision of recycling bins	Carnival Cruises	International	Provision of recycling bins
Behavioural Measures Targeted Offshore			

Table A3.15: Measures Targeted Off-Shore			
Case study Name	**Organisation**	**Coverage**	**Type of Initiative**
GRIMPOLA	Ecomar	Spain	Training, environmental education
Mediterranean EnDangered - Expedition MED	Mediterranean EnDangered	Mediterranean	Scientific/educational programmes
CYMEPA	CYMEPA	Cyprus	Efforts to prevent pollution of the sea, Awareness raising, environmental projects
Keep the Mediterranean Litter-free Campaign	MIO-ECSDE, HELMEPA, and Clean-up Greece with the support of MED/POL and UNEP/MAP	Greece, Mediterranean	raising awareness on the causes/ impacts of the pollution of the sea from solid waste.
Become Part of the Solution	HELMEPA and North Aegean Sea Canneries SA	Greece	Raise awareness about marine litter for fishing vessels and pleasure craft users.
The Australian Maritime Safety Authority (AMSA)	Stow it don't throw it'	Australia	Vessel waste management campaign to raise awareness of the impacts of harmful marine debris and to encourage prevention. The campaign includes brochures on good on-board waste management practices, and directories of waste reception facilities in ports.
The Green Guide to Coastal Boating	The Green Blue	UK	Raising awareness and prevention of waste from entering the aquatic environment
Recreational Angling Code of Conduct	Welsh Federation of Sea Anglers	Wales	Raising Awareness and Prevention of waste from entering the aquatic environment
AECO guidelines	Association of Arctic Expedition Cruise Operators (AECO)	Artic	Educational, awareness raising
Behavioural and Clean-up Measures Targeted Offshore			
Blue Flag Award	Keep Britain Tidy	UK	Award scheme
Canoe Patrol of St. Francis	The Catholic Youth Association	Poland	Education, clean-up
Cumbria Marine Litter Project	Keep Britain Tidy	UK, Cumbria	Quantifying and addressing problem, engaging locals
European Waste Free Oceans	The European Plastics Converters	Europe/ European waters	Clean-up using fishing trawls and new technology
Forth Coastal Litter Campaign	The Forth Estuary Forum	Scotland The Forth Estuary	Clean-up, education, community involvement
Quality Coast Award	Keep Britain Tidy	UK	Award scheme
Save our shores	Save our shores	USA, California	Advocacy, education, clean-ups
Save the North Sea	Keep Sweden Tidy Foundation	North sea	Awareness raising, research
Vac from the sea	Electrolux	International	Create vacuum cleaner from collected litter
Keep the Archipelago Tidy	Keep the Archipelago Tidy	Finland	Investment in infrastructure, waste collection, recycling, information and education.
Bund campaign against littering the seas	Friends of the Earth BUND	Germany	Beach cleans, competition, events and awareness raising
SOS Plastic	WWF Italy	Mediterranean	To develop the first State mapping from plastic pollution at sea and along the coasts. Boaters are requested to report on large amounts of plastic waste seen.

Table A3.16: Measures Providing Guidelines					
Case study Name	**Organisation**	**Coverage**	**Type of Litter Targeted**	**Main Method/ Activity**	**Type of Initiative**
Guidelines for those offshore					
AECO guidelines	Association of Arctic Expedition Cruise Operators (AECO)	Artic	Marine litter	Ensures that expedition cruises and tourism in the Arctic is carried out with consideration for the environment, culture, etc.	Educational, awareness raising
The Green Guide to Coastal Boating	The Green Blue	UK	Marine litter	Raising awareness and prevention of waste from entering the aquatic environment	Education, Communication and Outreach;
Reception and Waste Handling Plan for Ships and cargo residues, Guide for port users and vessels	The Port Authority of Malaga.	Spain	Marine litter	Guide on the proper waste management in the harbour area to prevent marine litter	awareness raising
Recreational Angling Code of Conduct	Welsh Federation of Sea Anglers	Wales	Recreational fishing litter	Raising awareness and prevention of waste from entering the aquatic environment	Education, Communication and Outreach
Guidelines for those onshore					
Operation Clean Sweep	American Chemistry Council and the Plastic Industry Trade Association, British Plastics Federation	UK/EU/USA	Plastic pellets	Guidance to plastics industry on reducing loss of pellets	Education, Communication and Outreach;
Western Australia Guidance Manuals	The Department of Western Australia	Western Australia	All	Guidance manuals	Educational, awareness raising

Table A3.17: Measures Relating to Special Events				
Case study Name	**Organisation**	**Type of Litter**	**Coverage**	**Main Method/Activity**
Rubbish and recycling at Glastonbury	Network recycling	Festival litter	Glastonbury, UK	Clean- up and recycling during and post festival
Reusable crockery at events	German municipalities	Cups, dishes,	Germany	Law mandating the use of reusable crockery at events. Eg. Oktoberfest
Green Goal	FIFA World Cup Organising Committee	Cups, dishes, Packaging, etc	Germany	waste prevention at the soccer world championship (2006) through reusable crockery, low-waste packaging, etc.
Waste prevention at major events- Austria	Various	Event litter	Austria	Waste prevention at major events- Information to the organizers on specific prevention measures, including support by information material for visitors on waste prevention
Purchase and use of reusable cups- Austria.	Various	Cups, etc	Austria	Event organizers in Vienna use reusable cups at various festivals

Table A3.18: Common Template for Feasibility Assessment of Measures					
Category	**Evaluation Issue**	**Description**	**Possible Feasibility Assessment Criteria**	**Type of Information**	**Indicator**
Level of interest/ uptake (feasibility)	***Administrability***	Institutional: feasibility of carrying out a measure against the administrative, infrastructural, cultural, socio-economic and geographic context	Administrative context; time needed for implementation	Qualitative	existing administrative mechanisms
				Quantitative	time needed to implement measure
				Quantitative	costs involved for new capacities
			Infrastructural context: types and capacities of existing infrastructure, their effect on the feasibility of a measure and possibilities, time and efforts needed for implementation	Quantitative/ qualitative	types and capacities of existing infrastructure
			Cultural and socio-economic context: attitudes and behaviour due to cultural and socio-economic circumstances and possibilities, their effect on the feasibility of a measure and time and efforts required for changing them	Qualitative	attitudes and behaviour of residents, tourists and other actors
			Geographic context: Relevant geographical conditions (e.g. remoteness, population density), their effect on the feasibility of a measure and possibilities, time and efforts needed for implementation	Quantitative/ qualitative	quantities of waste from remote areas (e.g. islands) properly managed
		Political: political willingness to implement measure	Opposition by stakeholders	Qualitative	involved stakeholders that may face new economic costs or administrative burdens (= sources of opposition)
			Support/acceptance by stakeholder	Qualitative	involved stakeholders that may see economic chances
			Non-compliance	Qualitative	underlying reasons for non-compliance e.g. need for incentives, etc.
			Engagement non-Member States, e.g. Norway, candidate countries, EU neighbouring countries	Qualitative	incl. input from BIPRO study
		Legal: identifying difficulties and opportunities in terms of introducing the measures	Difficulties/ opportunities in terms of introducing measures	Qualitative	legal frameworks, (cooperation between) responsible authorities, status of implementation, etc.
			Based on perceptions: e.g. surveys of visitor opinions on litter	Qualitative	qualitative classes: high - medium - low

Table A3.18: Common Template for Feasibility Assessment of Measures					
Category	**Evaluation Issue**	**Description**	**Possible Feasibility Assessment Criteria**	**Type of Information**	**Indicator**
Costs	***Financial***	Cost of implementation	Negative and positive costs related to the implementation	Quantitative (Qualitative)	public costs e.g. for administration or provision of infrastructure, costs for industry, costs for concerned sectors e.g. fishery, tourism, costs for consumers
		Social costs	Negative and positive costs related to employment	Quantitative (Qualitative)	particularly job losses and gains
		Time costs (and for discounting)	Time needed for implementation	Quantitative	incl. development, technical issues; (procedures ~institutional feasibility)
Effectiveness	***Relevance [aims/ objectives of measure]***	Covers the extent to which measures actually match the aims, i.e. do they reduce, prevent or clean-up litter?	Is dealing with litter the main objective of the measure, or are there multiple objectives e.g. education, awareness raising, improving the visual amenity of a tourist hot spot, etc.	Qualitative	
	Effectiveness	Environmental effectiveness: overall impact on the amount of litter entering the marine system. Covers the results, outputs and impacts of the measures	Directly measurable: changes in amount of litter found on beach/sea	Quantitative	quantities of marine litter found (kg/ km³ or kg/ km shoreline)
			Based on perceptions: e.g. surveys of visitor opinions on litter	Qualitative	qualitative classes: high - medium - low
		Political effectiveness: addressing loopholes and gaps per regional sea	Directly measurable: changes in amount of litter produced or possibly entering the marine system	Quantitative	quantitative: e.g. reduction of share of landfill by XX% within 5 years
	Coherence	Possible overlap or complementarity between measures	Does the impact of the measure depend on the simultaneous implementation of another measure?	Qualitative	relations with other measures
			Can the measure be implemented on its own?	Qualitative	
			Complementarity between measures?	Qualitative	
			Adverse impacts of the measure?	Qualitative	adverse impacts

Table A3.18: Common Template for Feasibility Assessment of Measures					
Category	**Evaluation Issue**	**Description**	**Possible Feasibility Assessment Criteria**	**Type of Information**	**Indicator**
	Community added value	Considers if the measures meet the needs of the stakeholders (i.e. users of sea/ beach, residents/ owners,)	Does the measure fit with the aims and desires of stakeholders (this can be determined where survey data are available)	Qualitative	
		Considers whether action at EU level is actually more beneficial than regional or national action level	At what geographical level is the measure implemented?	Qualitative	
			Would the measure have greater impact if it were implemented across a wider area?	Qualitative	
	Sustainability	Financial: in terms of whether there is funding for the measure to continue	Are there funds and resources available to support the measure? Which? By whom?	Qualitative	availability of funds
		Time frame: in terms of a long, medium or short term positive effect of the measure	Will the measure continue to reduce, prevent or clean up litter, or does it have a one-off impact?	Quantitative (Qualitative)	time dependent impact of the measure
	Monitorability [to provide evidence on which to base effectiveness predictions]	Possibility to monitor the effect of a measure e.g. in order to control the efficiency of a measure within a certain time frame	Monitoring strategy (Y/N; method, indicator, time frame)	Qualitative	time and efforts required for monitoring
Distributional analysis/ stakeholder analysis	***Who causes the problem?***	Identification (where known) of where the litter problem is coming from (this could be generic to all measures)		Qualitative	

Table A3.18: Common Template for Feasibility Assessment of Measures					
Category	**Evaluation Issue**	**Description**	**Possible Feasibility Assessment Criteria**	**Type of Information**	**Indicator**
	Who pays (incurs costs)	Identification of the groups that are responsible for implementing the measures, and hence, who pays to implement the measure	This would pull together the results of the above assessment to give a picture of the distribution of costs, benefits and dis-benefits	Qualitative	
	Who benefits (positively impacted)	Who receives the benefits (this could be broad groups)		Qualitative	
	Who loses out (negatively impacted)	Who is negatively impacted/'suffers' (again this could be broad groups)		Qualitative	
Wider issues	***Transfer-ability (applicability)***	Potential to implement the measure in other countries, geographical areas, sectors. Covers how adaptive certain measures are to different contexts	What limitations does the measure entail?	Qualitative	type and relevance of limitations
			What additional costs arise from the limitations of the measure?	Quantitative (Qualitative)	costs to overcome limitations
			Is the measure only applicable to a particular region or locality?	Qualitative	conditions that prevent the application in other regions
			Is the measure only applicable to one target group, or is it universally valid?	Qualitative	conditions that prevent the application in other regions

ANNEX 4: CASE STUDY– COMPARING SIMILAR PACKAGES OF MEASURES IN DIFFERENT MEMBER STATES: MARKET-BASED MEASURES TARGETING PLASTIC BAGS

A4. MARKET BASED MEASURES TARGETING PLASTIC BAGS

A4.1 Introduction

The objective of this case study is to evaluate and compare how similar economic tools, also known as market-based instruments have performed in different Member States. This will provide a clearer view of the factors which impact the success or weakness of market-based instruments in influencing consumer behaviour. Market-based instruments aim to influence behaviour by increasing the costs of actions which are considered undesirable and/or reducing the costs of actions which are considered to be desirable. They have become an increasingly popular policy tool to address littering, including marine litter.[1]

Deposit-refund systems are another way to give value to waste which may otherwise be discarded and contribute to litter. These measures are examined in detail in the study of the largest loopholes within the flow of packaging material (ENVD.2/ETU/2011/0043) (see Section 1 of this report).

In the initial analysis for this case study, a number of different types of market based measures were identified, these were:

- deposit refund systems;
- plastic bag taxes and charges;
- other single use item/packaging taxes; and
- a reward scheme for used cooking oil.

Following an initial assessment of the measures, which included an analysis of the perceived impacts, economic instruments targeting plastic bags were chosen for further evaluation.

The aim of plastic bag taxes and charges is to reduce the consumption of plastic bags. There are many reasons for this with one of the principle reasons being to reduce litter. Plastic bags are a major contributor to litter. Reducing plastic bag consumption is high on the European agenda and has attracted strong public support. In addition to economic instruments, measures that have been implemented to try to achieve this include national, regional or local bans on the use of plastic bags (see Box A4.1, over page). These measures are also examined in detail in the study of the largest loopholes within the flow of packaging material (ENVD.2/ETU/2011/0043).

[1] Ten Brink, et al (2009): **Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter,** Institute for European Environmental Policy (IEEP), Brussels, Belgium, and Sheavly Consultants, Virginia Beach, Virginia.

Box A4.1: Bans to Reduce Plastic Bag Consumption

Several countries and regions have introduced legislation banning single-use plastic bags. In some cases, national bans have been applied (e.g. Bangladesh and Rwanda), in others bans have been implemented in certain regions (e.g. South Australia).

In addition to legislative bans, voluntary bans in towns or cities have been organised by local communities. In the UK, for example, a number of towns are, or are attempting to become, plastic bag free. Modbury in Devon was the first town in Europe to become plastic bag free, in 2007. Alternatives were introduced such as biopolymers, paper and cotton bags. The Marine Conservation Society (MCS) lists the following towns in the UK which are plastic bag free. It also provides a guide for communities that want to become plastic bag free. This highlights the issues concerning plastic bags and identifies the possible steps that towns and communities can take to get started.

Plastic Bag Free Towns in the UK				
England	Girton	Aylsham	Henfield	Steyning
Modbury	Overton	Bishops Castle	Hebden Bridge	Horsham
Crediton	Wimbledon Park	Church Stretton	Tisbury	
Scotland		**Wales**		
Banchory		Hay-on-Wye		
Selkirk				

Source: Marine Conservation Society; downloaded from: http://www.mcsuk.org/what_we_do/Clean%20seas%20and%20beaches/Campaigns%20and%20policy/Plastic%20bag%20free%20towns
Marine Conservation Society (n.d.) ***Why go plastic bag free?,*** *downloaded from: http://www.mcsuk.org/downloads/pollution/plastic%20bag%20free%20pack.pdf*

A4.1.1 Selected Case Study Measures

The case study focuses on measures which increase the cost of plastic bags, either through taxes or charges, and thus aim at reducing their use. Many countries have either introduced such taxes or are considering their introduction, including, for example, Scotland, Wales, Denmark, Northern Ireland. Some countries have introduced a plastic bag tax along with taxes on other single-use items (e.g. Belgium).

In addition to these statutory measures, some retailers have introduced voluntary charges for plastic bags provided to customers (e.g. Marks and Spencer, Aldi, Lidl, etc.). The aim of these charges is also to reduce the use of plastic bags, in line with the companies' environmental policies. However, they also have the effect of reducing retailers' costs.

The measures listed in Table A4.1 have been analysed as part of the case study.

Table A4.1: Selected Measures: Case Study on Similar Packages of Measures in Different Member States

Name of initiative	Organisation	Coverage	Type of Litter Targeted	Main method/ activity
Taxes				
Irish plastic bag levy	Irish Government	Ireland	Plastic bags	Tax per bag

Table A4.1: Selected Measures: Case Study on Similar Packages of Measures in Different Member States				
Name of initiative	**Organisation**	**Coverage**	**Type of Litter Targeted**	**Main method/ activity**
Bulgarian plastic bag tax	Bulgarian Ministry of Environment	Bulgaria	Plastic bags	Tax per bag
Belgian pic-nic tax	Belgium Government	Belgium	Plastic bags (and other single use products)	Tax per bag/ product
Welsh single use carrier bags regulations	Welsh Government	Wales	Single use carrier bags (plastic, paper, etc.)	Tax per bag
Voluntary Charges				
M&S food carrier bag charge	M&S	M&S grocery stores	Carrier bags	Charge per bag
Lidl carrier bag charge	Lidl	Lidl stores	Carrier bags	Charge per bag

The selected measures are all categorised as behavioural measures as they aim to reduce littering through changing people's behaviour. The analysis set out in the following sections compares the measures in terms of their success in influencing people's behaviour and preventing litter, and their cost-effectiveness. The key success factors and the major barriers faced by different measures in different Member States are considered, as are the implications for the design of instruments at an EU-wide basis.

A4.2 Nature of the Measures and the Context in which they have been Adopted

A4.2.1 Introduction

Although the measures in this case-study share broad similarities, each one is implemented in a slightly different way and under slightly different circumstances. The measures differ in terms of tax/charge rate, the range of bags included, the retail outlets to which they apply and associated campaigns.

Some of the measures have been established for a longer time than others. This is also an influential factor determining the amount of data which is available on each measure.

A4.2.2 Objectives

Both taxes and charges increases the cost of plastic bags for consumers, which in turn is expected to decrease consumption. One of the primary objectives of taxes and charges on plastic bags is to reduce the consumption of plastic bags. According to the Welsh Government, the reason behind it's carrier bag tax is to reduce the number of

single-use carrier bags as they represent "*a waste of resources and can become a litter problem*"[2].

The Irish plastic bag tax was also intended to reduce plastic bag use. The tax rate was set at a sufficiently high level to dissuade consumers from using plastic bags and encourage them to carry their own reusable shopping bags[3].

