





COUNTRY REPORT ITALY



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Views, Opinions and Ideas of Citizens in Europe on Science

COUNTRY REPORT ITALY

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Ecsite - the European network of science centres and museums 89/7, Avenue Louise B-1050, Brussels Belgium info@ecsite.eu

AUTHORS

Kupper, F., Lynch, D.H.J, Van der Ham, L. and Broerse, J.E.W. (Athena Institute, VU University Amsterdam)

RESEARCH TEAM

Prof.dr. Jacqueline E.W. Broerse (M.Sc.); Dr. Frank Kupper (M.Sc., M.A.); Dr. Janneke E. Elberse (M.Sc., M.A.); Lia van der Ham (M.Sc.); Barbara M. Tielemans (M.Sc.); Wanda S. Konijn (M.Sc.); Anna van Luijn (M.Sc.); Fiona Budge (M.Sc.); Tirza de Lange (M.Sc.); Durwin H.J. Lynch (M.Sc.); Marzia Mazzonetto (MAS); Willemijn M. den Oudendammer (M.Sc.); Inge Schalkers (M.Sc.); Samuel J.C. Schrevel (M.Sc.); Dr. ir. Rianne Hoopman (M.Sc.); Samuel Ho (M.Sc.); Sarah Cummings (M.Sc.); Rylan Coury (B.Sc.)

EDITORS

Marzia Mazzonetto and Luisa Marino, Ecsite Francesca Conti, Tatiana Crisafulli and Elisabetta Tola, formicablu Srl Michael Creek, free-lance

DESIGN/DTP

Teresa Burzigotti, formicablu Srl

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For more information on the report, the results of the VOICES project, please contact Marzia Mazzonetto (mmazzonetto@ecsite.eu).



Introduction	4
The VOICES project	
Citizen participation in social innovation	
The process	
Structure of the report	
Methodology	6
The VOICES focus group approach	
The VOICES approach to urban waste	
Analysis of the focus groups	
Ethical issues	
Country relevant data - Italy	11
•	• • • • • • • • • • • • • • • • • • • •
Composition of the focus groups	
Results	15
How is waste managed at household level?	
Waste separation	
Waste collection	
Knowledge about waste pathways	
Waste management behaviour and convenience	
Barriers and concerns regarding urban waste	
Waste prevention and production	
Waste management in the household	
Waste disposal and pathways	
- ·	
Policy, management and communication	
Conclusion, discussion and evaluation	31
	٠.
Ideas for achieving a 'zero waste society'	
	The VOICES project Citizen participation in social innovation The process Structure of the report Methodology The VOICES focus group approach The VOICES approach to urban waste Analysis of the focus groups Ethical issues Country relevant data - Italy Demographic country data Factsheet on waste Composition of the focus groups Results How is waste managed at household level? Waste separation Waste collection Knowledge about waste pathways Waste management behaviour and convenience Barriers and concerns regarding urban waste Waste prevention and production Waste disposal and pathways Citizens' ideas on how to realise a 'zero waste society' Environmental sciences and technology

Annex 1: Full list of ideas for research and innovation, policy, management and communication Annex 2: Attitudes of citizens from Italy towards resource efficiency



1.1 The VOICES project

VOICES (Views, Opinions and Ideas of Citizens in Europe on Science) is a year-long, Europe-wide citizen consultation exploring the concept of waste as a resource. It represents an innovative method of integrating public opinion into the 'Climate action, resource efficiency, raw materials' dimension of the Horizon 2020 Work Programmes beginning in 2014.

Funded by the European Commission and led by Ecsite, the European network of science centres and museums, the VOICES project is a response to the Science in Society 2013.1.2.1-1 call on citizen participation in science and technology policy. Citizens are invited to give input to the Consolidation Group that will define the priorities for the next work programme on 'Urban Waste' (call SiS.2013.1.2.1-2).

The main aim of VOICES is to yield valuable insight on methods and procedure for engaging citizen participation to help set the research agenda for Europe's Responsible Research and Innovation framework. The knowledge gained through VOICES will be put to use in similar participatory actions across Horizon 2020.