The Irish Tax and Customs Authorities state that "*An environmental levy on the use of plastic bags offers an appropriate solution towards reducing the consumption of plastic shopping bags and thereby reducing the consequential environmental problem of litter*"[4].

A4.2.3 Implementing Bodies and Geographical Coverage

Four of the six measures in this case study are government-implemented taxes; these generally apply to a whole country.

The voluntary charges are implemented through private companies; e.g. M&S and Lidl Supermarkets. These charges are restricted to retail outlets managed by that company.

A4.2.4 Types of Bags Subject to Taxes/Charges

A UNEP report suggests that, if the main policy aim of a tax is to reduce litter, then a tax which covers all (plastic) bags is more effective than one which is weight-based (i.e. one which is dependent on the thickness and weight of the plastic used to make the bag)[5].

Table A4.2 shows the considerable variation in the bag types which are subject to specific taxes and charges. Some measures have a rather narrow scope, covering only plastic bags of a certain thickness and exclude biodegradable plastic bags, for example when it was first introduced the Bulgarian plastic bag tax only covered plastic bags of 15 microns or less.

Others apply to a wider range of bag types; for example the Welsh tax applies to all single-use carrier bags which may be made from plastic, paper or plant based starch. All single-use carrier bags are covered by the tax as they are all considered to represent a waste of resources and also contribute to the litter problem[6].

---

2 The Welsh Government (2012): **The Welsh Carrier Bag webpage**, downloaded from: http://www.carrierbagchargewales.gov.uk

3 Convery *et al* (2007): *The most popular tax in Europe? Lessons from the Irish plastic bags levy,* Environmental Resource Economics, 38:1–11.

4 Irish Tax and Customs Department (nd): **Environmental Levy on Plastic Bags, An Appropriate Solution for Protecting the Environment**, downloaded from: http://www.revenue.ie/en/tax/env-levy/environmental-levy-plastic-bags.html

5 UNEP (2005c): **Selection, design and implementation of economic instruments in the Kenyan solid waste management sector**. United Nation Environment Programme, Geneva, Switzerland.

6 The Welsh Government (2012): **The Welsh Carrier Bag webpage,** downloaded from: http://www.carrierbagchargewales.gov.uk

Table A4.2: Types of Bags Subject to Taxes/Charges and Rates		
Measure	**Types of Bag Subject to Tax/Charge**	**Rate (€)**
Taxes		
Irish plastic bag levy	Plastic bags - includes biodegradable bags - excludes plastic bags below a certain size when used for blocking (separating food stuffs and other products for hygiene and food safety purposes).	2002 - €0.15 per bag 2007 - €0.22 per bag
Bulgarian plastic bag tax	Initially single-use plastic bags with a thickness of up to 15 microns. Since June 2012, all plastic bags. Excludes biodegradable bags.	2011 - €0.08 per bag 2012 - €0.18 per bag 2013 - €0.23 per bag 2014 - €0.28 per bag
Belgian pic-nic tax	Disposable plastic bags - excludes biodegradable plastic bags. - the tax also applies to other single use products such as kitchen utensils, food wrap and aluminium foil.	€0.01 and €0.10 per bag depending on thickness
Welsh single-use carrier bags regulations	Single-use carrier bags made wholly or mainly from paper, plant-based material or natural starch.	minimum charge of €0.06 per bag
Voluntary Charges		
Marks and Spencer (M&S)	Charge for all bags:	€0.06 per single-use bag €0.12 per 'bag for life'
Lidl	Charge for all bags:	Between €0.04 and €0.11 per bag €1.10 per extra thick bag
Source: Ministry for Environment, Community and Local Government Ireland, Plastic bags, downloaded from http://www.environ.ie/en/Environment/Waste/PlasticBags/		

The type of bags covered by the tax or charge is related to the objective of the measure. The extended tax in place in Wales, which covers all single-use carrier bags (plastic, paper and plant-based starch) aims to tackle environmental issues on a wide scale[7]. The aim is that a tax which covers all bags sends a clear message to the consumer that single-use bags are a threat to the environment, whereas a tax which only covers plastic bags may dilute this message to an extent. Single-use bags are a particularly persistent and visible type of litter and therefore, according to the 'broken window' theory, they may in turn attract additional litter.

Although some measures include biodegradable bags, others exempt them from the tax or charge. However, it should be noted that biodegradable bags are equally as likely to become litter as traditional plastic bags. In addition, biodegradable bags may be seen as less of an issue for people to throw away as litter because it may be believed that the bags will quickly decompose, where in fact they do not. The precise definition of biodegradable plastics can vary between countries and regions.
In the Irish and Welsh cases, biodegradable bags are included within the tax regulation and there is therefore no definition of 'biodegradeable'. In Bulgaria and

[7] ERIC (2012): **Welsh levy on carrier bags; Legislating to change behaviour**, The Environmental Regulation and Information Centre, downloaded from: http://eric-group.co.uk/news_story.php?content_id=274

Belgium biodegradable plastic bags are exempt from the tax. According to our consultation with the Bulgarian Ministry, the terms biodegradable and compostable are used interchangeably in Bulgaria but bags which are exempt must meet the EN13432 standard for compostability. It is expected that this will result in an increase in the demand of biodegradable and compostable bags. Similarly, to be exempt from the Belgian tax, biodegradable bags must meet the EN 13432 standard.

Interestingly, M&S justifies its choice of not using biodegradable bags as it considers that they does not encourage reuse and can thus hinder the progress of existing recycling activities[8].

The issue of biodegradable plastic bags is of particular importance when focusing on marine litter. Biodegradable plastic bags are praised for being more environmentally friendly than traditional plastic bags and degrade faster. Muller et al (2011) find that in a controlled composting situation it takes several weeks for a biodegradable bag to break down. However, in seawater the conditions are far different and are much less favourable for degradation of biodegradable plastics[9].

A4.2.5 Tax/ Charge Rate

The tax rates adopted by legislative schemes vary considerably in both size and tax basis. For example:

- the Irish and Bulgarian taxes are similar in size. The Irish tax is €0.22 per bag; the tax in Bulgaria started at BGN 0.15 (€0.08) in 2011 and is set to reach BGN 0.55 (€0.28) in 2014;
- in Belgium and Wales tax rates are considerably lower. The Belgian tax is based on the weight of the plastic used and is equivalent to between €0.01 and €0.10 per bag while in Wales there is a minimum charge of £0.05 (€0.06), which can be increased by the retailer[10].

8 Marks and Spencer (2012): **How we do Business; Natural Resources,** downloaded from: http://corporate.marksandspencer.com/howwedobusiness/our_policies/natural_resources

9 Müller et al (2011): *Experimental degradation of polymer shopping bags (standard and degradable plastic, and biodegradable) in the gastrointestinal fluids of sea turtles,* Science of the Total Environment, 416 (2012) 464 – 467.

10 ArcPlus (2011): **Good Practice in Waste Prevention; Eco-taxation on disposable plastic bags, disposable kitchen utensils, food wrap & aluminium foil, Belgium.** Part of the International Pre-waste workshop, Sharing ways to tackle municipal waste prevention in cities & regions, 28 March 2011, Brussels.

Tax rates may change over time. The Irish Government, for example, imposed an initial tax of €0.15 per bag in 2002; since then the levy has increased once to €0.22 per bag in 2007. More recently, under the Waste Management (Landfill Levy) Regulations 2011, it has become possible to amend the Irish plastic bag levy once in any financial year. This is done in relation to the consumer price index, with the possibility of adding an extra 10% at the discretion of the Minister for the Environment. The ceiling for the Irish tax is now set at €0.70[11].

The plastic bag tax in Bulgaria is set to increase annually until it reaches an upper limit. It was introduced at BGN 0.15 (€0.08) in 2011 and rose to BGN 0.35 (€0.18) in 2012. It is set to increase to BGN 0.45 (€0.23) in 2013 and BGN 0.55 (€0.28) in 2014. However, prior to the 2012 tax rise, over 1 000 Bulgarian manufacturers protested against it[12].

Voluntary schemes also vary in the charge rate they impose on bags. Lidl levies a range of charges depending on the bag type. In the UK, charges range from 3p (€0.04) (available in selected stores) to 5p (€0.06), to 9p(€0.11) or 89p (€1.10) for extra thick, re-usable bags. In M&S single-use plastic bags are charged at 5p (€0.06) per bag. However, customers can pay 10p (€0.12) for a 'Bag for Life' which is made from 100% recycled materials and can be replaced free of charge when it wears out.

A4.2.6 Method of Collection and Enforcement

Most bag taxes are payable by the consumer, but they are not always levied on the consumer directly. In Belgium, for example, the tax is levied on the wholesaler; however, the additional cost is expected to be passed down the supply chain to retailers and ultimately consumers. It has been noted that the Belgium tax has been far more effective in large retail outlets than in small retail stores such as pharmacies, bakeries, etc., where plastic bags are often still provided to consumers free of charge[13].

Similarly, according to The Taxpayers' Alliance, small Welsh businesses often fail to pass the tax onto the customers. It notes that some retailers or shop-owners find it awkward to ask customers to pay for a bag after they have spent considerable amounts of money in the shop, especially in popular tourist destinations where tourists may be unfamiliar with such a tax[14]. However, such small shops are still required to charge for carrier-bags and those which continue to provide free carrier-bags can face a fine of up to £5 000 (€6 000). However, the Welsh Government announced in July 2011 that, due to the additional administrative and financial burden associated with

---

11 ERIC (2012): **Welsh levy on carrier bags; Legislating to change behaviour, The Environmental Regulation and Information Centre**, downloaded from: http://eric-group.co.uk/news_story.php?content_id=274

12 The Sofia Globe (2012): **Manufacturers of plastic bags protest against Bulgaria's new eco-tax**, downloaded from: http://sofiaglobe.com/2012/09/26/manufacturers-of-plastic-bags-protest-against-bulgarias-new-eco-tax/

13 PreWaste (2011b): **Fact sheet 26; Eco-taxation on disposable plastic bags, kitchen utensils, food wrap & aluminium foil (pic-nic tax), Belgium**, downloaded from: http://www.prewaste.eu/waste-prevention-good-practices/detailed-factsheets/item/288-26-ibge-ecotaxation-plastic-bags.html

14 The Tax Payers Alliance (2012): **Protest against Bag tax,** downloaded from: http://www.taxpayersalliance.com/grassroots/2012/04/protest-bag-tax.html

recording bag charges and accounting for the revenues, small businesses (with fewer than 10 staff) are exempt from recording the tax as it places additional pressure on the small business sector[15].

In Bulgaria, it is the producers and/or importers of plastic bags who are required to register with the Ministry and provide information on the bags they produce/import. This is for record keeping and applies regardless of whether the bags are subject to the tax or exempt from it. The tax is paid by producers and importers to the Ministry Environmental Protection Fund and is monitored by the Ministry through on-site checks. The cost of the bag is then transferred down the chain to the consumers.

A4.2.7 Use of Revenues

Whilst the aim of plastic bag taxes and charges is to increase the costs of plastic bags and thus reduce their use, the impacts of taxes and charges on marine litter can be enhanced by the use to which the tax revenue is put. Using the revenues raised for environmental purposes, rather than simply contributing to general tax revenues, can also increase the political acceptability of taxes.

The Irish government provides clear information that the revenues from the plastic bag levy are assigned to an environmental fund operated by the Department of the Environment, Heritage and Local Government. The tax revenues cover the cost of administration of the tax and also supports and promotes a variety of environmental programmes[16]. In Wales, revenues are collected by retailers, who are then encouraged to pass the money on to charities of their choice, preferably environmental ones. In the case of Bulgaria and Belgium there is no available data which clearly explains where the revenues go. However, through our consultation with a Bulgarian Ministry representative it was noted that profits from the tax (i.e. revenues net of the costs of operating the tax) are used to finance environmental projects.

The revenues raised by the M&S voluntary charge are used for environmental purposes. Between May 2008, when the charge was first implemented, and May 2011 all the profits were donated to the UK environmental charity Groundwork. Currently, all profits go to funding the 'Forever Fish' programme; 40% to the Marine Conservation Society, 40% to the World Wide Fund for Nature and 20% to School of Fish programme. The charge is part of the company's eco and ethical programme, known as Plan A, which tackles multiple issues such as climate change, raw material use and waste. M&S also carries out other associated actives, such as beach clean-ups, and its website has links to fun educational activities aimed at raising awareness.

No information is available on how the revenues raised by the voluntary charge by Lidl are used.

---

[15] The Tax Payers Alliance (2012): **Protest against Bag tax,** downloaded from: http://www.taxpayersalliance.com/grassroots/2012/04/protest-bag-tax.html

[16] Convery *et al* (2007): *The most popular tax in Europe? Lessons from the Irish plastic bags levy,* Environmental Resource Economics, 38:1–11

A4.3 Achievements

A4.3.1 Irish Plastic Bag Levy

Ireland was the first European country to implement a plastic bag tax in 2002 and the impacts have been significant. The levy is reported to have contributed to a 90% reduction in plastic bag consumption, from an initial level of 1.2 billion bags per year. It had an immediate effect on consumer behaviour, decreasing plastic bag usage from an estimated 328 bags to 21 bags per capita per year. However, this rate slowly rose to 31 bags per capita in 2006, which was the reason for the subsequent increase in the tax rate in 2007, in an attempt to reduce consumption again[17].

In general the measure has been positively received by the public, the media and the retail industry[18]. However, the Irish plastics industry initially opposed the introduction of the plastic bag levy, claiming that it was in breach of the EU Packaging Waste Directive. The levy aims at reducing consumption of bags at retail outlets but fails to tackle plastic bags which are used for other purposes. According to the Carrier Bag Consortium, business has increased substantially for some market players within the plastic bag industry, for example there has been a sharp rise of between 300% and 500% in the sale of plastic bin liners, nappy bags, etc[19]. This would indicate that the net reduction in plastic bag use is in fact lower than the figures recorded. However, it should also be noted that in terms of litter, bin liners are less likely to end up as litter but rather in landfill.

One of the policy goals when implementing the Irish plastic bag levy was to reduce plastic bag litter throughout the countryside and along the coastline. Plastic bags are a persistent and visible type of litter. Since the tax was introduced, there has been a notable reduction in plastic bag litter in Ireland[20]. One source claims that the Irish plastic bag levy has contributed to a 95.6% reduction in plastic bag litter[21]. Survey data from the National Litter Pollution Monitoring System, covering 2010, shows plastic bags constituted about 0.25% of litter pollution nationally[22]. The most recent survey data available (2011) shows that plastic bag litter further fell to 0.24%. This is a substantial improvement on the 5% share of plastic bags in litter pollution nationally prior to the introduction of the levy[23].

---

17 Convery *et al* (2007): *The most popular tax in Europe? Lessons from the Irish plastic bags levy,* Environmental Resource Economics, 38:1–11

18 Convery et al. (2007): *op cit*

19 Carrier Bag Consortium (nd): **The Holes in the Argument for a Carrier Bag Tax,** downloaded from: http://www.carrierbagtax.com/downloads/CBC2ppLeaflet61.pdf

20 Convery et al. (2007): *op cit*

21 Keep Wales Tidy (2006): **Plastic Bag Litter Position Paper**, downloaded from: http://www.keepwalestidy.org/1528.uploadfile.dld

22 TOBIN (2011): **The National Litter Pollution Monitoring System, Litter Monitoring Body, System Results 2010,** prepared for The Department of the Environment, Heritage and Local Government, Dublin.

23 TOBIN (2012): **The National Litter Pollution Monitoring System, Litter Monitoring Body, System Results 2011,** prepared for The Department of the Environment, Heritage and Local Government, Dublin.

A4.3.2 Welsh Carrier Bag Tax

The Welsh carrier bag tax, introduced in 2011, has also reportedly led to reductions in consumption. According to the Minister for Environment and Sustainable Development, there has been a reduction in bag consumption of between 35% and 96%, depending on the type of retail outlet:

- food: 70 - 96% reduction;
- fashion: 68% - 75% reduction;
- home improvement: 95% reduction;
- food service: up to 45% reduction; and
- telecommunications: 85% reduction.

As in the Irish case, a recent assessment in Wales also found that carrier bag reuse (i.e. as bin liners, etc.) had decreased from 57% to 51%[24].

A4.3.3 Other Taxes and Charges

In Belgium the pic-nic tax is reported to have achieved a reduction in single-use plastic bags. The first year of implementation saw a significant reduction in plastic bag use. However, this was not the case for the other items covered by this tax which include single-use table-ware, food wrap and aluminium foil[25].

In the case of the Bulgarian plastic bag tax there is very little data available on the results. Consultation with a Bulgarian Ministry representative indicated that, according to plastic bag producers, there has been a 50% decrease in the production of and demand for plastic bags (with thickness of up 15 microns). Although our consultation indicated that decisions on the tax increase and product requirements was reached with industry involvement, Sofia Globe (2012) suggests that the tax rise was subject of debate and industry protests[26].

With regards the voluntary charges imposed by private organisations, some positive results have also been recorded. M&S claims that, since introducing the voluntary charge, there has been a drop in plastic bag use by more than 80%[27]. In addition, environmental organisations such as Groundwork and Forever Fish have benefitted from donations made from the profits raised through the bag charge. Lidl has not provided information about the impacts of its voluntary charge, which appears to have been in place for some time.

---

24 Cardiff University (2012): **Evaluation Of The Introduction Of The Single-Use Carrier Bag Charge In Wales: Attitude Change And Behavioural Spillover**, downloaded from http://wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/substance/carrierbags/attituderesearch/?lang=en

25 PreWaste (2011b): **Fact sheet 26; Eco-taxation on disposable plastic bags, kitchen utensils, food wrap & aluminium foil (pic-nic tax), Belgium**, downloaded from: http://www.prewaste.eu/waste-prevention-good-practices/detailed-factsheets/item/288-26-ibge-ecotaxation-plastic-bags.html

26 The Sofia Globe (2012): **Manufacturers of plastic bags protest against Bulgaria's new eco-tax**, downloaded from: http://sofiaglobe.com/2012/09/26/manufacturers-of-plastic-bags-protest-against-bulgarias-new-eco-tax/.

27 Marks & Spencer (2011): **Marks & Spencer launches Forever Fish,** Press Release, downloaded from: http://corporate.marksandspencer.com/media/press_releases.

A4.3.4 Factors Influencing Achievements

Europen argues that, in order to change behaviour, a plastic bag tax must be substantial[28]. Ireland set a relatively high tax rate and has achieved high reductions in consumption of plastic bags. The sharp initial drop in consumption is likely to be due to the high tax rate imposed in comparison to many other countries. However, the relationship is not straight-forward. Whereas Ireland set the tax at €0.15 which resulted in a 90% reduction in plastic bag consumption, Wales set a tax at just over a third of this level (5p (€0.06) per bag) and experienced a reduction of between 35% and 96% in carrier bag consumption, depending on the type of retail outlet. The Bulgarian tax, initially set at €0.08 per bag achieved a reduction of 50%. However, the bags covered by the tax may also influence results.

Achievements are also likely to be influenced by the type of bags covered by the tax. For instance, the Bulgarian tax was initially a weight-based tax covering bags of 15 microns or less. In contrast, the Welsh tax covers all carrier bags and the Irish and Belgian taxes cover plastic bags (although the Belgium tax excludes biodegradable bags). The weight-based tax in Bulgaria resulted in many manufacturers and importers switching to thicker bags in order to evade the tax, which somewhat defeats the aim of the tax (resulting in an increase in the amount of plastic used). More recently, the Bulgarian tax has been extended to cover all plastic bags, excluding biodegradable bags. It is noted that this may increase demand for biodegradable bags in the Bulgarian market[29].

A4.4 Costs and Savings

Plastic bag taxes are set up using government funding. The revenues raised are generally used to cover running costs. Revenues from the Irish plastic bag tax, for example, cover the administrative costs and also provide support for a variety of environmental projects. The tax had a one-off set up cost of €1.2 million, which was used for new computer systems and additional resources needed to administer the tax. A publicity campaign which was launched to raise awareness about the tax cost in the region of €358 000. Annual administrative costs amount to approximately 3% of the revenues. In 2002 the total tax collected amounted to €10.5 million, in 2007 after the tax rise it amounted to €26.6 million, and in 2010 it had decreased to €17.4 million. The Government levy on the use of plastic shopping bags has generated €166m for the exchequer since it was introduced 10 years ago[30]. Costs are reduced because it is possible to integrate reporting and collection into existing Value Added Tax reporting systems.[31]

---

28 Europen (2007): **Europen Comments on The European Commission Green Paper on Market-Based Instruments for environment and related policy purposes**. Europen, Brussels.

29 European Plastics News (2012): **Bulgaria to increase plastic bag tax by 233%,** downloaded from: http://www.europeanplasticsnews.com/subscriber/headlines2.html?id=1643

30 The Irish Examiner (2012): Plastic bag levy nets €166m in 10 years, downloaded from: http://www.irishexaminer.com/ireland/plastic-bag-levy-nets-166m-in-10-years-185605.html

31 Convery et al. (2007): *op cit.*

Compared to Ireland, the Belgian pic-nic tax is much lower. In 2008 revenues from the charge were over €1 million[32].

There is little information on the costs of implementing the tax in Wales. However, it is reported that prior to the tax local authorities in Wales spent an estimated £1 million annually in cleaning up plastic bag litter.[33] A reduction in plastic bag use is likely to reduce the cost of plastic bag clean-up, which may help to offset the costs.
Bulgaria also lacks accessible data on costs or revenues. However, through our consultation we found that only 4 000 BGN (€2 050) had been raised since its implementation in October 2011. This is partly due to the fact that producers/importers quickly switched to bags thicker than 15 microns in order to avoid paying the tax. According to the Ministry representative, there are no direct budget expenses associated with implementing the tax; however, the Ministry is in the process of procuring equipment for precise measurement of the thickness of bags in microns, to aid enforcement. A total of 34 meters will be used throughout the country at a total cost of 1 000 – 2 000 BGN (€510 - €1 023).

M&S funds its own voluntary plastic bag charge, which is part of a broader company environmental initiative. No data are available on the costs to the company. Revenues raised from the charge have been donated to charitable projects.

A4.5 Adaptability to Other EU Regions

The use of market based measures has become increasingly popular to influence consumer behaviour. In the case of plastic bags, taxes and charges are frequently used to reduce consumption. Ireland was the first EU Member State to introduce such a measure in 2002, but similar measures have been adapted and implemented in various other Member States since then. Similar measures have also been implemented in other countries around the world. As described in this case study various aspects of these measures can be altered and adapted to suit the context and policy goals of different regions. This flexibility may facilitate adaptability to other regions or Member States.

A paper by Torgler et al (2009) investigates environmental morale in relation to perceived environmental cooperation of the general public. It found that individuals in Western European countries have a higher environmental morale than those in Eastern European countries. This may be an additional factor which influences public support for the measure. For example, the Bulgarian plastic bag tax has faced industry opposition and protests, whereas in Wales and Ireland although there was some opposition, there is strong public support for the tax[34,35]. However, according to

32 Question écrite n° 4-3598 de Sabine de Bethune (CD&V) du 23 juin 2009 au vice-premier ministre et ministre des Finances et des Réformes institutionnelles, [question posed to the vice prime minister and the minister of finance and institutional reform], downloaded from:
http://www.senate.be/www/?MIval=/Vragen/SchriftelijkeVraag&LEG=4&NR=3598&LANG=fr

33 Welsh Assembly Government (2010): **National Enforcement Priorities for Wales: Supporting Evidence for the Selected Priorities,** prepared for the Local Better Regulation Office for the Welsh Assembly Government.

34 PreWaste (2011a): Levy on plastic bags in Ireland, downloaded from: http://www.prewaste.eu/waste-prevention-good-practices/detailed-factsheets/item/download/435.html

our consultation with a Bulgarian Ministry representative, the measure has raised awareness and has gained public interest and support. A survey conducted in the press indicated that 85% of respondents (including general public and industry) supported the initiative.

In terms of costs, once the measure is in operation, revenues will generally cover costs. However, there are initial investments involved in setting up the tax schemes which could be prohibitive in some Member States. According to a 2005 UNEP report, a consumer-based plastic bag levy tends to bear a greater administrative burden than a supplier-based one, but also tends to be more effective. In addition, careful consideration should be given to the level of the tax. This can be adapted to suit the context. If the tax is set too high, it is likely to cause public opposition; however, if it is set too low it will not act as a large enough disincentive and is likely to have little impact. A low level of tax or charge may also indicate low importance given to the related policy aims, i.e. litter or consumption of single-use goods.

Due to the administrative requirements involved in setting up a national tax, voluntary charges may be more easily adaptable to different regions. They may also be effective on a local or regional level, rather than requiring national level implementation. In this case study, such measures have been implemented in two large retail stores. It is questionable as to how effective or accepted this would be in small independent retail stores, especially if the use to which revenues are put is not clearly conveyed.

This case study demonstrates that taxes and charges can take various different forms and therefore are more adaptable to multiple regions as various factors can be altered to suit the context.

A4.6 Conclusion/Lessons Learnt

This case study analyses plastic bag taxes and charges, an instrument whose structure may differ depending on the relevant policy aims and the capacity and infrastructure available. This type of measure is generally considered to have the potential to effectively reduce consumption of plastic bags as well as have a positive impact on the reduction of litter[36].

The Irish plastic bag tax was the first within Europe and is probably one of the most well documented. It has been seen as a success, not only in reducing consumption of plastic bags but also for reducing the amount of litter in the Irish countryside and coastal areas. Although the Bulgarian tax has faced industry opposition, it has gained public interest and support. In terms of reducing consumption of plastic bags, both the Welsh and Belgian tax have also been deemed successful.

---

35 Packaging News (2012): **Call for plastic bag levy in England**, downloaded from: http://www.packagingnews.co.uk/news/call-for-plastic-bag-levy-in-england/

36 Ten Brink, et al (2009): **Guidelines on the Use of Market-based Instruments to Address the Problem of Marine Litter,** Institute for European Environmental Policy (IEEP), Brussels, Belgium, and Sheavly Consultants, Virginia Beach, Virginia.

With regards the voluntary charges imposed by large retail outlets, there is more documentation on the M&S charge than the Lidl charge. Plastic bag charges can reduce costs for large retail outlets but may also improve their corporate image. In addition, by charging for plastic bags the company encourages customers to bring their own reusable bags, which has an environmental benefit. In the case of M&S, the charge is accompanied by associated awareness raising campaigns such as educational activities and beach cleans. Moreover, the profits are donated to charities working within the environmental domain. Although some of the national measures, such as the Irish and Welsh tax, also fund environmental projects, details are generally less accessible. M&S provide in depth details and links to different aspects of their campaigns and activities on their webpage as well as providing limited information in store.

The detailed design of measures will generally differ depending on the main policy aims. If the main policy aim is to reduce litter, it is likely that effectiveness may be increased by including all single-use bags within the measure, as in the Welsh example. Biodegradable bags are as likely to become litter as traditional plastic bags and they will continue to form a visible nuisance when discarded. Therefore, by targeting all single-use bags the message is clearly conveyed that that the practice of using a bag once and then throwing it away is inappropriate.

Setting the tax or charge level right is also a major factor in the potential effectiveness of a measure. Setting the level too low may result in an inadequate disincentive for customers as well as giving the impression that the policy aims are of little importance, whereas setting the level too high may result in industry or public opposition.

A thorough assessment of the potential environmental impact should be carried out prior to implementation of a market-based measure which tackles litter issues. Moreover, the consequences of the tax for consumers, industry and other stakeholders should also be carefully considered[37]. Tackling marine litter requires efforts to change behaviour, attitudes and management approaches as well as multi-sectoral involvement[38]. Market-based instruments can play an important role in addressing marine litter when used in conjunction with other measures within a comprehensive approach which may include education and outreach programmes, strong laws and policies, governmental and private enforcement, and adequate support infrastructure.

[37] Europen (2007): Europen Comments on The European Commission Green Paper on Market-Based Instruments for environment and related policy purposes. Europen, Brussels.

[38] UNEP (2006): Ecosystems and biodiversity in deep waters and high seas. UNEP Regional Seas Reports and Studies. No. 178. UNEP/IUCN, Switzerland 2006.

ANNEX 5: CASE STUDY
COMPARING DIFFERENT PACKAGES OF MEASURES AIMED AT A PARTICULAR TYPE OF LITTER: MEASURES TARGETING CIGARETTE AND CHEWING GUM

A5. CASE STUDY COMPARING DIFFERENT PACKAGES OF MEASURES AIMED AT A PARTICULAR TYPE OF LITTER: MEASURES TARGETING CIGARETTE AND CHEWING GUM LITTER

A5.1 Introduction

The objective of the case study is to examine the effectiveness of different measures and combinations of measures, targeted at a particular type of litter, namely smoking and gum related litter. This will provide a clearer view of the relevance of different instruments to particular litter types and how instruments can be combined to increase their effectiveness.

Cigarette litter includes cigarette butts and cigarette packaging. Cigarette butts are costly to clean up and are harmful to the environment. The hazardous substances in cigarettes are toxic for aquatic life, but the butts are also swallowed by animals (e.g. birds and fish) which leads to health problems. Cigarette butts take 1 to 15 years to biodegrade[1].

An increase in the problem of cigarette litter is often observed in countries or cities where a smoking ban has been introduced in public places like restaurants and bars. For instance, in the Netherlands a regulation was implemented on the 1st of July 2009 which prohibits smoking in restaurants and bars. Dutch authorities anticipated increased smoking related littering and developed a guide for local authorities with possible measures and guidelines. Surveys have shown that 60% to 70% of those who smoke outdoors litter their cigarette butts. Causes for this high prevalence include**Error! Bookmark not defined.**:

- lot of smokers don't perceive cigarette butts as litter;
- smokers consider that cigarette butts only account for a minor share in the total amount of litter. Moreover, they are easily cleaned up;
- cigarette butts are perceived to be easily biodegradable. Their environmental impact is underestimated;
- habit; and
- unavailability of ashtrays.

Rath et al (2012)[2] found that not considering cigarette butts to be litter was the primary factor that influenced cigarette littering behaviour. Nevertheless, of the 86% of smokers that consider cigarette butts to be litter, three-quarters reported disposing of them on the ground or out of a car window at one time or another. The majority of respondents believed that cigarette butts are harmful to the environment. Even though most smokers acknowledged that littering tobacco products could have damaging effects, our study found a clear disconnect between behaviours and beliefs. They

[1] Impulsgebonden Zwerfvuil (2008): **Preventie rokengerelateerd zwerfafval bij de invoering van het rookverbod in de horeca** (Dutch), downloaded from http://www.gemeenteschoon.nl/media/249437/gids_preventie_rokengerelateerd_zwerfafval_2008.pdf

[2] Rath *et. al.* (2012): *Cigarette Litter: Smokers' Attitudes and Behaviors,* International Journal of Environmental Research and Public Health: 2189–2203

conclude that messages in anti-cigarette-litter campaigns should emphasize that cigarette butts are not just litter but are toxic waste and are harmful when disposed of improperly.

A5.1.1 Chewing Gum Litter

Chewing gum litter is very difficult and costly to clean up. It makes paved areas look grimy, dirty and generally degrades an area. Different strategies have been followed to reduce gum litter. Next to existing fines for dropping chewing gum, some authorities have examined the introduction of a tax on gum to compensate cleaning costs. In Singapore, a ban on chewing gum was implemented in 1992, but has since been lifted for sugar-free chewing gum (in light of dental health benefits). Their also lies a responsibility with gum producers to develop chewing gum that is biodegradable and less sticky.

In this case study we will identify different instruments and packages of instruments that have been successful in tackling cigarette and gum litter. Information from earlier stages of the study on the nature and cost-effectiveness of the instruments, background information on the significance of cigarette and gum litter in the different Member States and the detailed analysis of the measures is supplemented by discussions with the authorities responsible for the measures.

A5.2 Selected Case Study Measures

Different types of measures concerning cigarette and chewing gum litter have been implemented: education campaigns, provision of personal ashtrays, enforcement, etc. In the Netherlands a combination of these measures has been implemented to combat cigarette litter.

The behaviour resulting in cigarette and chewing gum littering is relatively similar. This case study will therefore also assess measures targeting chewing gum.

Table A5.1: Selected Case Study Measures

Name of initiative	Organisation	Coverage	Type	Type of Litter Targeted	Main method/activity
Ashtray cones	local authorities/ coastal authorities	popular in ES, PT, IT, NL	Preventative	cigarette litter	provision of ashtray cones
Butt FREE City	Butt Free Australia	Australia	Behavioural/ Preventative	cigarette litter	personal ashtrays, leaflets, fines, etc
No Butts on the Beach	Surfers Against Sewage, British naturists and MCS	UK	Preventative	cigarette litter	provision of butt bins
Chewing Gum Action Group.	Chewing Gum Action Group (CGAG)	UK	Behavioural	Chewing Gum	advertising campaign, awareness

Table A5.1: Selected Case Study Measures					
Name of initiative	**Organisation**	**Coverage**	**Type**	**Type of Litter Targeted**	**Main method/activity**
					raising
Gum Target	Meteora Limited	UK	Preventative	Chewing Gum	gum bins

The analysis set out in the following sections compares the measures in terms of their cost-effectiveness. The key success factors and the major barriers faced by different measures in different Member States are considered, as are the implications for the design of instruments at an EU-wide basis.

A5.3 Nature of the Measures and the Context in which they have been Adopted

A5.3.1 Introduction

The best approach for reducing littering is a combination of measures: people should know the harmful environmental effects of 'cigarette waste', but they should also have the 'tools' to change their behaviour (e.g. availability of ashtrays). Sometimes the threat of enforcement is the only way that some people will change their litter behaviour[3].

The measures that will be analysed in the following sections share broad similarities, but they are implemented in a slightly different ways and under slightly different circumstances. They differ, amongst other aspects, in targeted location and audience. Some of the measures have been established for a longer time than others. This is also an influential factor determining the amount of data which is available on each measure.

[3] Defra (2007): **Preventing Cigarette Litter in England – Guidelines for Local Authorities**, available at: http://archive.defra.gov.uk/environment/quality/local/legislation/cnea/documents/cigarette-litter.pdf

A5.3.2 Cigarette Related Litter

Infrastructure

Ashtrays are key to butt littering prevention. Ultimately, if all smokers used an ashtray then there would not be a litter problem. Smokers often cite a lack of ashtrays as a reason for littering cigarette ends[3].

Research carried out by ENCAMS has shown that smokers prefer dedicated cigarette bins to dispose of their butts rather than general bins (due to the risk of fire). The bin should be large enough to hold a high volume of cigarette ends, should be clean and easy to use, and clear signage should indicate that it is for butt ends. Placement, design and visibility of the ashtray bin can influence the amount of use it gets[3].

The Victorian Litter Action Alliance distinguishes 4 main types of ashtrays[4]:

- personal ashtrays: small ashtrays designed for people to carry them in their bags or pockets to dispose of their butt if they are unable to find a suitable receptacle;
- wind proof ashtrays: ashtrays on a bench or table that are usually available at outdoor drinking and dining areas as they capture the butts and ash and stop them from blowing away;
- mobile but bins: similar in capacity to wall mounted but bins but they are mobile and can therefore be used at events;
- wall mounted but bins: permanently installed bins that come in a variety of shapes and capacities.

Defra also distinguishes variations on these categories, e.g. free standing ashtrays, litter bin mounted ashtrays, etc.

Next to design, placement of ashtrays is important. Defra's Guidelines for Local Authorities presents suggestions for choosing the right type of ashtray in common litter hotspots. Wall mounted ashtrays are for instance useful at transition points such as entrance to buildings while free-standing ashtrays tend to hold a high volume and are therefore very useful in designated smoking areas.

Personal ashtrays are often part of awareness raising campaigns, and are provided in numerous shapes. Currently the ashtray cones are popular and are provided at beach areas. They are broadly used in coastal areas in Portugal, Spain, Italy and other Mediterranean countries, and are being introduced in other countries like the Netherlands and Belgium. These small cones have been developed to reduce cigarette, and other, waste being left on the beach. The cone (generally small and plastic) is very useful and easy to use. They stay upright in the sand and there is often a lid which features a built in cigarette holder groove. The cones are reusable. They can be emptied in the appropriate receptacle and used again. Furthermore, they are small in size and easy to carry with you to the beach. On other beaches they are stored in a dispenser dock. Beach-goers can take a cone and return it as they leave

[4] Victorian Litter Action Alliance (2007): **Litter Prevention Kit – Cigarette Butts** http://kb.keepbritaintidy.org/smokinglitter/publications/vlakit.pdf

(however, these cones are often taken away and the dock stands empty). These cones can also be used for other small pieces of litter. Cones have also been designed for disposal of chewing gum.