1.2 Citizen participation in social innovation

A national and European capacity-building initiative, VOICES unites science communication practitioners and academics, and, as such, will result in an effective method through which to consult the public on science and technology related issues.

Compared to many other consultation initiatives, VOICES represents a breakthrough because of its scale (covering all of Europe) and because of the methodological approach used on this wide scale: an approach which makes use of a qualitative methodology, which allows a harvesting and deep understanding of citizens' views, fostering real governance processes and social innovation.

VOICES is also very innovative in its commitment to formally include the results of the citizens' consultations in the main policy document that will shape the priorities of European research. Another unique element is that the knowledge gained with this pilot, in terms of methodology, infrastructure and results, can be used to organise similar participatory actions across Horizon 2020.

1.3 The process

One thousand European citizens participated in focus group discussions about 'Waste as a resource' using a structured VOICES methodology which spans training, implementation and analysis. The methods, infrastructure and results of VOICES are fully documented on an open access portal (www.voicesforinnovation.eu) designed for similar participatory actions occurring throughout Horizon 2020.

VOICES engaged citizens in 33 locations covering 27 EU countries. 28 Ecsite network institutions make up the Third Party task force which organised the 100 focus groups, with approximately ten citizens each, in their respective countries.

Ecsite Project Managers and researchers from the Athena Institute, VU University Amsterdam, were responsible for conducting the focus groups, analyzing public consultations, writing the country and synthesis reports and disseminating their outcomes at public events.

1.4 Structure of the report

In this country report on the VOICES outcomes from Italy, the VOICES research methodology is further detailed in the following chapter. In Chapter 3, some specific data is provided on the country's population, on national urban waste figures and on specificities of the participants of the focus groups. Chapter 4 presents the results of the citizens' consultation on waste management at household level, barriers and concerns experienced in prevention and management of waste, and ideas for research and innovation, policy, management and communication. The report ends with a summary and discussion of the findings.



This section provides general information about the focus group method, and in particular about the VOICES approach. It also describes the structure of the VOICES focus groups and the process of data analysis.

As a qualitative research method, the focus group is increasingly used in political and social sciences, and can be defined as "a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment". An important advantage of focus groups in comparison to other research methods is that participants can respond to and build on the views expressed by the other participants. Because of this interaction, focus groups generate a large variety of opinions and ideas which provide insightful information, while maintaining a specific focus during the discussion. The method provides the opportunity to gain in-depth insight into ideas, values, wishes and concerns of participants and stimulates shared creative thinking. A specific characteristic of the focus group method is that it seeks understanding of a research topic from a particular perspective; in the case of the VOICES project, the perspective of European citizens.

2.1 The VOICES focus group approach

In the VOICES project, a total of 100 focus groups were held, each of them with approximately 10 citizens. Participants were selected by local recruitment agencies, according to predefined selection criteria. The selection criteria were applied in order to obtain diversity in focus group participants, and to represent society at large. General selection criteria with respect to demographic information included: sex (50% men and 50% women), education (low, medium and high levels of education)² and employment (employed, unemployed, retired and student). The focus groups were stratified by age using the following categories: 18 to 35 years of age, 36 to 50 years of age and 50+. Other criteria addressed elements relevant to the VOICES project's specific topic, including: participants from urban and non-urban areas³, diversity of types of municipality (at least five different municipalities, including bigger towns and smaller villages), and diversity of housing situation (flat or house). These selection criteria were applied in all EU member states. Because of the local context and the availability of participants there are minor differences between member states in the resulting composition of focus groups.

In most EU member states, three focus groups were conducted, all in one location. However, all member states with a population of above 25 million (Germany, France, Spain, Poland, Italy and the UK) had two sets of three focus groups each in two different locations, resulting in six focus groups in total in these countries.

The focus groups lasted 3 hours and followed a semi-structured script consisting of an introduction, four main exercises and an evaluation part (see box 2.1). During the focus groups, specific attention was paid to keeping the environment noise-free and providing enough space to relax, walk around and engage in the conversation. Each focus group was led by a moderator, who was in charge of stimulating and guiding the discussion. The moderator's role was also to maintain the focus of the discussion by ensuring that key themes were covered, while managing group dynamics.