The organisation Surfers Against Sewage designed a 'butt bin' to let smokers stub out their cigarettes and store them safely and without causing a mess until they can get to a bin.

Other campaigns target motorists who smoke. Free personal ashtrays are sometimes provided at service stations, for instance. These tend to be cup shaped ashtrays that can be stored in the cup holder. Plastic and reusable car tidy bags (designed to hang on the back of the passenger or driver's seat) are also available for other litter which accumulates in the vehicle. For instance the organization 'Butt Free Australia' has delivered several campaigns targeting motorists and providing ashtrays suitable for the user.

Awareness and Education

Effective education engages people and motivates them to act. A good campaign includes:

- information about the problem;
- incentives to motivate people to change their behaviour; and
- communication tools to convey the message.

The Litter Prevention Kit of the Victorian Litter Action Alliance presents a **Communications Plan** Template that can help authorities to flesh out their communication strategy and outline their plan. Advantages and disadvantages of different communication tools are discussed. Furthermore, ideas for media releases and a launch event are provided.

Since 2003, But Free Australia has organised several campaigns targeting **different audiences**, such as:

- Butt FREE City;
- Butt FREE Transport;
- Butt FREE Business;
- Butt FREE Pubs n Clubs;
- Butt FREE Highway; and
- Butt FREE Beach etc.

The latest national awareness campaign provided by Butt Free Australia was entitles 'Not a Good Look' and was launched in March 2010. The campaign derives from extensive independent behavioural research commissioned by Butt Free Australia.
The innovative artwork depicts butt litterers – real people – being photographed in the act of littering, as if caught by a CCTV network. It focuses on individuals asking them to consider how littering makes them look in the eye of the observer. The campaign includes an interactive "*Not a Good Look Website*" (www.notagoodlook.com.au), where visitors are able to receive a free personal

ashtray for themselves or a friend, download campaign material, submit images, participate in polls, leave comments and watch applicable videos.

Tools to encourage family, friends and colleagues to change their butt littering behaviour are also provided in the form of email templates and links to social media. In 2012, the first Butt Free Day was organized on the 18th of October. Besides educating people, awareness raising campaigns are also used to communicate the fines that apply for littering.

Enforcement

Sometimes the threat of enforcement is the only way that people will change their littering behaviour. In some countries a specific fine for littering butt ends has been implemented, in most countries there is a general fine for littering. In the UK, a new section was added in the Clean Neighbourhoods and Environment Act to clarify that 'litter' includes the discarded ends of cigarettes, cigars and the discarded remains of other products designed for chewing.

This had the effect of making it clear to practitioners that action can be taken against this from of litter, including the use of fixed penalty notices as an immediate and cost effective deterrent[3].

The state of Victoria in Australia has a very comprehensive legislation regarding cigarette litter. A range of offences exist, from depositing a small amount of litter (extinguished butt), to depositing litter (litt cigarette butt) to possibly charging an individual for aggravated littering (depositing a lit butt on a day of total fire ban day), with penalties ranging from 1 penalty unit to 2 penalty units and up to 60 penalty units or 6 months imprisonment respectively[4].

Several cities in Victoria also have cigarette litter related stipulations in footpath trading permits. These permits regulate the use of a specific area for business trading purposes. See box A5.1 for an example[5].

Box A5.1: City of Port Philip, Footpath Trading Guidelines – windproof ashtrays
• The footpath trading permit holder must provide windproof ashtrays for patrons at all times and regularly remove cigarette butts and deposit them within bins kept inside the premises • Failure to provide suitable windproof ashtrays will result in the cancellation of the current permit • Operators found weeping cigarette butts into the gutter will immediately forfeit all rights to trade on the footpath area
Source: Victorian Litter Action Alliance (2007) Litter Prevention Kit – Cigarette Butts

More controversial might be the EPA Report Line. Victoria's litter legislation allows members of the public to report people who litter from their cars to EPA Victoria. Litterers are then fined. Record details of the vehicle registration number, car details, location where the littering occurred, time and date need to be reported. One should also be prepared to attend court as a witness if required.

[5] Victorian Litter Action Alliance (2007): **Litter Prevention Kit – Cigarette Butts** downloaded from http://kb.keepbritaintidy.org/smokinglitter/publications/vlakit.pdf

Reporting of litters has risen rapidly (see figure A5.1), supporting research that shows how supportive the community is towards fining those who litter. Over 90% of the fines are for cigarette butts. Road signage is present and provides the telephone number by which to report litterers. The roadside signage aims[6]:

- to educate drivers that littering is illegal;
- to act as a deterrent to littering; and
- as a call to action for witnesses to report litterers to authorities.

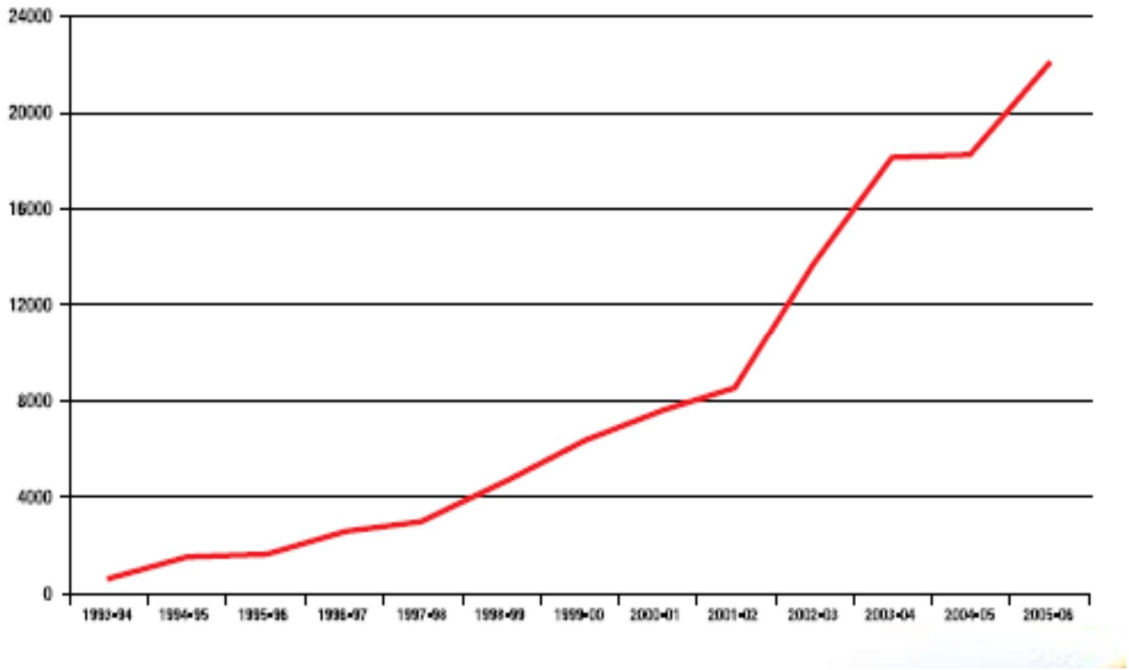

Figure A5.1: Litter Fines from 1993 to 2006 based on public litter reports (Victoria, Australia)

Source: Victorian Litter Action Alliance (2007) Litter Prevention Kit – Cigarette Butts

A5.3.3 Chewing Gum Related Litter

Infrastructure

Infrastructure is less of an issue with regard to gum litter. People can drop their gum in a regular bin. In areas where no bins are present such as on the beach, cones comparable to ashtray cones can prevent chewing gum litter.

An innovative approach to the prevention of chewing gum litter is the **GumTarget** developed by a private company called Meteora and in association with various UK borough councils, colleges and universities. GumTarget is a form of hardware designed to fix to existing lamp posts, signposts, bus stops or railings. On the front of every gum target is a gum sheet carrying amusing, engaging or provoking pictures or messages that not only encourage gum to be stuck to them, but also help to maintain

[6] Ibid.

interest in the initiative ensuring the gum boards are continually well used. The designs change regularly, so there is less risk of loss of interest.

Awareness and education

In the UK, the Chewing Gum Action Group (CGAG) was set up in 2003 as part of a joint initiative, with the aim of achieving a long-term solution to irresponsible chewing gum disposal. The first CGAG campaign in 2006 ran across 15 local authorities and was founded on the premise that we don't like being reprimanded or criticised, and if we are then we tend to do precisely the opposite of what is being asked of us. Therefore, the advertising conveyed a sense of gratitude to the reader and 'thanked' them for binning their gum. The 2007 campaign, which ran in 16 local authorities, further developed the 2006 campaign with a striking visual appearance and a revised message about appropriate behaviour and enforcement.

More recent campaigns are the 2011 'Save Yourself a Packet' campaign which communicated the fines for dropping gum, and the 2012 campaign which aimed to tap into the excitement surrounding the Olympics and show how UK citizens are all representing their country in 2012.

Enforcement

Like for cigarette butts, in most countries only general fines for littering are applicable. As mentioned above, in the UK legislation defines that litter includes cigarette related litter and products designed to litter.

A5.4 Achievements

A5.4.1 Cigarette Related Litter

There are limited results available on individual measures, however the Victorian Litter Action Alliance and Butt Free Australia publish evaluation reports of their campaigns. These campaigns are usually a combination of infrastructure, communication and enforcement. Below, we present the results of a 2006 Butt FREE Highway campaign and of the Victorian 2007 'Don't be a Tosser' campaign.

Butt FREE Highway: Motorist Cigarette Butt Littering Reduction Campaign (2006)[7]

The Motorist Cigarette Butt Littering Reduction Campaign South Australia aimed to raise awareness and educate vehicle users, to improve overall cigarette butt disposal practices while travelling on South Australia's roads and highways.

The campaign ran for a five week period in early 2006 (from 10th January 2006 to 17th February) and used roadside messaging, posters, educational materials, personal interviews and mass media to achieve its objective. In addition to free personal ashtrays (used in the 2005 study) the campaign offered butt buckets and car tidy bags

[7] KESAB environmental solutions (2006): **Motorist Cigarette Butt Littering Reduction Campaign SA** – Final report

(plastic & reusable canvas type) incorporating awareness messaging. 35 roadhouses and service stations in the campaign areas joined the campaign displaying posters and signs and distributing resources. Over the 5 week period a total of 3 000 personal ash trays, 250 butt buckets, 250 reusable car bags, 20 000 plastic car bags and 10 000 information cards were distributed.

While follow up interviews engaged only a small number of people who initially self-reported inappropriate butt disposal behaviour, 81% (13 from 16 respondents) were no longer throwing butts out the window, and 56% (10 from 18) were no longer throwing butts on the ground during journey breaks.

'Don't be a Tosser' campaign (2007)[8]

The 'Don't be a Tosser – Bin Your Butts' campaign, implemented by Sustainability Victoria, aimed to counteract and reduce the expected increase in cigarette butt litter outside pubs and clubs following the 1st of July 2007 smoking ban in licensed premises in Victoria.

The short term objectives of the campaign were to prevent an increase in butt littering associated with licensed premises and demonstrate how it could be reduced through building a shared responsibility between smokers, industry and governments to take effective action. As cigarette butts represent 56% of Victoria's litter stream the long term goal of the campaign was to help meet Victoria's Towards Zero Waste litter target of 25% reduction in littering by 2014.

There were two primary objectives against which behavioural outcomes were evaluated. They were:

- to have at least 20% of licensed premises to be model adopters by the peak of the campaign (end of August), demonstrating high levels of participation and support for the butt litter prevention campaign through active implementation of recommended actions accompanying the introduction of the legislation; and
- to prevent an increase in cigarette butt littering by smokers at model adopter locations by the peak of the campaign and to accomplish their target littering rate of under 50%, or preferably 40%. That is to say, after the campaign smokers will be much less likely to litter and more likely to use bins to dispose of butts.

Over 8 000 pubs, clubs, bars and full club licensed venues across Victoria were mailed a 'Don't be a Tosser – Bin Your Butts' campaign toolkit to help them understand and tackle the issue of butt litter. The toolkit included a range of fact sheets and campaign resources. These included:

- Two 'Don't be a Tosser' campaign posters;
- One 'We Support Don't be a Tosser – Bin Your Butts' front door sticker;
- Fact sheet: Preventing Butt Litter;
- Fact sheet: Engaging Staff and Customers;
- Fact sheet: Butt Litter FAQs;

[8] Sustainable Victoria (2007): **Tackling butt litter** – The don't be a Tosser, Bin your Butts Campaign – Evaluation Report

- Fact sheet: Which Butt Bin is Right for me?;
- Fact sheet: Butt Bin Rebate Scheme; and
- Butt Bin Rebate Scheme Application Form.

Fifty of the pubs, bars and nightclubs, where campaign washroom advertising was displayed, were selected and provided with 100 free personal ashtrays to hand out to their patrons in the first few weeks of the smoking ban. In response to industry demand, Sustainability Victoria, with support from EPA Victoria, offered a Butt Bin Rebate Scheme to help pubs and clubs at most risk of increased butt litter meet the cost of buying a butt bin for their patrons to use outside their venue. The Butt Bin Rebate Scheme was available to 'landlocked' licensed premises that were small or medium enterprises. 'Landlocked' premises are those which don't have an external smoking area within the boundaries of the venue (so smokers will be forced onto the footpath to smoke). A rebate was available for the purchase price of a fixed or mobile butt bin, up to a maximum of $300.

The outcomes of the projects were:

- The pre-legislation littering measure of 58% would have been expected to rise to between 70%-90% without intervention. At campaign peak, littering rates had almost halved from 58% down to 33%.
- Prior to 1 July 2007, 40% of smokers were binning their butts. By campaign peak this had increased to 66%, with two thirds of smokers binning their butts. Although there were more people in public spaces following the smoking ban in licensed premises, there was a decrease in butt littering behaviour.
- Littering decreased where venues implemented the litter prevention strategies promoted through the campaign. The goal of achieving 20% of venues being very or extremely supportive through active implementation of recommended actions of the campaign was exceeded, with almost three quarters (73%) of venues indicating support at the campaign peak in August.

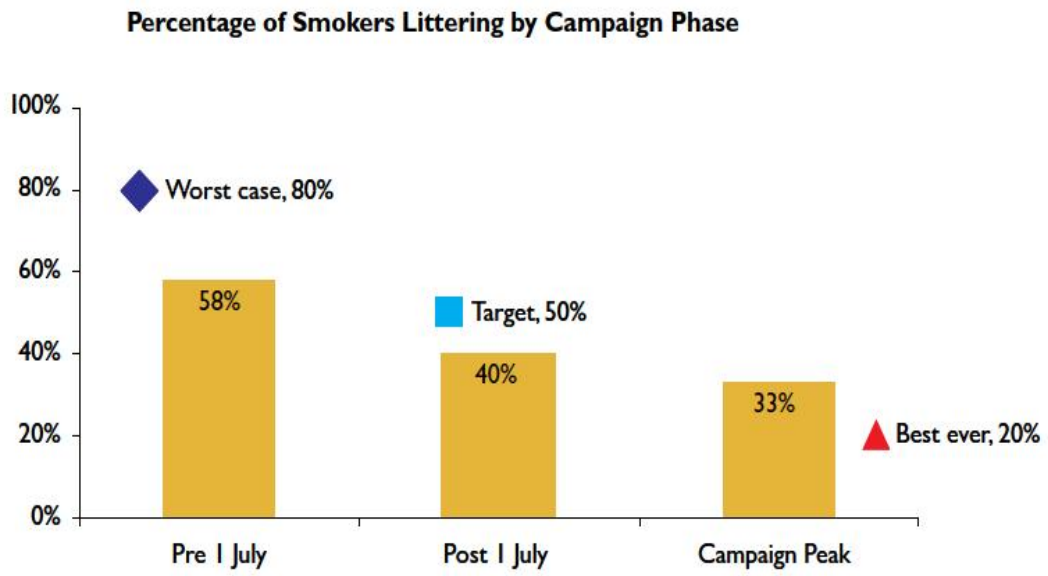

Figure A6.2: percentage of Smoker Littering by Campaign Phase

Source: Sustainable Victoria (2007) Tackling butt litter – The don't be a tosser bin your butts campaign – Evaluation report

Six months after the campaign a new evaluation was made. The follow-up report showed that littering rates continued to stay low at 37%.

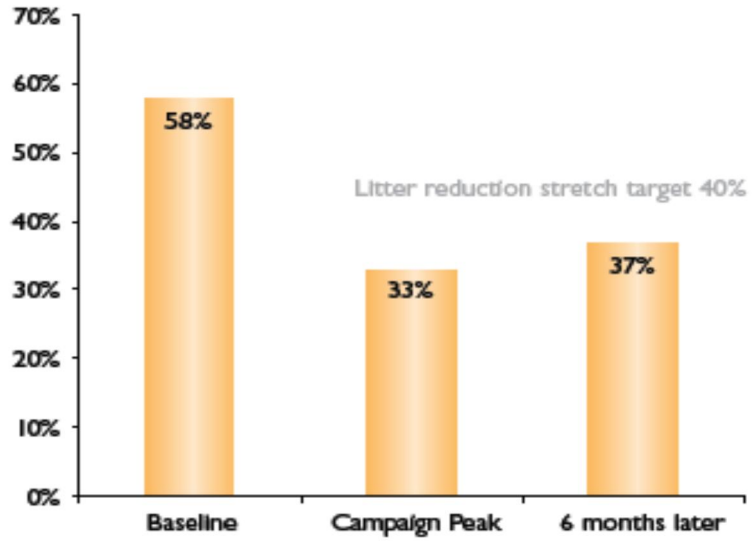

Figure A6.3: Follow-up Evaluation

Source: Sustainable Victoria (2008) Tackling butt litter – The don't be a tosser bin your butts campaign – 6-months' follow up report

A5.4.2 Chewing Gum Related Litter

No information is available with regard to enforcement.

The **GumTarget** seem to be effective in 'catching' gum. In Bournemouth, gum targets are collecting over 1 700 pieces of gum per week. In Luton, gum targets collected over 75 000 pieces of gum in the first year. Of course, it is not clear whether all these pieces of gum would have ended up on the street instead of in the waste bin, so their effectiveness cannot be assessed.

The yearly success of **awareness raising campaigns** is assessed by Chewing Gum Action Group. Results showed a significant reduction in gum littering in 2006, due in part to the introduction of fines of up to £80. The 2008 and 2009 campaigns were also very effective, with even more focus on the fine message resulting in a gum litter reduction of 48%. The 2010 activity took the message from this campaign and increased its impact with a bright illustrative style, resulting in an overall reduction of 50%.

A5.5 Costs and Savings

A5.5.1 Costs and Funding

The total budget of the **Butt FREE Highway** - Motorist Cigarette Butt Littering Reduction Campaign cost approximately AUD 128 000, of which almost AUD 10,000 for personal ashtrays, about AUD 25,000 for communication materials and almost AUD 20,000 for monitoring and follow-up[9].

Butt Free Australia is the trading name of the Butt Littering Trust – a product stewardship initiative established in 2003 by British American Tobacco Australia (BAT Australia). The campaigns under Butt Free Australia are therefore funded by the industry.

Total budget of the **"Don't be a Tosser" campaign** was AUD 1.3 million. Funding came from both authorities as well as from industry[10]:

- Sustainability Victoria budgeted AUD 1.2 million for advertising and public relations;
- Victorian Litter Action Alliance funded local government resources and capacity building;
- EPA Victoria funded butt bin rebates; and
- the Butt Littering Trust supported the licensed premises toolkit.

With regard to the **ashtray cones**, relevant costs include installation of the dispensing dock, the maintenance of it, the cones, the time spent distributing them and additional awareness raising (publicity) activities. Prices of plastic cones can range from AUD 0.05 - AUD 0.5 per piece (presumably without a logo).

Funding is both an option for industry as well as government. The cones can be used for advertising or a sponsorship logo of a company. This is beneficial for the company as they get advertising but can also raise their profile as an environmentally responsible company. Advertising revenues can be used for publicity and marketing of butt litter prevention and awareness raising on the use of ashtray cones. On the other hand, local authorities can use the cones for spreading awareness raising messages.

A5.5.2 Savings

Cigarette Related Litter

The Victorian Litter Action Alliance calculated that the total cost to Victorian local governments of providing a municipal litter service, street sweeping and litter clean up services, cost in excess of AUD 58 million in 2004-2005. Local government spent over AUD 41 million on litter in 2000-2001. This means that the cost of cleaning

---

9 KESAB environmental solutions (2006): **Motorist Cigarette Butt Littering Reduction Campaign SA** – Final report

10 Sustainable Victoria (2007): **Tackling butt litter** – The don't be a Tosser, Bin your Butts Campaign – Evaluation Report

litter has risen by AUD 17 million dollars in 4 years[11]. Cigarette buds account for about 58% of this street litter.

In the UK, about 200 million cigarette buds end up on the streets every day or about 2 g/inh/day. Local authorities spend yearly about €472 million to clean this letter[12].

Chewing Gum Related Litter

It is estimated that UK councils spends over £150 million pounds each year cleaning chewing gum off streets and so a reduction in gum litter is likely to make a significant cost saving to councils/government departments.

Conclusions

Cleaning costs incurred by authorities for cigarette and chewing gum litter are very high. There are no data available on the exact savings when reducing x% of litter, but it is clear that significant cost savings would be possible.

Furthermore, innovative ideas like the ashtray cones may create new jobs in the design and production industry as well as in relation to advertising/marketing on the cones. Currently, the number of jobs is estimated to be low within the ashtray cone sector. However with increased use, not only on the beach but for other events and locations, more companies could grow from this innovative idea.

A5.6 Adaptability to Other EU Regions

Awareness raising campaigns, infrastructure and enforcement are instruments applied in all Member States for reducing littering. The various types of ashtrays could be adopted in any country as could the GumTargets.

Enforcement schemes differ in different Member States. For instance, both the penalty and the way of issuing penalties to litterers differs in Member States. In some countries only police officers can issue an infringement notice when they witness the offence, in other countries specific sworn governmental officers can also issue a penalty notice. In the case of Victoria State, the public can report litterers to the Environmental Protection Agency.

A5.7 Conclusion / Lessons Learnt

There is no magic bullet to reduce cigarette butt or chewing gum litter. It requires effort, a mixture of instruments and cooperation between different actors.

Campaigns in Australia and the UK show that significant litter reduction is possible. According to the Victorian Litter Action Alliance the four most critical change

[11] Victorian Litter Action Alliance (2007): **Litter Prevention Kit – Cigarette Butts** http://kb.keepbritaintidy.org/smokinglitter/publications/vlakit.pdf

[12] Impulsgebonden Zwerfvuil (2008): **Preventie rokengerelateerd zwerfafval bij de invoering van het rookverbod in de horeca** (Dutch) downloaded from http://www.gemeenteschoon.nl/media/249437/gids_preventie_rokengerelateerd_zwerfafval_2008.pdf

enablers, as identified through the evaluation of the 'Don't be a Tosser – Bin Your Butts' campaign, can be categorised as partnerships, place, promotion and personal action[13]:

- Partnerships – strong strategic alliances between the hospitality industry, local governments and state government to facilitate an integrated collective approach.
- Place – venues acting on the campaign's messages and providing facilities for smokers to bin their butts (providing bins, having staff regularly patrol and clean up butt litter, having signage asking smokers to bin their butts).
- Promotion – supporting promotion, mainstream advertising and media publicity can raise awareness of butt litter.
- Personal action – to ensure that smokers going to the effort to bin their butts do not feel ostracised or 'blamed' through the campaign.

Key to a successful strategy is the promotion of a collective responsibility and capacity building of local governments and relevant businesses (traders, business owners, building managers,…) to address the issue, specifically targeting smokers, as well as raise awareness of butt litter in the general community, and develop strategic cross sectoral partnerships. In addition, existing management expectations about cleanliness at a venue influence uptake of initiatives like the butt litter campaign. Businesses follow the expectations and standards set by the venue[14].

[13] Sustainable Victoria (2007): **Tackling butt litter** – The don't be a Tosser, Bin your Butts Campaign – Evaluation Report

[14] Sustainable Victoria (2007) *op cit.*

ANNEX 6: CASE STUDY
COMPARING DIFFERENT PACKAGES OF MEASURES AIMED AT A PARTICULAR TARGET GROUP:
CHILDREN

A6. CASE STUDY: COMPARING DIFFERENT PACKAGES OF MEASURES AIMED AT A PARTICULAR TARGET GROUP

A6.1 Measures Targeting Children

A6.1.1 Introduction

The objective of this case study is to compare how different instruments aimed at the same target group have performed. This will provide a clearer view of the factors which influence the success of particular instruments in influencing target group behaviour.

An initial analysis identified major target groups (children, young adults and fishermen) which display behavioural characteristics and habits which may be impacted by, and/or key to the development of potential marine litter behavioural measures. Following an initial assessment of the measures, which included an analysis of the perceived impacts, the target group of children was chosen for further evaluation in this case study.

Littering is a mind-set developed at a very early age which children often learn from their parents. According to Lewis et al[1], children are low level litterers. However, at around the age of 15 people become more persistent litterers. Measures which target children may help to reverse this trend. There are a number of initiatives in place in Member States, as well as outside the European Union, that aim at improving the littering behaviour of children as they grow up, thereby supporting their education.

Focusing educational campaigns at the primary school level may also have a wider impact, as children can influence adult attitudes by informing their parents as to the implications of litter[2]. In addition, children are responsive and they accessible through school or other activity groups[3]. Measures carried out in environments such as schools and/or other group situations, where children interact with each other, can be especially beneficial as the group behaviour can influence the individual mind set and individual behaviour.

Several organisations offer educational materials and special activities specifically designed for children. These include classroom activities as well as clean-up measures and other forms of active engagement that could make learning about waste and littering interesting and fun for children of all ages.

---

1 Lewis *et al* (2009a): **Litterbugs. How to Deal with the Problem of Littering**, Policy Exchange, London.

2 Ferguson K (2012): **How Understanding the Metrics of Litter can Assist Solid Waste Professionals in a Time of Budget Constraints**

3 UNEP (nd): **Public Education, East-Asia and the Pacific**, downloaded from http://www.unep.or.jp/ietc/estdir/pub/msw/ro/Asia/Topic_j.asp, last accessed 17 May 2012

A6.1.2 Selected Case Study Measures

The measures selected for the case study analysis cover a number of EU member States and include individual initiatives as well as international projects. The projects identified focus on a variety of litter types that include general litter, paper and plastic. They are listed in Table A6.1.

Table A6.1: Selected Case Study Measures

Name of initiative	Organisation	Coverage	Type	Type of Litter Targeted	Main method/activity
GRIMPOLA	Ecomar	Spain	Behavioural	marine litter	training, environmental education
Hulladékgyűjtési kampány a Gyimesekben (Litter collection campaign in Gyimes)	Pogány-Havas Micro Regional Association	Romania, micro regions of Pogány - Havas	Preventive	paper and plastic bottles	provision of designated bins in schools
Iskolai Papírgyűjtési Akcio (Paper Collection for schools)	Green Bridge Region Environmental and Waste Management Ltd.	Hungary	Behavioural/ Preventive	Paper	provision of designated waste containers
Litter Less (CZ)	Tereza	CZ (Litter Less operates in 15 countries)	Behavioural	general litter	clean-up, awareness raising, education
Mimando Nuestro Mar (Pampering our Seas)	Fundación Global Nature	Tenerife	Behavioural	marine litter	briefings, exhibitions, leaflets and stickers

Within the measures analysed, two types of initiatives aimed at children can be identified, these are:

- behavioural: training and environmental education such as workshops, exhibitions and activity classes; and
- preventive: installation of waste receptacles accompanied by school competitions.

These initiatives are most frequently implemented independently and receive funding on an ad-hoc basis from regional or national sources. The following sections provide further analysis on the individual initiatives broken down by type of measure.

A6.2 Nature of the Measures and the Context in Which They Have Been Adopted

A6.2.1 Introduction

The five initiatives listed in Table A6.1 (above) can be categorised as behavioural and preventive. The measures have been implemented in four different Member States, two of which have a coastline, Romania and Spain, and two of which do not, the Czech Republic and Hungary. The following subsections provide an introduction to the measures.

A6.2.2 Behavioural Measures

Three behavioural measures have been assessed, two of them in Spain and one in the Czech Republic. The two Spanish initiatives, Grimpola and Mimando Nuestro Mar, are directly relevant to marine litter. The organisations responsible for the implementation of these measures, Ecomar and Fundación Global Nature respectively, are not-for-profit organisations and receive funding though public and private entities. In the Czech Republic, Litter Less is financed by the Wrigley Corporation and managed by the NGO Tereza. It targets school children with the aim of increasing environmental responsibility and improving littering behaviour.

Ages of Children Targeted

The two Spanish initiatives cover children of different age groups. The Grimpola initiative is aimed at children between the ages of 7-14, that is primary school age, while Mimando Nuestro Mar focuses on children in high-schools.

The Czech Eco-School program, which implements the "Litter Less" campaign, involves primary and secondary schools as well as children of kindergarten age; that is, ages of 3-19. The Eco-School program is currently operating successfully in 21 European Union countries.

Methods Used

Grimpola was started as a pilot project in a sailing club, providing innovative environmental education for young recreational boaters. Its principle aim is to raise awareness about the impact of boating on the marine environment and to conduct sustainable boating activities. Sailing and boating schools gain a certificate after successfully completing training and this enables them to provide the Grimpola environmental education to children. Delivering the programme in sailing clubs allows for the utilisation of existing facilities. Ecomar, the organisation under which Grimpola is run, is also responsible for various other marine and coastal related initiatives, including beach cleans and school competitions. It can therefore use its experience and network to effectively deliver this measure. Although the programme started small, in a few yacht clubs and sailing schools in 2006, it had by 2012 reached about 44 000 children. By expanding parallel to existing boating and sailing clubs, Grimpola has been able to make use of this established network.

Mimando Nuestro Mar is an example of an educational awareness raising initiative in Tenerife. It provided school children with education about the coastline and the waters around Tenerife. This incorporated multiple aspects, such as the importance of conservation, the threats to the marine environment and the physical, biological, social and cultural interactions in coastal areas. The measure was developed within the organisation La Fundación Global Nature, which was created in 1993. The organisation's main aims are conservation, protection and management of the environment and it has been involved in many similar projects. According to information from the program website, Mimando Nuestro Mar was intended to be carried out in 25 schools and as such would reach 3 000 secondary school students in Tenerife.

The Litter Less campaign builds on the Eco-School network, which has been active in multiple schools around the world; its aim is to empower students to be actively involved in environmental activities. In the Czech Republic the national operator of Eco-Schools, and the campaign Litter Less, is the NGO TEREZA. The NGO is involved in different programmes in more than 700 primary and secondary schools reaching over 67 000 children. The core element of the Eco-Schools programme is the promotion of Education for Sustainable Development. Schools that participate in the campaign collaborate with other schools to spread their ideas and experiences on how to take action for improving litter issues[4]. The Czech Litter Less initiative focuses on the minimisation of litter and recycling (see Box A7.1).

Box A6.1: Methods Used in the Litter for Less Initiative in the Czech Republic

As part of the classroom exercises, schools are asked to organise their own event on the topic of pollution, such as a school or class undertaking a one day clean up of their surroundings.

Another approach is when children are asked to create a product from the waste, such as a sculpture or collage created from the collected garbage, or to come up with an advertising slogan.

Group exercises are also encouraged, where students search for suitable topics, such as the impact of pollution on life and will then publish articles, create a photo reportage, radio or television news report. All must also include a proposed solution to the situation.

For a more interactive activity, students are also asked to plan and implement educational activities for younger pupils, parents and the public. Through practical examples they are shown how a reduction in the amount of litter can impact their daily lives.

Source: Ekolist (2011): AMI Communications: Nadace společnosti Wrigley učí malé Čechy, jak zacházet s odpadky, downloaded from http://ekolist.cz/cz/zpravodajstvi/zpravy/nadace-spolecnosti-wrigley-uci-male-cechy-jak-zachazet-s-odpadky?all_ids=1

[4] Eco-Schools (nd): **Litter less Campaign**, downloaded from: http://www.eco-schools-wrigley.org/Eco-Schools-p2.html

Topics Covered

The Litter Less framework enables activities to be adapted to fit the local context and therefore may have a greater impact over wider areas through its flexibility and adaptability. Schools can organise various events or campaigns such as clean-ups, activities which use litter in art work, student reporting, theatre events, etc.
The campaign concentrates specifically on litter, without a particular emphasis on the type of litter. Involvement in a Litter Less campaign illustrates how students can make improvements and how they have the power to change their environment and the attitudes and behaviours of others.

The Grimpola project is an education initiative providing information on sustainable boating activities. Ecomar prepares the training material, which is then sent to the boating clubs in return for a small fee, which includes a logbook and other merchandise (e.g. rucksacks, keyrings, etc.). Ecomar also undertakes other initiatives (see Box A7.2).

Box A6.2: Other Initiatives Run by Ecomar

The Ecomar foundation runs two additional initiatives alongside Grimpola, focusing on education and clean-up, these are:

- Annual prizes awarded to high-schools, focusing on children between the ages of 7 and 14. Every year participating high-schools are given a certain environment-related task to complete. This year they were asked to put together newspaper articles relating to environmental protection and the marine environment. The winning teams are taken on free boating lessons.
- Clean-up activities are organised alongside workshops, teaching children on how to recycle the litter that can be found at sea and on the shores. The clean-up campaigns usually take place once every three to six months and can bring up to 200 children together.

Source: Interview with Ecomar, October 2012

Possible examples for expanding the content of the above described measures and incorporating a wider range of educational elements include that of the Ecofellows measure of Finland or the Halmstad school competition in Sweden. The Ecofellows initiative[5] which has been running since 2002 offers the opportunity for primary and secondary school students to invite environmental advisors to their classroom and engage in an interactive discussion about sustainable consumption. The project also involves visits to an environmental exhibition dealing with waste and recycling.

The Halmstad school competition was first launched in 2008 and involved 14 middle and high schools with its primary aim being the reduction of food waste and the education of children. The competition included workshops and provided children with information leaflets in school canteens. Food waste was weighed on a daily basis, thereby encouraging competition. The campaign itself had a wider theme that included well-being, as well as CO_2 reduction: "*Eat well – feel good; Eat more greens*

[5] Pre-Waste (2012a): **Ecofellows: Awareness Raising Lessons for the School Children**, downloaded from: http://www.prewaste.eu/waste-prevention-good-practices/detailed-factsheets/item/377-ecofellows-awareness-raising-lessons-for-the-school-children-pre-waste-factsheet-76.html

and Don't waste food"[6]. These examples prove that the topic of littering can be connected to a wide range of environmental issues and health issues that can be important to discuss in a school environment.

A6.2.3 Preventive Measures

Two preventive measures have been identified, both targeting paper collection in primary schools, in Romania and Hungary. Both of the initiatives are aimed at increasing awareness of recycling and are not directly linked to marine litter.

Although the litter collection campaign in Gyimes (Hulladékgyűjtési kampány a Gyimesekben) is not a coastal initiative which specifically targets marine litter, it is aimed at modifying children's behaviour, which can have a long-term impact on litter in the environment. The measure is organised in schools and encourages responsible waste disposal, with a focus on paper and plastic. According to the 2008 European Values Study survey (see Section 2 of this report), Hungary was found to have the highest number of respondents (77%) claiming that all of their compatriots throw away litter in public places. This behaviour can therefore be seen as the norm and relatively socially acceptable.

Hungary does not have a coastline and therefore the measure in this case in one which targets children's behaviour in relation to litter in general rather than at marine litter specifically. The Paper Collection for schools, campaign (Iskolai Papírgyűjtési Akcio) is a measure organised in schools which aims at encouraging children to separate waste, recycle and dispose of waste responsibly.

Age of Children Targeted

Both initiatives target children in primary schools. The Gyimes campaign involved 30 schools while the Hungarian project had 18 participants. The Gyimes campaign was a one-off initiative while the Hungarian paper collection campaign has been re-launched by the organising company for the second year.

Methods Used

The Gyimes litter collection campaign was organised through the micro regional association of Pogány-Havas in 2009. Separate collection of waste had not taken place previously in schools in the region. Therefore, this campaign acted as a one-off initiative which aimed at raising awareness about the importance of recycling and waste collection. Permanent segregated waste bins for paper and for plastic were provided for each of the 30 primary schools involved.