Moderators facilitated the discussion by following the focus group script, which was provided to them in advance and contained questions and exercises to guide their work and ensure equal individual input as well as group discussion. Because of their crucial role in the focus groups, all moderators involved in the VOICES project followed a specific 2.5 day training course. The training focused on specificities of the VOICES focus group script as well as on refining important competencies of the moderators' role, including interpersonal communication, process management and understanding of the topic addressed.

In order to capture the data generated during the process, audio and/or video recordings were made of all focus groups. A note taker was also required to be present for the entire duration of the focus groups, in order to record additional data and to assist the moderator. All visual data generated by the participants, for example, individual drawings or collective mind maps, were collected at the end of each focus group and photographed.

BOX 2.1 SUMMARY OF VOICES FOCUS GROUP SCRIPT

INTRODUCTION

The moderator introduces himself/herself, the note taker and any observers and asks the participants to introduce themselves. The moderator then explains the aims and topic of the focus group using a PowerPoint presentation.

EXERCISE 1

The goal of Exercise 1 is to raise the focus group participants' awareness of household waste and related waste management systems. It also identifies what people know and do with respect to their household waste. Participants are asked to draw on an A3 sheet of white paper how they think the waste streams are managed around their house. When they have finished, the papers are collected and taped to the wall. The moderator then asks the participants to explain their drawings and encourages them to elaborate.

EXERCISE 2

Exercise 2 aims to identify barriers and concerns of the participants with respect to current urban waste pathways (including prevention) and to go into more depth on the causes and underlying reasons for the reported barriers and concerns. The moderator shows the participants PowerPoint slides about the four most common pathways of waste and prevention. After this, participants are asked to think about barriers and concerns they experience regarding waste, waste management and prevention of waste and to write two examples of these barriers or concerns down on Post-Its. The Post-Its are collected and for each, the moderator asks the participants to explain what they wrote down and why.

EXERCISE 3

The objective of Exercise 3 is to stimulate creative ideas for improvement and solutions for problems and possibly to translate ideas and solutions into research topics or questions. The moderator introduces the concept of a 'zero waste society' to the participants using PowerPoint slides. The participants are then asked to work in groups and brainstorm about ideas for achieving the aims of a 'zero waste society', focusing especially on what research and innovation would be needed for this. Participants are then asked to present their ideas to the entire group, while the moderator uses a flip chart to list all concrete ideas for research and innovation suggested by the participants. The moderator then asks the participants to reflect further on possible futuristic technical solutions and 'wild' ideas regarding waste management and prevention.

EXERCISE 4

The aim of Exercise 4 is to attribute a level of priority to the research topics formulated in Exercise 3. Participants are given three stickers, which represent money (1 million each) that they can spend on ideas written down during Exercise 3. They are asked to assign one or more stickers to the ideas that they feel should be prioritised because of the importance of the problem it addresses and/or the quality of the solution it provides. Once the participants have assigned their stickers, a plenary discussion is held to talk about which ideas got the most stickers and why.

EVALUATION

The moderator ends the sessions and asks the participants to share feedback on their experience taking part in the VOICES focus group. Participants are also asked to fill in an evaluation questionnaire.

2.2 The VOICES approach to urban waste

In the focus groups, citizens of Europe were consulted on the topic 'Waste as a resource'. Urban waste is defined as solid waste collected by or on behalf of municipal authorities and disposed of through the waste management system. Most of this waste is produced by households, although similar waste from sources such as commerce, offices and public institutions are included. Consumer products disposed of by citizens, like clothes, electronics and furniture etcetera, are also considered urban waste. Industrial waste is not considered urban waste and is outside the scope of this project. On average, each of the 500 million people living in the EU throws away around half a tonne of household rubbish every year. This amounts to 70 million truckloads of household rubbish for the EU as a whole every year (one truckload is considered to be 3500 kg, the maximum weight for a truck). All this waste has a huge impact on the environment, resulting in pollution and greenhouse gas emissions that contribute to climate change, as well as significant loss of materials - a particular problem for the EU, which is highly dependent on imported raw materials. Current EU policy aims to reduce both the environmental impact of waste and the use of raw materials needed for production processes. Nowadays, the challenge of urban waste is approached from two perspectives; the waste hierarchy and the life-cycle approach. These combined approaches are the building blocks of the current thematic strategy on waste.