As in the Romanian case, much of Hungary's selective waste collection is in its early phase and waste separation has not been extensively implemented previously at schools. However, campaigns have been running in the country for over twenty years, organised at different levels, from individual initiatives by school to regional

[6] Pre-Waste (2012b): **Halmstad schools competing to reduce food waste in canteens, Sweden** (Pre-waste factsheet 29), downloaded from: http://www.prewaste.eu/waste-prevention-good-practices/detailed-factsheets/item/323-029_food_waste_at_schools_halmstad_klimatsmart.html

campaigns. Green Bridge Ltd has organised paper collection campaigns[7] in 18 primary schools, with the aim of encouraging increased waste separation and recycling. Green Bridge Ltd is a waste management company that was founded by municipalities in the counties of Pest and Nograd. In addition to being responsible for the treatment of municipal waste, the company organises a number of environmental programmes. Besides the paper collection campaigns, which have been re-launched for the school-term of 2012-2013, the company also launched a drawing competition on the topic of selective waste collection for children in kindergarten.

A6.3 Achievements

A6.3.1 Behavioural Measures

The most apparent difference between the three behavioural measures is in their scale of operation. Mimando Nuestro Mar was carried out on a considerably smaller scale than Grimpola and Litter Less. This may be a result of the geographical locations; while Ecomar is based on mainland Spain and Tereza is active all over the Czech Republic, Mimando Nuestro Mar targeted rural locations on the island of Tenerife. It specifically targeted 25 rural schools along the coast which were further from the towns and cities and thus the children may have fewer opportunities to partake in similar activities.

The Grimpola campaign had involved 44 000 children by 2012, as it covers the whole of Spain, with nearly 50 yacht clubs involved. The biggest ones located in Barcelona and Valencia.

The Czech Litter Less initiative involves 14 schools from all over the country with 336 supervisors and over 4 000 children participating.

The benefit of small-scale measures is that they can focus on specific issues which large-scale measures may find difficult. An example of this is that the smaller geographic area allows organisers to take into consideration specific challenges that are particular to a region, such as waste management practices, after-school activities etc. and can therefore be more tailored to suit the locality. In addition, in the case of Mimando Nuestro Mar which targeted a predominantly rural community, if long-term implementation is sustained, the measure may contribute to the creation of a strong local culture of environmental consciousness.

All the initiatives evaluated in this case study appear to have measured their success in terms of the number of participants, rather than changes in behaviour. This is probably because behavioural changes are more likely to develop over longer periods of time. These behavioural changes can include quantity of litter thrown away, perception of littering, the use of recycling etc.; however, it can be difficult to link such changes to specific initiatives, as participants may also be exposed to a range of other influencing factors. Short-term success, on the other hand, can be measured and compared more easily based upon the number of people involved and this can also provide a basis for setting targets. The Ecofellows initiative, for example, has

[7] Information from Zoldhid Kft, downloaded from http://www.zoldhid.hu/kft

involved over 3 000 children; however, the target of the project is to reach all children in the Tampere area that are between the ages of 7 and 13.

The Halsmstad school competition, however, did measure success in terms of outcomes rather than simply participation. The competition ran for three years, between 2008 and 2011, with the participation of just under 7 000 children. The campaign achieved a 13% reduction of food waste, resulting from a change of behaviour from pupils, and led to cost saving of €17 000 per year. This is an example of how an intensive campaign can impact on the behaviour of the participants. Furthermore, the success of the Halmstad campaign led the local municipality to the decision to weigh food waste in all schools twice a year, in order to monitor behaviour.

A6.3.2 Preventive Measures

The 2011 autumn semester programme of paper collection for schools in Hungary resulted in the collection of over 220 tonnes of paper waste across the country as a whole. The individual schools collected between 1 to 57 tonnes of paper and the per capita collection varied significantly from 5kg per person in some schools to up to 132 kg per person in others[8]. In a somewhat similar initiative in Latvia as part of a four-day environmental event, students collected 26 tonnes of paper[9].

In the Gyimes campaign students from the 30 participating primary schools have collected 2.6 tonnes of paper, 2.5 tonnes of PET bottles and 15 kg of aluminium[10,11].

Both campaigns were introduced to educate children on the use of waste and their value as well as the importance of selective waste collection which are still not available in all locations. While engaging children in activities that raise awareness about environmental issues is crucial, another important element is the continuity of these initiatives, which could enable the identification of measureable impacts over time.

An example of the importance of continuity is reflected by a similar waste collection campaign run in Brussels[12]. The initiative has been on-going from 1999 with the participation of 54 schools per year. The campaign focuses of different types of waste every year, such as paper, food waste or disposable food and drink containers. The long-term nature of the campaign allowed for the measurement of behavioural changes. It has resulted in a decrease of paper consumption by 35% and a decrease

8 Results of the competition can be found at http://www.zoldhid.hu/files/tiny_mce/KFT/Oktatas/Pap%C3%ADrgy%C5%B1jt%C3%A9s_k%C3%A9t%20fordul%C3%B3s%20eredm%C3%A9ny_j%C3%B3.pdf

9 Comenius (2009): **Eco-intelligence in Action, Rujiena Secondary School**, downloaded from: http://www.our-comenius.de/2008-2010/start%20frame%2008.htm

10 Information from the regional website of Szekelyhon, downloaded from: http://www.szekelyhon.ro/aktualis/csikszek/oktatoi-jellege-is-volt-a-szelektiv-hulladekgyujtesnek/print

11 Pogany-Havas Microregion (2009): **2009 Annual Report**, downloaded from: http://www.poganyhavas.hu/img/poganyhavastevbesz2009.pdf

12 Pre-Waste (2012c): **Accompanied paper waste prevention projects in schools,** pre-waste factsheet 22 downloaded from: http://www.prewaste.eu/waste-prevention-good-practices/detailed-factsheets/item/281-22-ibge-accompanied-waste-prevention-schools.html

of drink packaging waste by 30%. Moreover, the accompanying educational element, which consisted of lectures and discussions, resulted in pupils and teachers implementing twice as many ways to reduce waste (such as using draft paper or printing on both sides etc.).

A6.3.3 Factors Influencing Achievements

Infrastructure

The physical and organisational infrastructure associated with a measure can have a considerable impact on its success. The measures within this case study illustrate the different structures upon which measures have been implemented. While some measures are positioned under an umbrella organisation, others are more local, ad-hoc and intermittent.

Grimpola is organised under Ecomar, an organisation which is responsible for various other marine and coastal related initiatives including beach cleans and school competitions. Providing multiple measures under the same organisation can maximise the awareness raising capacity of each measure, as the variety of measures can give the organisation a more holistic approach. Grimpola has also made use of an established network of boating and sailing clubs along the coast; this has allowed it to take advantage of the facilities already in place in the clubs and to develop the educational aspect of the programme within the existing framework of boating activities. In addition, this structure may make learning more fun, which is important when trying to attract and maintain the attention of young children.

The remaining four measures in this case study are organised in collaboration with schools. Using the classroom structure is quite common for measures targeting children. Schools can provide a stable organisational basis which may enable longer-term implementation of a measure. Schools also provide the learning environment and facilities which may make children more responsive to the educational aspects of measures.

Both the litter collection campaign in Gyimes, Romania and the Paper Collection for schools, Hungary are organised within the primary school structure. Mimando Nuestro Mar and Litter Less also take advantage of the school structure; however, they are part of wider initiatives. Mimando Nuestro Mar is organised under Fundacion Global Nature, which carries out a range of initiatives related to conservation, protection and management of the environment. Similarly, the Litter Less campaign is implemented under the framework of Eco-Schools. In the Czech Republic it is organised through the NGO TEREZA. Litter Less encourages tailoring the measure to fit the local scenario and community while at the same time providing an international framework which enables collaboration with other schools, nationally and internationally. It is also active in multiple schools around the world. This grounds the individual schools activities within a much larger framework.

Coordination

Grimpola's strategy of using the network of sailing and boating clubs enabled it to take advantage of an already captive audience of young people who enjoy the ocean.

It also allows the children to ground their acquired knowledge in reality, through the first hand experiences that they gain through boating activities. Ecomar, the organisation responsible for Grimpola, also delivers a variety of other measures. This demonstrates the coordinated approach within its overall aim of improving and caring for the marine environment. This approach offers a more holistic response to the issues in question which, in the literature, is considered to be more effective[13].

Both the litter collection campaign in Gyimes and the Paper Collection for schools are more ad-hoc measures, as they require less time for preparation and coordination. It could be argued that these measures might be more effective in the long-term if they were coordinated over time and across the country. These measures are organised within the classroom. It is believed that group behaviour and interaction between children can have a strong influence on individual behaviour. Therefore, this approach of carrying out waste separation as a group activity may aid in the success of the measure.

Coordination between the participating schools is one element that was lacking in both the Romanian and the Hungarian measure. There is no indication that schools would be encouraged to collaborate further, beyond the scope of the individual campaigns. The possibility of networking and forming connections with other schools during competition periods can make a simple task such as waste separation seem more fun and there is a very visible (potential) gain. The campaign in Hungary is continuing for the school-term of 2012/2013 as well, however, there is no indication that the project would be extended to cover a wider geographic area.

The Litter Less measure carried out in the Czech Republic also encourages networking and collaboration between schools. This facilitates the exchange of knowledge and ideas.

In addition to Mimando Nuestro Mar, there have been a number of marine litter clean-up initiatives in Tenerife, such as one run by the Cabildo de Tenerife (Island Council of *Tenerife*) which removed 80 kilos of waste from the beach Puertito de Guimar in a clean-up initiative in 2011. There is no indication that these two measures have been linked, although coordination could help improve results and monitoring. The beach clean-up initiative takes place each year, with the help of volunteers[14]. Mimando Nuestro Mar was launched in order to strengthen the environmental commitment of local children. Unfortunately there is no information regarding the possible follow-up of this 2005 initiative.

A6.4 Costs and Funding

There is considerable variation regarding the funding available and costs of the different measures. The Grimpola campaign has been supported by the Plastics Europe Foundation in return for including a module in the programme that deals with the impacts of plastics in the sea. Ecomar has received sponsorship from Coca Cola

[13] For example Lewis et al (2009a); McKenzie-Mohr (2011); Umweltbundesamt (2010)

[14] Canarian Weekly (2011): **Beach Clean Up**, downloaded from: http://www.canarianweekly.com/beach-clean

and Kinder+ Sport. However, it also receives support from the government of Rioja, ENDESA (a Spanish utility company), the Spanish Olympic Committee and the Sports Council.

Mimando Nuestro Mar, which is organised under the Fundación Global Nature, is also sponsored by private donors such as Carrefour, Santander and Unilever. The Eco-Schools Litter Less Campaign received funding from the Wrigley Company Foundation in excess of $3.25 million for a total of three years for the participating countries (including the Czech Republic).

The measures in Romania and Hungary, on the other hand, have small budgets and are funded locally. The waste separation campaign in Romania is largely funded by the local municipality. It also receives funds from other local partners such as the regional environmental association, Zöld SzékelyFöld Egyesület and Solaris Trade. The campaign cost €1 810 (9795 RON), out of which €1 087 (5880 RON) was provided by the local council. The measure in Hungary is financially supported by the Green Bridge Region Waste Management Ltd, which in addition to its own financial resources also provides a bus which can be used by schools to travel to waste recycling sites.

A6.5 Adaptability to Other EU Regions

Similar measures to Grimpola could be developed in any region where recreational boating is a popular past time.

Both the Romanian and Hungarian measures are relatively simple measures which can be effective in introducing children to waste separation and the importance of recycling. The provision of bins can be accompanied by competitions or education to broaden knowledge on the impact that poor waste disposal has on the environment.

The Litter Less Campaign has already been replicated in 15 countries all over the world such as China, Croatia, Cyrus, Czech Republic, Greece, Lithuania, Northern Ireland, Russia, Uganda, and the USA.

A6.6 Conclusion/Lessons Learnt

Campaigns aimed at children are often delivered through a range of fun and entertaining activities. This is likely to be effective, as it raises interest and eagerness to participate while also keeping the children's attention. However, it is also crucial that the message behind the measure, of reducing litter, is not lost. Campaigns should include an effective educational element which explains to children why they are partaking in such activities and what the importance is.

Grimpola has been successful on this level. It cleverly used the established network of sailing and boating clubs, as well as the associated network of stakeholders, in order to ensure participation. However, this structure means that it focuses on coastal locations and therefore may limit possibilities for reaching inland residents who may holiday on the coast.

As Section 2 of the report notes, studies have shown that the design of receptacles is an important aspect of littering behaviour[15]. The design can have a significant impact on the amount of use which the receptacle receives. Measures such as those in Hungary and Romania provide an example of where the design element could be taken advantage of. While there is no indication that design elements were used in the measures, fun, bright designs which encourage children to use the bins may be helpful for attracting the attention of children as they can prove to be more effective than dull bins. Additionally, the use of colour coding the primary school bins to mirror the colours used in waste separation on a national level could bring the idea of separate waste collection and recycling closer to children, thus creating a practice and everyday routine. This could provide additional benefits, through increasing the effectiveness of waste separation outside the school gates.

The competitive nature of the Hungarian measure provides children with motivation to take an active role in the measure. Both the Romanian and Hungarian measure take a fun, light hearted approach but lack comprehensive long-term and wide-spread coordination throughout the country. Their ad-hoc nature is likely to reduce their capacity for consistent long-term results. Moreover, increased efficiency of these measures could possibly be achieved if they were accompanied by specific education on the use of waste and the importance of recycling.

The Czech Republic example demonstrates how a measure can be locally specific whilst simultaneously taking advantage of a large network of groups working towards a mutual goal. The Eco-schools carry out multiple activities to reduce litter and encourage environmentally friendly behaviour among young people. The students take an active role in how their school can be run for the benefit of the environment in their local community. The individual schools are, however, encouraged to bring along issues that are of local importance as well as to collaborate and exchange ideas and knowledge with other schools, both nationally and internationally.

Many campaigns targeting children aim at changing behaviour in the long-run. Therefore, it may take longer to see the extent of the results. Because of this, long-term projects are likely to be more appropriate than short-term, one-off projects. This has implications in terms of funding, as well as the organisational structure of projects. However, one-off, short-term sub-projects may make it easier to maintain the interest of individual children as part of a longer-term approach. These sub-projects could include exhibitions, documentaries, site visits that could serve to give students additional information regarding the impacts that individual actions of littering can have on the environment, as in the Ecofellows initiative in Finland[16]. In the case of introducing coastal initiatives such as Grimpola to an inland area, classroom activities could be useful in explaining to children the impact that littering can have on the marine environment.

[15] Lewis *et al* (2009a): **Litterbugs. How to Deal with the Problem of Littering**, Policy Exchange, London.

[16] Pre-Waste (2012a): **Ecofellows: Awareness Raising Lessons for the School Children**, downloaded from: http://www.prewaste.eu/waste-prevention-good-practices/detailed-factsheets/item/377-ecofellows-awareness-raising-lessons-for-the-school-children-pre-waste-factsheet-76.html

Coordination and collaboration with similar campaigns and other projects may also increase achievements. One of the areas that could be further improved is collaboration between schools that participate in the individual measures and activities. Such collaborations could also be useful for providing more comprehensive information on the results achieved in terms of changes in behaviour.

ANNEX 7: CASE STUDY COMPARING DIFFERENT PACKAGES OF MEASURES TARGETED AT A PARTICULAR LOCATION: BEACH LITTER

A7 CASE STUDY COMPARING DIFFERENT PACKAGES OF MEASURES TARGETED AT A PARTICULAR LOCATION: TOURIST BEACH LITTER

A7.1 Introduction

The objectives of this case study are to compare the performance of different measures which have attempted to reduce marine litter on beaches, and to provide a clearer view of the factors which influence the success of these particular instruments. This case study focuses upon littering on beaches within the EU (European Union). There are currently a wide range of different schemes in place to address littering on beaches, undertaken by a range of stakeholders including the public sector, NGOs (Non-governmental organisations) and private companies, particularly in the UK.

The study investigates current measures which are being implemented by municipalities to prevent and clean-up litter. It reviews six behavioural and preventive measures and ten clean-up measures undertaken recently by NGOs and the private sector. In many cases municipalities and NGO's often use a variety of measures to manage beach litter depending on the particular objectives of litter management at individual sites. The case study therefore reviews a particular location where a combination of measures has been implemented.

The study compares the relative success of different types of measures and identifies the challenges faced in order to determine what measures (if any) could be used in the management of beaches across Europe. Although very little quantitative or qualitative information has been collected on the costs and benefits of litter prevention and clean-up. The case study provides general conclusions based upon the limited information available.

A7.2 Nature of the Measures and the Context in which they have been Adopted

Although the overall objective of the measures in this case study is broadly similar (to reduce the amount of litter on beaches), they differ in their geographical coverage, the promoting organisation, and the target audience. The nature of the objectives for beach litter management also varies and particularly influences the choice of measures adopted.

The measures are categorised as:

- behavioural;
- preventive; and
- clean-up.

The statutory drivers are described elsewhere in this report but the economic cost of litter on beaches is most commonly the primary driver for action, particularly in tourist areas. Research undertaken in South Africa found that a drop in beach

cleanliness standards could reduce tourism revenue by up to 52% (Ballance et al. 2000). The same study also investigated the densities of litter that exerted a deterrent effect on tourists and found that 85% of beach users would not visit a beach with 2 or more 'large' debris items per metre, with 97% stating they would not visit a beach with 10 or more large items of debris per metre. In Sweden research suggested that marine litter can reduce tourism levels by between 1 and 5%, resulting in a loss of €15 million in revenue (Ten Brink et al. 2009).

For municipalities with a large beach-based tourist sector the potential loss of tourist-based revenue is the principal motivation for removing beach litter from amenity beaches and implementing measures to reduce litter (such as bins and signs). These measures often cost less to the local economy than the loss of revenue which may result if no action were taken. For example, research undertaken by KIMO (2010) found that tourism acts as the principle driving force for beach cleaning programmes. Surveys undertaken in the UK and the Netherlands/Belgium found that the most common reason for municipalities to undertake beach cleaning activities was to maintain and enhance popular tourist areas (92% of participating municipalities in the Netherlands/Belgium and 89% in the UK). Statutory requirements were found to have less of an influence in both the Netherlands/Belgium and the UK (31% in the Netherlands/Belgium and 56% in the UK). Therefore, in many cases the potential economic impact of marine litter may provide a more powerful incentive for removing beach litter than statutory legislation (KIMO, 2010).

A7.3 Implementing Bodies and Geographical Coverage

The geographical coverage of the measures varies from local through to international level with respect to the organisation and/or promotion of the initiative. However, all rely on local groups or municipalities for implementation.

Annual clean up measures are generally undertaken by local voluntary groups as part of national or international awareness campaigns. The objectives of such initiatives are generally environmental or for community benefit.

Municipalities undertake a variety of behavioural, preventive and regular clean-up measures to maintain the quality of their amenity beaches for tourism (and hence economic) purposes.

A7.4 Overarching Measures

The most successful measure promoting clean beaches has been through the use of awards or eco-labels. This is an overarching measure which requires activities at a local level.

A number of award schemes have been developed to recognise beaches that are managed to a high standard. The most widely known and prestigious award (or eco-label) is the Blue Flag Award. The Blue Flag is an international award scheme which was created in 1987 and which offers a recognised standard of beach maintenance. This assures beach users that the beach meets recognised standards in terms of

cleanliness, safety, water quality and facilities. It is awarded to coastal destinations which have achieved the highest quality in water, facilities, safety, environmental education and management. Currently the Blue Flag is awarded to 3,850 beaches and marinas in 46 countries across Europe, South Africa, Morocco, Tunisia, New Zealand, Brazil, Canada and the Caribbean.

The Blue Flag eco-label is run by the NGO Foundation for Environmental Education (FEE) but administered at national level by national NGOs. The measures to maintain clean beaches are implemented by municipalities and are occasionally supported by local voluntary groups.

The awards require a variety of different measures to be implemented to meet the award criteria including those to ensure that beaches are clean. Holding an award can bring substantial economic benefits to a municipality through increased visitor numbers and expenditure. Research has shown that local authorities, tourism authorities and the media consider beach awards as a powerful tool to attract visitors, and thus have a positive economic influence (McKenna et al. 2011). For example, the pursuit of awards, such as the Blue Flag award, stimulated beach cleans in 46% of the municipalities surveyed in the UK, the Netherlands and Belgium because gaining such an award has positive impacts on tourism. As a result of the tourism benefits municipalities take a leading role in implementation of measures required to achieve the award.

Keep Britain Tidy (the NGO administering Blue Flag in the UK) believes that the economic value of holding a Blue Flag is in the millions of pounds (sterling) but there is currently no published and reviewed work to substantiate this (Richard McIllwain, Keep Britain Tidy, pers.comm).

The Blue Flag Awards tend to apply to busier amenity beaches while a number of other award systems have been introduced to recognise beaches that are managed to a high standard (but are not eligible for the Blue Flag Award). In the UK these include the Quality Coast Awards, the Green Coast Awards and the Seaside Awards. In the Netherlands the "Schoonste strand van Nederland" (Cleanest beach of the Netherlands) is a non-profit project in which the cleanest Dutch beach is elected annually by a group of representatives. Evidence suggests that since the first contest in 2003, Dutch beaches became twice as clean.

A7.5 Behavioural Measures

A large number of campaigns, primarily organised by NGOs, are aimed at preventing litter through changing people's behaviour. Campaigns are run at an EU level down to a regional and local level. Table 1 highlights a number of examples of behavioural measures targeted specifically at individuals who generate beach litter. Other schemes such as the 'Mermaids Tears' campaign run by Surfers Against Sewage aims to put pressure on industry to reduce sources of beach litter.
The behavioural measures used to prevent littering are:

- awareness campaigns;
- posters and notices; and

- raising awareness of litter issues in the community through newsletters, talks, school visits and other promotional activities;

One of the most important tools in litter prevention is the use of signs and notices. KIMO (2010) found that 71.7% of UK authorities used signs to discourage littering and they are also common in the Netherlands.

Campaigns use a variety of methods including publicity campaigns (employing various forms of media such as posters, art work, printed information and advertising), the provision of educational resources and speaking face-to-face with various groups to encourage them to reduce beach litter. While some of these schemes are partly funded by government organisations, most are funded entirely by NGOs and as a result there is a potential risk of overlap or gaps with municipality schemes, therefore reducing programme efficiency. This also demonstrates a general lack of practical programmes and measures at a national level implemented by governments to specifically manage beach marine litter.

The campaigns highlighted have all been shown to have positive impacts. However, as the schemes are all run at different scales and have slightly different aims and objectives, assessing their relative success becomes more complex.

It is apparent that there is a general dependence on voluntary engagement in both the public and industry schemes, because compliance with campaigns is not mandatory. This highlights the current lack of statutory enforcement in measures that prevent sources of beach litter entering the marine environment. Research has shown that initiatives need to be kept in the media and updated regularly for anti-littering campaigns to remain successful. Most of the campaigns analysed as part of this study were generally long term projects although the short lifespan of other beach litter initiatives may result in a decline in motivation, and remedial action over time.

A7.6 Preventive Measures

In addition to the behavioural measures, municipalities employ a diverse range of litter prevention measures including:

- litter bins;
- fixed penalty notices and fines for littering;
- warden and staff patrols on busy beaches; and
- providing specific recycling bins and facilities on beaches for particular types of litter.

KIMO (2010) found that litter bins were the most common prevention method used in the UK by authorities with 94% of them reporting that they used these on beaches and coastlines within their area (spending almost €160 000 per year on the provision of them). In the Netherlands litter bins were also found to be the most common measure. The use of notice boards and posters were also popular to discourage beach litter (KIMO, 2010).

Fixed penalty notices are a useful tool for preventing litter. For example, a fine of £75 (approx €100) currently exists on beaches in many resort towns. Enforcement is a challenge as fixed penalty notices can only be issued when the offender can be identified and the offence is witnessed. Records from Brighton (UK) show that only 2 fixed penalty notices have been issued[1]. Such fines exist across the globe with similar examples in Newburport in the USA where penalties of $300 can be given for littering on beaches.

Another method of litter prevention used by municipalities on some beaches in Spain, Italy and Portugal is the use of ashtray cones. These small cones have been developed to reduce cigarette and other waste being left on the beach. On some beaches they are stored in a dispenser dock, where beach-goers can take a cone and return it as they leave. However, one problem with these is that the cones are often taken away and the dock stands empty.

A7.7 Clean-up Measures

Beach cleaning is the most widely recognised measure for managing beach litter. For amenity beaches it is undertaken frequently throughout the summer months by municipalities. Beach cleans are carried out for tourism purposes but also as part of the programme of measures to achieve the Blue Flag or other beach award.

A7.7.1 Municipalities

Removing litter from beaches is undertaken by municipalities to ensure that they remain safe and aesthetically attractive for users. Legislation such as the Environmental Protection Act (EPA) 1990 in the UK places duties on, and gives powers to, local authorities to keep beaches clear of litter according to a Code of Practice. The requirements apply to all beaches; the Code suggests that between May and September beaches should be subject to frequent monitoring and cleansed to as high a standard as is practically possible. Authorities are advised that they may find it helpful to encourage voluntary groups to assist in cleaning up beaches.

This can often result in substantial litter cleansing costs (Ten Brink et al. 2009). Costs associated with beach cleaning include:

- the cost of collection, transportation and disposal of litter. Beach cleans can either be conducted manually by hand or mechanically (using various types of machinery such as tractors and rakes);
- contract management;
- programme administration; and
- volunteer time.

In general popular amenity beaches are more likely to be cleaned than remote rural or isolated beaches. KIMO (2010) found that 90% of UK municipalities surveyed

[1] Whatdotheyknow.com (nd): **Litter on Brighton Beach Front**, downloaded from http://www.whatdotheyknow.com/request/litter_on_brighton_beach_front

carried out clean-up operations on popular, highly used beaches While only a small minority of authorities carried out clean-up operations on isolated beaches. Cleaning costs were highest when associated with more intense beach cleansing operations which focused on regularly removing marine litter from small areas of coastline, particularly in key tourist areas such as Bournemouth or Brighton (KIMO, 2010). Currently most beach cleans are undertaken in the summer, particularly in the peak summer months when most tourists are around. KIMO (2010) found that municipalities cleaned less well-used beaches on an 'as necessary' basis, particularly during the winter months.

Estimates (KIM0 2010) suggest that the total cost to UK local authorities of removing marine litter is approximately €14-18 million per year (with an average annual cost of around €146,000). This represents a 37% increase in cost over the past 10 years. Similarly, coastal municipalities in the Netherlands and Belgium spend an estimated total of €10.4 million each year removing beach litter with an average cost of around €220,000 (OSPAR 2009; KIMO, 2010). KIMO (2010) found that authorities in the UK cleaned over 800 km of beaches (representing approximately 4.7% of the total UK coastline) with the distance cleaned by each authority varying from less than 1km to over 150km.

Firth of Clyde Forum (2011) undertook a review of the approaches used to manage beach litter by Local Authorities in the Firth of Clyde area as part of its Marine Litter Strategy. The survey found that beach litter management was higher on the agenda of some local councils than others. Those which were not so economically dependent on beach tourism generally spent less effort and expenses on beach cleaning. Cleaning was partly dependent on how beach-users were dispersed with high use on few beaches suiting mechanical cleaning whereas lower use on many beaches is more likely to suit manual beach cleaning. Geographical features and designation of biologically sensitive sites (e.g. Sites of Special Scientific Interest) also deemed, in some instances, to have a bearing on the cleaning approach taken. The study found that open coastline makes mechanical cleaning a viable option. These beaches are generally easily accessed by tractors and the long length of the beach makes the effort of getting onto the beach worthwhile. Remote coastlines with small bays and rocky promontories are likely to complicate access, and short stretches of beach would not make building an access point worthwhile. In these situations manual beach cleaning is the only option. For example, along the rugged coastlines of Argyll and Bute, manual beach cleaning is carried out by voluntary groups who are encouraged and supported by the GRAB (Group for Recycling in Argyll & Bute) Trust. The Trust itself is funded by Environmental Body Scotland Ltd (Score Environment), the Crown Estate and Scottish Natural Heritage.

Municipalities may collaborate in partnership with voluntary groups to clean beaches. Providing support and resources for voluntary groups to undertake beach cleans instead of directly cleaning beaches can provide a substantial cost saving for authorities, although this is unlikely to be an appropriate mechanism on busy amenity beaches.

A7.7.2 Voluntary Groups

Beach clean-ups are carried out by international and national organisations as well as local partnerships. Some of these organisations are dedicated solely to beach cleaning while others focus on a diverse range of marine and coastal issues, which include beach litter as part of their remit. Numerous voluntary beach cleaning programmes currently exist and are undertaken by a diverse range of groups including NGOs, community groups, schools, environmental groups, university societies and youth groups. Some cleans are coordinated on an international level such as the 'International Coastal Cleanup' which is the world's largest, one-day volunteer effort to clean-up the marine environment (with over 90 countries participating). Others such as the UK Surfers Against Sewage (SAS) 'Big Spring Beach Clean' are carried out on a more local scale. Unlike municipal cleaning operations, these initiatives often have wider community and societal aims in addition to the removal of debris, which can include:

- increasing awareness of beach litter and its impacts;
- promoting a feeling of community spirit and pride;
- identifying and monitoring quantities and sources of beach litter; and
- encouraging action to reduce beach litter 'at source'.

A selection of schemes are summarised in Table 2. These clean-up measures generally rely upon volunteers to undertake the work, often with paid members of staff as campaign coordinators. In some regions the use of volunteers is the primary type of beach clean strategy and can allow for large datasets to be collated with minimal equipment, experience and cost. Volunteering is an effective means of drawing attention to the issue at hand and engaging members of the public in environmental management. However, the use of volunteers is not appropriate in some situations and extensive use and reliance on volunteers in some areas (such as popular tourist amenity beaches), or for formal monitoring (such as to assess MSFD compliance) may not be appropriate (Marine Scotland, 2011).

A7.7.3 Analysis

From the review of initiatives it is apparent that the focus of many beach cleans is on relatively populated areas, with less cleans in remote areas or beaches in which access is difficult. This is partly due to population demographics and distribution. In addition, accessing areas such as isolated storm beaches would provide a considerable logistical and safety challenge. However, litter on some of these beaches is likely to be much greater than in more regularly cleaned populated areas (which may be covered by both voluntary and local authority initiatives).

Collecting data during beach cleans is an important means of quantifying the sources and levels of beach litter in any given area, although the quality and potential usefulness of the data collected can be highly variable. Many organisations record the quantity of litter collected but fail to record other data such as the spatial density of the litter on a beach, or categorisation of litter type. Many surveys typically only provide data which can inform broad trends, due to the irregular spatial and temporal frequency of surveys. Differing methodologies have in some cases led to sparse datasets spanning short time-frames. In some situations for example, beaches are not

surveyed systematically on an annual basis, hindering analysis of temporal trends or quantitative appraisals of clean-up initiatives. We believe that one of the best examples of a beach clean which has deployed standardised annual monitoring is the MCS 'Beachwatch' scheme.

These beach cleans have been running since 1993 providing a long term dataset. It is undertaken throughout the UK and therefore provides monitoring and trend data for marine litter on national and regional level. It also has links with the International Coastal Clean-up and data is fed into the OSPAR Marine Litter Monitoring Project. For beach cleans to provide meaningful and interpretable data it is vital that standardised methodologies are used regardless of the scale of the project.

Table A7.1: Examples of Behavioural Measures					
Name of the initiative	**Sector / Organisation**	**Scale of scheme**	**Details of the scheme**	**Evidence of positive impacts of scheme**	**Costs**
Save the Beach Campaign'	Industry: Corona beer company	European	The Corona 'Save the Beach Campaign' aims to preserve Europe's endangered beaches, recovering at least one European beach each year, chosen with the help of internet users' votes. In addition the scheme has built a 'trash hotel' art piece which tours around cities to raise awareness on the issue of marine litter.	This measure is supported by celebrities (surfers, bands, environmentalists, etc.) and is a high profile campaign. It involves the organisation of parties, concerts and other activities which carry the underlying message of respecting the beach and keeping it clean. The beach is chosen through an internet vote. In 2009 for example, Capocotta beach in Italy won with 42 200 votes. The garbage hotel project received over €25 million in publicity value and 2 500 clips of the campaign were broadcast in 180 countries. Online, 'Save the Beach Hotel' received over 650 000 Google hits and over 75 000 Facebook fans in one month.	The garbage hotel project received over €25 million in publicity value and 2 500 clips of the campaign were broadcast in 180 countries.
Mermaids Tears	NGO: Surfers Against Sewage (SAS)	National (UK)	This measure raised the profile and placed pressure on the plastic industry to reduce the potential impacts of plastic and polystyrene pellets (nicknamed 'mermaids tears') which are the raw materials for many plastic products. Millions of pellets end up along the UK's coastline.	In 2007, armed with a strong body of evidence and 10 000 mermaids tears (that were collected from a single Cornish beach), SAS visited the British Plastics Federation (BPF) conference to expose the problem these tiny plastic pellets are causing. BPF reacted positively and took its challenge to international plastic conferences. SAS discovered plastic manufacturers on the west coast of the United States suffered from the same problem, but also had a solution. The BPFs American counterparts had put together a guidance document on how to achieve zero pellet loss. A UK version of this guidance was created, and promotes better house-keeping methods within plastic factories to ensure that escapes are minimised and any lost pellets are recaptured and reused.	Not known
Baltic Marine Litter (MARLIN)	NGO: Keep Sweden Tidy Foundation (funded though the Central Baltic Interreg 2009-2013	National (Sweden)	The Baltic Marine Litter (MARLIN) project intends to contribute to the reduction of marine litter on the shores of the Central Baltic area. Planned activities include awareness raising actions on marine litter among policy makers, other relevant stakeholders,	This scheme has only recently been implemented but expected results include: • increased knowledge and awareness amongst relevant stakeholders (e.g. policy makers, education institutions, media and the broader public) in the project area and in the whole Central Baltic area, of threats associated with	Not known

Table A7.1: Examples of Behavioural Measures					
Name of the initiative	**Sector / Organisation**	**Scale of scheme**	**Details of the scheme**	**Evidence of positive impacts of scheme**	**Costs**
	programme).		media and the broader public in this geographical area, and capacity building measures in local municipalities and NGOs to address the issue of marine litter in environmental management routines.	marine litter, threats to the environment and local socio-economic development; • the first ever attempt made to compare littering rates over time, spatial variations and identify materials and sources of marine litter in the Baltic Sea; • improved capacity on handling marine litter within environmental education and management activities in NGOs and municipalities through a pilot implementation of UNEPs common guidelines for marine litter assessment; and • marine litter action plans/mitigation strategies of the participating NGOs and municipalities produced and inserted to current local coastal zone/nature conservation programmes. A cross-border network of marine litter experts and beach clean-up teams created a central Baltic area acknowledged as the pilot region for adapting the new marine litter assessment method and a best practice model for similar actions in the Baltic Sea Region and worldwide	
Forth Coastal Litter Campaign	NGO: The Forth Estuary Forum	Regional (UK)	The scheme aimed to develop and implement a community involvement and public awareness raising programme intended to tackle and monitor the issue of marine and coastal litter in the Firth of Forth.	The campaign has focused public attention on marine litter, and has also created a sense of environmental responsibility amongst the coastal communities of the Forth, with people living there reporting a sense of achievement, ownership and empowerment (Storrier, 2004). Evaluation forms for the campaign were sent out to 56 people. Of the 24 respondents, 22 said that they thought the Coastal Litter Campaign had been a success, and 23 said they planned to continue surveying beach litter	Not known

Table A7.1: Examples of Behavioural Measures					
Name of the initiative	**Sector / Organisation**	**Scale of scheme**	**Details of the scheme**	**Evidence of positive impacts of scheme**	**Costs**
				and/or organising beach cleans in the future.	
Return to Offender	NGO: Surfers Against Sewage (SAS)	National (UK)	The scheme challenges companies whose litter is found on UK beaches to step up 'the anti-littering' message on products; look at using less harmful packaging to ensure products can be broken down naturally without putting wildlife at risk, promote recycling and/or reuse wherever appropriate and support community beach litter initiatives or anti-litter projects.	The campaign won the Coast award for 'Best Blue Green Campaign' in 2009 and has returned almost 1000 items of identifiable marine litter to companies. SAS have also been is discussion with companies. Haribo for example responded directly to the Return to Offender Campaign' campaign challenge and have stepped up their anti-litter messaging on packaging, replacing the universal 'Litter Man' icon with their own, far larger 'Golden Bear'. This means that the anti litter message is far more accessible to the young people who use their products.	Not known
'Bag It and Bin It – Don't Flush!'	Industry and NGOs: South West Water, the Marine Conservation Society, Surfers Against Sewage and other organisations.	National (UK)	Encourage people not to flush their discarded 'personal products' down the toilet. The aim of the scheme was to raise awareness of the problems of Sewage Related Debris (SRD) and to encourage people to dispose of personal waste carefully, whether in their own household waste bins or in special disposal bins in public toilets. The campaign promotes the use of a logo as well as resources such as leaflets, stickers and bags which companies and organisations can use free of charge.	Logo and campaign resources used widely in media (such as websites) and on products. Logos are also widely seen in public toilets.	Not known

Table A7.2: Examples of Beach Clean Schemes					
Name of the initiative	**Sector /Organisation**	**Scale of scheme**	**Details of the scheme**	**Evidence of positive impacts of scheme**	**Cost**
Blue Flag Beach Awards	NGO Foundation for Environmental Education (FEE) but administered by national organisations.	International	Created in 1987 it offers a recognised standard of beach maintenance, which assures beach users that it meets recognised standards in terms of cleanliness, safety, water quality and facilities. It is awarded to coastal destinations which have achieved the highest quality in water quality, facilities, safety, environmental education and management.	Currently the Blue Flag is awarded to 3850 beaches and marinas in 46 countries across Europe, South Africa, Morocco, Tunisia, New Zealand, Brazil, Canada and the Caribbean	Keep Britain Tidy charge £660 + VAT for each Blue Flag application. For England - total income generated is around £75,000 - all of which (as a not for profit) is invested in running the programme - including programme staff salaries, overheads, award materials, payment of a licence levy to FEE judging and marketing.
Dorset Beach Cleans	Municipality/Dorset County Council	Local	Indicative of beach cleans around the UK and Europe which are managing beaches to attain and maintain Beach Awards. Local authorities in Dorset spend up to A range of strategies are employed including: • Undertaking regular beach cleans (using both mechanical equipment and by hand); • Providing large numbers of regularly maintained waste and recycling bins; and • Using fixed penalties (£75 or approx 97 euros) to deter people from littering (highlighted by posters and enforced by a team of Seafront Rangers).	The preventive and clean-up measures ensure that the municipality maintains its Blue Flag status and remains a primary UK tourist resort. It contributes to supporting a total tourist income of £1.5 billion (1.95 billion euros).	£800,000 (€983,000) per year keeping the beaches clean (Smith, 2012).