In order for the results of the focus groups to be translated into outcomes which are relevant and beneficial for European research, the VOICES focus group design explicitly uses these same two approaches in presenting the topic of urban waste and in structuring the exercises. The vision of a 'zero waste society' is used as a

focus for the participants while thinking about possible innovations and the techniques and knowledge necessary to develop them.

The waste hierarchy is initially depicted as a pyramid with a wide base representing disposal in a landfill, a second layer representing recovery of energy through incineration, a third layer representing recycling, a fourth representing reuse and the top (and smallest one) representing prevention. This reflects the current situation of waste management in Europe. In order to achieve a 'zero waste society', this pyramid should be turned around and its top, prevention, should become very wide while its base, landfill, very narrow.

The five-step waste hierarchy can be used as a rule of thumb when choosing between options of waste management, with prevention as the most preferred and disposal in landfill as a last resort. However, all products and services have environmental impacts in various stages of their existence. To avoid shifting negative impact from one stage to another, the life-cycle approach is also considered. Life-cycle thinking involves looking at all stages of a product's life - from the extraction of raw materials for their production to their manufacture, distribution, use and disposal - to find out where improvements can be made to reduce environmental impacts and use of resources.

2.3 Analysis of the focus groups

After each focus group, a summary report was written by the moderators based on the note taker's notes and the information on the flip charts. A draft of this summary report was sent to the focus group participants who were asked to comment on it. Moderators collected any feedback and included it in the final version of the summary report as an annex. The audio recording of each focus group was transcribed word-for-word and translated into English for analysis. The translated transcripts were coded and analysed using MaxQDA, a programme for qualitative data analysis. For the analysis of the data, both structured analysis as well as open coding were used. Structured analysis was carried out by using a predesigned coding sheet based on preliminary research. This type of analysis allows for all relevant outcomes to be extracted from the raw data. Open coding runs parallel to the structured analysis and allows for insights unforeseen by preliminary research to emerge. The summary reports of the individual focus groups have been used to validate and complement the analysis.

2.4 Ethical issues

At the beginning of the focus groups, all participants were asked to sign an informed consent form providing information on the topic and aims of the focus group. It was explained that participation was voluntary and participants were free to withdraw at any time, without giving reason. The form obtained participants' approval for audio and video-recording of the focus group, for the use of the resulting data for research purposes, including the use of anonymous quotes, and for data storage for five years. All data were processed anonymously.

¹Krueger R.A. (1994). Focus Groups: A Practical Guide for Applied Research. Sage: Thousand Oaks, California

²The typology of low, medium and high education level is based on the International Standard Classification of Education (http://en.wikipedia.org/wiki/International_Standard_Classification_of_Education)

³The urban-rural typology is based on the new urban/rural typology developed by the European Commission (http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Urban-rural_typology)

⁴Questions and Answers, Thematic Strategy on the prevention and recycling of waste and the proposal for the revision of the Waste Framework Directive (Available at: http://ec.europa.eu/environment/waste/pdf/faq.pdf)

⁵ Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee of the Regions on the Thematic Strategy on the Prevention and Recycling of Waste, Brussels, 19.1.2011, COM (2011) 13 final; EU Waste Policy - The Story behind the strategy, 2006



3. Country relevant data - Italy

This chapter of the report presents relevant data about the country and local focus groups. This includes demographic data, data related specifically to local waste management and information concerning the setting of the local focus groups.

3.1 Demographic country data

Italy is one of the bigger EU member states with a population of approximately 61 million, spread over urban areas (36%), intermediate areas (44%) and rural areas (20%).

Table. 3.1 Population Data^{6,7,8}

		2011		
Population at 1 January		60 765 235		
Population as percentage of EU27		12.1%		
Gross Domestic Product (PPP)		25 100 Euro		
	Urban	21 573 000	36%	
Population urban-rural typology	Intermediate	26 694 000	44%	
	Rural	12 359 000	20%	

3.2 Factsheet on waste

The amount of municipal waste generated and treated in Italy is higher than the average amount of waste treated in the EU27. Italy ranks 10th on the EU27 ranking list on Municipal Solid Waste Recycling (MSW). Italy seems to be on the right path to reach the EU recycling target of 50% for MSW by 2020.9

Table 3.2 Municipal Waste 10,11

		lta	aly	EU27 a	verage
Municipal waste generated (kg per person)		531 kg		502 kg	
Municipal waste treated (kg per person)		50:	2 kg	486	S kg
Municipal waste treated	Landfilled	256 kg	55%	185 kg	38%
	Incinerated	75 kg	15%	107 kg	22%
	Recycled (material recycling)	105 kg	21%	122 kg	25%
	Composted (organic recycling)	65 kg	13%	73 kg	15%

3.3 Composition of the focus groups

In Italy, six focus groups (FGs) took place on the weekend of 23rd March 2013. Three focus groups were held at the Museo Nazionale della Scienza e della Tecnologia "Leonardo da Vinci" in Milan, moderated by Sara Calcagnini, Head of the Science and Citizens Unit. Three other focus groups were held at the Città della Scienza science centre in Naples, moderated by Luca Simeone.

In total, 61 people (29 male and 32 female) participated in the six FGs. The age of the participants ranged from 19 to 71 years. 20 participants were aged between 18 and 35 years, 21 between 36 and 50 years, and 20 were aged 51 or older. There were 36 participants with a high level of education, while 18 had a middle level and 6 a low level of education. 35 participants were working, while 17 were unemployed, 5 were retired and 3 were students. 51 participants live in a house and 9 in a flat. For one participant, data regarding education, employment and housing were missing. Details of the composition of these focus groups are presented in the table below.

Table 3.3 Composition of the Focus Groups¹²

		M FG1	M FG2	M FG3*	N FG1	N FG2	N FG3	TOTAL
Participants	Total	10	10	10	11	10	10	61
Gender	Male	4	5	5	5	5	5	29
Gender	Female	6	5	5	6	5	5	32
	18-35	10	0	0	0	10	0	20
Age	36-50	0	10	0	11	0	0	21
	50+	0	0	10	0	0	10	20
	High	9	7	6	4	7	3	36
Education	Medium	1	3	3	7	0	4	18
	Low	0	0	0	0	3	3	6
	Unemployed	3	4	0	4	5	1	17
Employment	Employed	6	6	7	6	3	7	35
Employment	Retired	0	0	2	1	0	2	5
	Student	1	0	0	0	2	0	3
Housing	Flat	9	7	8	10	10	7	51
riousing	House	1	3	1	1	0	3	9

^{*} Missing data for one person regarding education, employment and housing

⁶ Eurostat Statistics Database Online (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

⁷ Eurostat Newsrelease (http://europa.eu/rapid/press-release_STAT-12-51_en.pdf)

⁸ The urban-rural typology is based on the new urban/rural typology developed by the European Commission (http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Urban-rural_typology)

⁹ European Environment Agency (2013). "Managing municipal solid waste - a review of achievements in 32 European countries" EEA Report No 2/2013 (http://www.eea.europa.eu/publications/managing-municipal-solid-waste)

¹⁰ Eurostat Newsrelease (http://europa.eu/rapid/press-release_STAT-12-48_en.pdf)

¹¹ The reported quantities of waste generated and treated do not always match exactly due to one (or more) of the following reasons: Estimates for the population not covered by collection schemes; Weight losses due to dehydration; Double counts of waste undergoing two or more treatment steps; Exports and imports of waste; Time lags between generation and treatment (temporary storage)