Table A7.2: Examples of Beach Clean Schemes					
Name of the initiative	**Sector /Organisation**	**Scale of scheme**	**Details of the scheme**	**Evidence of positive impacts of scheme**	**Cost**
International Coastal Cleanup (ICC)	Ocean Conservancy	International	Every September, hundreds of thousands of volunteers from countries all over the world spend a day picking up marine litter. The ICC is the world's largest, one-day volunteer effort to clean-up the marine environment.	In 2011 nine million volunteers from 152 countries and locations have cleaned 145 million pounds of litter from the shores of lakes, streams, rivers and the ocean.	Not known
Clean-up the world Mediterranean initiative.	Clean-up the world	European (the Mediterranean)	Beach cleans in the Mediterranean	In 2007, over 1,200 beaches and sections of the coast were cleaned with over 500 authorities and associations involved.	Not known
Quality Coast Awards	Keep Britain Tidy	England	Aims to be an effective management tool for beach managers helping them plan for future improvements and to generate funding to achieve these developments. As part of this scheme and before an award can be made the beach and adjoining seafront should be regularly monitored and cleansed to an acceptable level, taking into account usage at peak times. Litter bins should be provided and serviced regularly. During the 3 year award period operators should tackle litter proactively including issuing fixed penalty notices where appropriate	In 2011 total of 108 English beaches received Quality Coast Awards (QCA's).	The cost of an award is: 1 to 3 award applications will cost £495 + VAT per beach per season 4 to 6 award applications will cost £470 + VAT per beach per season 7+ award applications will cost £445 + VAT per beach per season
Seaside Awards	Tidy Northern Ireland, Keep Wales Tidy, Keep Scotland Beautiful.	Scotland, Wales and Northern Ireland	It recognises beaches that meet mandatory water quality standards and are clean, safe and well managed. With specific regard to litter adequate cleansing of the beach and surrounding area must be undertaken, properly secured litter bins must be provided and signage encouraging users to take their	A total of 61 beaches were awarded Seaside Award status for the 2012 season.	Not known

Table A7.2: Examples of Beach Clean Schemes					
Name of the initiative	**Sector /Organisation**	**Scale of scheme**	**Details of the scheme**	**Evidence of positive impacts of scheme**	**Cost**
			litter home where appropriate, should be in place.		
Green Coast Awards	Keep Wales Tidy	Remote rural beaches in Wales and Ireland	The scheme is designed to award rural beaches which meet Guideline Water quality but do not have the infrastructure required to meet 'Blue Flag' or 'Seaside Award Resort' status.	The Green Coast Award is awarded to beaches which, are managed with the involvement of the community, for the benefit of visitors and the environment. It places a strong emphasis on community and environmental activities. Community involvement may include, among others; a Coastcare Group, Beachwatch and Community Councils. Originally a list of criteria was produced, similar to that of the Seaside Award (Rural). However, after further investigation, it was decided that due to the nature of these remote rural beaches, strict criteria were not flexible enough to account for the enormous variations between them and so the scheme became objective-led.	Not known
Beachwatch	Marine Conservation Society	National (UK)	The Marine Conservation Society's (MCS) Beachwatch is part of the MCS campaign for Clean Seas and Beaches. Since 1994, Beachwatch has involved local communities and volunteers in a practical project to clean and survey beaches all around the UK. Beachwatch is a year-round initiative which aims to survey beaches once a season. Beachwatch Big Weekend takes place over the third weekend of September every year to coincide with the Ocean Conservancy's International Coastal Clean-up (ICC) taking place in over 70 countries. The survey results are used by MCS to raise awareness of the impacts of litter, to campaign at a national level on marine litter issues and to promote	A total of 4,375 volunteers participated during the Beachwatch Big Weekend 2011. A total of 142 km of UK beaches were cleaned, including 247,914 individual bits of litter collected, with an average of 1,741 pieces every km. Plastic and polystyrene pieces were the most common sources of litter. Most marine litter (40%) was though to have originated from items dropped or left by the public on the coast or inland and carried by wind and waves.	Not known

Table A7.2: Examples of Beach Clean Schemes					
Name of the initiative	**Sector /Organisation**	**Scale of scheme**	**Details of the scheme**	**Evidence of positive impacts of scheme**	**Cost**
			measures to reduce litter at source.		
Barefoot Beach Rescue Tour	Surfers Against Sewage	National (UK)	Community based beach clean sponsored by Barefoot Wines	In 2012, 1455 beach clean volunteers took part in the initiative at 14 beaches, rivers and canals nationwide, removing 3827kgs of marine litter from the coast.	Not known
Coastwatch	North Sea Foundation (Stichting de Noordzee)	National (Netherlands)	Coastwatch is an environmental educational project for high schools, organised every spring and autumn. Investigating the contents of marine litter is the central theme, an activity performed independently by students along the coast.	The Coastwatch investigations have been going on since 1988 in the Netherlands. In 2006, an average of 136 pieces of rubbish was found per 500 meters of beach.	Not known
Big Spring Beach Clean	Surfers Against Sewage	National (UK)	The SAS Big Spring Beach Clean helps tackle the growing problem of marine litter with the help of regional reps, supporters, SAS members and coastal community volunteers. This year SAS is encouraging dedicated volunteers to organise their own beach clean events, offering support and equipment to help empower communities to take positive action to protect local beaches, surf spots and waterways.		Not known
Motivocean Beach Clean Tour	Surfers Against Sewage	National (UK)	Motivocean beach clean events, first organized by SAS in 2010 to encourage environmental awareness and activism amongst youth volunteers. The sea and coastal environment are a vital component of many sporting activities	In 2010 and 2011 combined, almost 1000 youth volunteers participated in Motivocean events, all generously volunteering a few hours of their time to help make a positive difference to beautiful beaches, rivers and waterways around the UK. As a result, SAS has already removed hundreds of bags marine litter, totalling	Not known

Table A7.2: Examples of Beach Clean Schemes					
Name of the initiative	**Sector /Organisation**	**Scale of scheme**	**Details of the scheme**	**Evidence of positive impacts of scheme**	**Cost**
			from sailing to surfing, windsurfing to volley ball, and through this initiative SAS aims to build and reinforce awareness, linking sport and protection of the environment.	many tonnes of unsightly and dangerous waste.	
North Devon Beach Clean Series	Surfers Against Sewage	Regional (Devon, UK)	Community based beach clean initiative in North Devon.	Over 220 beach clean volunteers removed over 650kgs of marine litter from five beaches in North Devon	Not known
Da Vor Redd Up	Shetland Amenity Trust	Local (Shetland, Scotland)	Annual spring clean of Shetland's beaches and roadsides	Da Vor Redd Up is the largest community initiative of its kind in the UK. Each year up to 15% of the population gather about 50 tonnes of rubbish, but there is little data collection.	Not known
My Beach ("Cleanup? Do It Yourself! Beach")	Stichting De Noordzee	Local(The Netherlands)	MyBeach is a part of the beach, where people themselves clean the beach instead of the municipality. The motto of MyBeach is: "Cleanup? Do It Yourself!" As part of the scheme you agree to not only drop litter but also to pick up litter that was washed up on the shore.	Currently 2 MyBeaches exist. Some monitoring is executed by Stichting De Noordzee, but after 1 year no conclusions could be drawn.	Not known

A7.8 Combined Programmes of Measures

The measures identified above are combined in many cases to provide a programme of behavioural, preventive and clean-up measures to manage the levels of litter on beaches, particularly amenity beaches. The following section describes the different measures used in Dorset, particularly around the adjacent tourist resorts of Bournemouth and Poole.

The range of measures used by municipalities and NGOs is diverse but there is little data available on cost effectiveness, particularly for those relying on volunteers. Municipalities often use a mixture of behavioural, preventive and clean-up measures to tackle beach litter. For example several municipalities in the Netherlands and Belgium in 2009 were involved in a 2-year pilot project which aimed to promote the responsible disposal of litter by tourists. The project, which was run in conjunction with KIMO Netherlands and Belgium, Rijkswaterstaat and the North Sea Foundation, used a variety of different initiatives such as art exhibits displaying the amount of litter left behind in a single day, introducing clean teams, organising free lectures on litter and encouraging retailers to use more sustainable packaging materials.

The case study has therefore analysed a number of measures which are operating in a single region; Dorset in the UK, to provide a clearer view of the factors which influence the success of the various measures.

Dorset is a county in the south west of the UK and has nearly 300km of coastline. Tourism is the largest component of Dorset's economy, providing over 40 000 jobs in the county. In 2008, the total visitor related spend in Dorset was £1.5 billion (approximately €1.95 billion) (Smith, 2012). The coastal zone is a principal attraction, with approximately 16.5 million visitors each year. Approximately 35% of litter on the county's beaches is left by tourists with plastic accounting for almost 70% of all marine litter found (Dorset Coast Forum, 2003; Smith, 2012).

To protect the local tourist economy from the negative economic impacts associated with marine litter, local authorities in Dorset spend up to £800 000 (€983 000) per year keeping the beaches clean (Smith, 2012). A range of strategies are employed including:

- undertaking regular beach cleans (using both mechanical equipment and by hand);
- providing large numbers of regularly maintained waste and recycling bins; and
- using fixed penalties (£75 or approximately €97) to deter people from littering (highlighted by posters and enforced by a team of Seafront Rangers).

Despite high levels of visitors each year, the Bournemouth and Poole beaches have a reputation for being some of the cleanest in Europe. In 2012 Dorset received seven Blue Flag awards all of which were for beaches in the popular coastal resorts of Bournemouth and Poole. Bournemouth Pier Beach and Boscombe Pier Beach have also been awarded a Quality Coast Award.

The preventive and clean-up measures ensure that the municipality maintains its Blue Flag status and remains a primary UK tourist resort. The £800 000 cost of maintaining a clean coast (approximately 1 million euros) which contributes to

supporting a total tourist income of £1.5 billion (1.95 billion euros) could be seen as value for money.

Dorset's rural and remote beaches have fewer resources for the cleaning and prevention of litter than the resorts of Bournemouth and Poole. However a range of voluntary beach cleans such as the 'Great Dorset Beach Clean' run by Dorset County Council's Coastal Ranger Team and the MCS 'Beachwatch' scheme are undertaken. Behavioural measures such as the 'Litter Free Coast and Sea' campaign are also currently implemented. The 'Litter Free Coast and Sea' campaign is run through a partnership of environmental NGO's, coastal forums and statutory organisations and aims to help coastal visitors and residents understand the economic, social and environment impacts of marine and beach litter and promote practical action to reduce the amount of publicly-sourced litter along the coast. The team sought to achieve this by promoting community ownership of the issues and solutions through:

- Creating a strong marine and beach litter brand to be used by all local organisations to promote; beach cleans, responsible behaviour and awareness raising materials;
- Creating a project fund for local school, community and youth groups;
- Creating a marine and beach litter education pack for schools along the Jurassic coast;
- Gathering quotes from local stakeholders to publicise the local impacts of marine and beach litter;
- Raising awareness and promoting local action through Twitter, Facebook and press releases; and
- Supporting and promoting existing marine and beach litter campaigns.

The project started in October 2011 with a budget of £9 000 (approximately €12 000). No data currently exists on the impact which the campaign has had on quantities of litter (Bark, M. 2012).

Despite these measures, beach litter overall remains a major challenge in Dorset, with high levels of debris still recorded on the county's more rural beaches. For example, in the 2010 MCS survey, the greatest density of litter was recorded (as in previous years) in the South West (which includes Dorset). On average 3,144 items/km were recorded, considerably higher than the UK average (1,969 items/km), but representing a 3% decrease compared to 2009 average figures (3,269 items/km).

It is likely that this continued pattern of marine litter on rural beaches is due to the location of the beaches, with the prevailing winds continuing to bring in beach litter from the sea. Beaches open to the prevailing winds from the south west or on open coasts of the North Sea are likely to receive much greater quantities of marine litter than sheltered bays and coves. It is important to understand the source of the litter as isolated storm beaches are likely to have the greatest benefit from clean-up operations due to the limited visitor numbers (and the type of visitor). Amenity beaches are likely to need a combination of behavioural, preventive and clean up measures to provide an effective combination of measures.

A7.9 Conclusions

A wide variety of measures are currently being implemented, at a range of different scales, yet managing beach litter remains a considerable environmental challenge. Ensuring beaches are clean, visually appealing and safe for visitors is vital for local tourism economies, and with regional implications. The economic value of clean beaches to tourism acts as a powerful incentive to clean-up litter in regions with large coastal resorts, with action less dependent upon legislation and statutory requirements. Quality awards and eco-labels such as the international Blue Flag award appear to be the most powerful driver for municipalities. The economic value of these awards could potentially be in the millions of pounds (sterling) but no assessments have yet been made.

Currently rural resorts or isolated stretches of coast which have fewer visitor numbers (and where economic incentives are smaller) have fewer measures for dealing with beach litter in comparison with populated tourist areas. Reduced visitor numbers in rural areas are likely to reduce the amount of litter dropped directly, although dealing with other sources of beach litter (such as from nearby rivers, drains or from shipping) can be considerably more complex. Other factors such as practical difficulties (e.g. access routes) can increase cost and feasibility.

Behavioural or preventive measures are often not effective enough on their own and require the implementation of remediation in the form of clean-ups. These beach cleans mitigate the short-term impacts of marine litter, but are only perceived as economically beneficial on amenity beaches where tourist revenue is important. However, there is a lack of quantitative evidence of the economic impacts on regional tourism of litter on rural beaches.

The existing clean-up measures described are vital, but the underlying sources of beach litter remain as the 'culture' of littering is still often considered socially acceptable by some members of the public. Therefore, it is vital that behavioural measures are a priority. Aside from the public awareness campaigns (e.g. conducted by some NGOs) and other small initiatives there is still a general lack of behavioural measures that are implemented by governments at a national level to manage marine litter. Such campaigns could be beneficial in terms of addressing a national littering culture.

In the majority of case, local authorities and voluntary groups (rather than the litterers) cover the cost of removing marine litter. Fixed penalties for dropping litter on beaches are one solution to deal with public sources of litter (i.e. individuals). However, this does not address the issue of litter from offshore sources or from industry. Enforcement and monitoring of obligations under the Marpol Convention remains a challenge. Campaigns such as the SAS 'Mermaids Tears' and 'Return to Offender' are however trying to put pressure on industry to prevent items becoming litter on beaches. Other measures such as the My Beach ("Cleanup? Do It Yourself! Beach") scheme in the Netherlands encourages beach users to take greater ownership for keeping beaches clean, rather than relying on municipalities.

It is apparent that there is currently a lack of geographical coordination between the large number of different clean-up and preventive schemes been undertaken at

International, EU and National levels. Better coordination of measures at an EU or regional seas level is required. A broader suite of economic and practical incentives may also need to be implemented by governments to prevent litter caused by industry.

A comprehensive and standardised monitoring programme implemented at EU level would allow spatially comparable analysis and would support subsequent actions to reduce marine litter. The standardised approach used in the MCS 'Beachwatch' beach cleans in the UK is one such approach that could be implemented EU wide by volunteers. However, to meet the requirements of the MSFD litter monitoring, surveys using standardised methodologies agreed at an EU level (as recommended by the MSFD GES Technical Subgroup on Marine Litter[2]) may be more appropriate. This is fundamental for clarifying the extent of the issue, as well as providing trend data which will help with the evaluation of the effectiveness of measures to prevent litter.

[2] Joint Research Centre (2011): Marine Litter: Technical Recommendations for the Implementation of MSFD Requirements. European Commission, downloaded from: http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/22826/2/msfd_ges_tsg_marine_litter_report_eur_25009_en_online_version.pdf