¹² M = Milan, N = Naples





4. Results

This chapter describes the overall results of all focus groups held in Italy. The chapter includes three sections, which are structured according to the exercises of the focus groups. The first section provides insight into what people think and do with respect to waste management at the household level. The second section provides an overview of barriers and concerns of the participants about current urban waste prevention and management, and identifies underlying reasons for the reported barriers and concerns. The third section presents participants' ideas for research and innovation needed in order to achieve a 'zero waste society' including concrete information on the research category, the aim of the research, the proposed target group and the perceived priority of the research idea. Participants' ideas for policy, management and communication are included as well. Throughout the results, quotes of focus group participants are provided for illustrative purposes.¹³

4.1 How is waste managed at household level?

This section describes what people know and do with respect to household waste. It includes four parts. First, an overview is given of the types of waste that are generally collected separately and those that go in the general bin. The second part provides insight into how the waste is collected, while the third part describes what participants think happens to the waste after it is collected. The fourth part describes whether people deal with waste as they are supposed to and to what extent they think waste management is conveniently organised.

4.1.1 Waste separation

The majority of the participants indicated they separate waste. Participants from the focus groups held in Milan said they have been doing this for quite a number of years. The participants mentioned that when they separate waste, they do this in five or six streams: paper, glass, plastic, metal, organic and unsorted waste. Some participants indicated that they do not separate organic waste, and put it with the unsorted waste. While it was not explicitly mentioned what kind of waste is meant by unsorted waste, one participant did state that he categorized 'clothes' as unsorted waste. Some of the participants also mentioned the separation of types of waste that are less common, compared to the streams of organic/paper/glass waste. They said they separate clothes, medicines, batteries, light bulbs and small electronic appliances, such as mobile phones. A few participants on the other hand mentioned that they had no clue what to do with these types of waste and therefore they did not collect them separately. There were also a few participants that did not separate waste at all. Some of these participants mentioned that they did not see a need to separate waste, as everything would go to the landfills anyway. One participant mentioned that there were no possibilities to separate waste in his area.

A few participants stated that they have separate bins (organic/glass/paper) placed in their households to make waste separation and collection easier. Others mentioned that they only had one common bin, which they would use for organic/unsorted waste, and that they use their balcony to store waste for other streams

¹³ Abbreviations used in quotes: FG# = number of focus group, P# = number of specific focus group participant, PX = number of focus group participant unknown, M = Moderator.

(glass/paper), as this was more convenient. Most participants that separated their household waste indicated this waste is disposed of in special (coloured) containers placed in front of the home or nearby their building.

4.1.2 Waste collection

In general, most participants mentioned that the waste collection bins for glass, organic, paper and plastic waste were placed below their building. A few participants mentioned that in their area there were no general collection points for waste that was separately collected, such as glass. One participant stated that he therefore has to drive a few kilometres to bring such waste to a recycle centre. It was mentioned by some participants that the waste collection bins have a clear indication of which waste should be thrown into them. For instance, yellow bins are for clothes/plastic, green bell-shaped containers are for glass and grey metal containers for metal/aluminium.

Most of the participants mentioned that there were special designated days when waste was collected by the municipality. In most cases organic and unsorted waste was collected 3 times a week and paper, glass and plastic was collected once a week. A few participants brought up that in their area it is important to use clean (designated) waste bags, otherwise the waste will not get collected by the waste management company. Furthermore, some participants argued that it is important to rinse glass bottles (milk, yoghurt) before disposing of them, because otherwise it would attract animals. The participants mentioned that for bulky waste (construction waste, big electrical appliances and furniture) you would have to dial a (free) number and make an appointment with the waste management company to collect it.

When it comes to clothes, most participants take these to church or charity organisations or to Caritas. ¹⁴ Expired and unused medicines are brought to the pharmacy or supermarket. Mobile phones and batteries are brought to the electrical shop or to the shopping mall.

4.1.3 Knowledge about waste pathways

In general, the focus group participants do not have a clear idea of what happens to their waste after it is collected. Most participants hoped that most of their waste, especially clothes and old furniture, will get recycled or reused. However, many participants believed that this is not the case, and they speculated on a variety of possible waste pathways. These speculations range from waste being brought to a landfill, to waste being incinerated, to waste being crushed, and finally to waste being sold to Germany or Sicily where it would be properly treated, or not. It was noted that participants from the Naples area in particular really would appreciate some more transparency in the waste pathway.

With regard to particular types of waste, the participants did have specific thoughts of what happens to this waste. Some of the participants for example indicated that organic waste is used to produce fertiliser or compost, and even gave concrete examples, such as that of a factory in Montanaso Lombardo that processes organic municipal waste using bio-filters. Others believed that organic waste is burnt and transformed into energy for households. When it comes to electrical appliances, some participants assumed that these are collected by the companies that produce them and then get taken apart completely for reuse of the materials (mainly certain plastics and metals like copper), or directly disposed of in landfills.

¹⁴ Caritas International is a confederation of 164 Roman Catholic relief, development and social service organisations operating in over 200 countries and territories worldwide.

4.1.4 Waste management behaviour and convenience

From the focus groups, it became clear that, in general, most participants separate and dispose of their waste correctly. The participants mentioned that it is important to separate waste according to the system because otherwise the waste is not collected by the municipality. There are some exceptions however. Some participants indicated that they sometimes put waste in the wrong bin, for example disposing of a glass bottle with the organic waste, for reasons of convenience. One participant explained that he does collect glass in a special bag on his balcony, but leaves the full bag next to the glass collection bin at the end of the street, instead of disposing of the bottles one by one in the bin. He argued that it would take too much time to dispose of the bottles one by one. Some participants also mentioned that they do not always rinse the bottles, as this uses up extra water.

The majority of the participants however expressed that they separate their waste in their households, and are able to dispose of it quite conveniently at a container or bin for separate collection close to their home. There were also participants that stated that they do have a desire to separate waste, but that there are no containers or bins for separate waste collection available nearby their house. They argued that especially during colder seasons this is very inconvenient. There were a few participants that explicitly stated that they do not recycle correctly. This might have to do with poor organisation of waste separation in the places they lived, and/or that it would take too much of an effort to separate waste. Furthermore, a few participants mentioned that sometimes the garbage truck does not collect the waste correctly. In addition, it was stated that when the garbage truck collects the waste, the waste from all the separate containers is mixed in one truck.

4.2 Barriers and concerns regarding urban waste

This section provides an overview of the participants' barriers and concerns with respect to current urban waste and identifies underlying reasons for the reported barriers and concerns. The section consists of four parts. The first part, 'Waste prevention and production', focuses on barriers and concerns related to goods in the phase before they enter the household including both waste prevention and production. The second part, 'Waste management in the household', addresses goods and waste in the phase while they are in the household. The third part, 'Waste disposal and pathways', describes barriers and concerns related to the phase in which waste is disposed.

4.2.1 Waste prevention and production

With respect to waste prevention and production several barriers and concerns were mentioned by the participants. One of the first concerns mentioned by some of the participants is that nowadays there is too much unnecessary packaging around products.

"[...] we could already cut down a lot on waste if they cut down on all food packaging. There's no point in... Say packets of croissants or biscuits with all those layers of wrappers, cardboard, paper, cellophane and so on." (Milan FG3, P9)

"My grandma takes a pill each month called 'Bonviva'. It's a calcium pill like this, that basically has seven packages, but it is a tiny pill..." (Naples FG 1, P9)

Furthermore, some participants expressed that the entire concept of having plastic packaging should be abolished, as plastic is not biodegradable, and thus forms a threat to the environment.

"They should get rid of all the plastic. It is bad for the environment." (Naples FG3, P3)

A few participants also argued that nowadays people have a very consumerist attitude, and buy much more than they actually need. The participants explained that people love to buy products in bigger quantities, which leads to more waste production.

"I interpret the word barrier in a broad sense. For me a barrier in waste management could be consumerism, including one-off packaging etc., and we have to tackle this idea of continuous consumption." (Milan FG3, P8)

"I think people are just not up to economising [...] you could choose a smaller pack, some things which come in packs of three you can buy just one." (Milan FG3, P3)

However, participants also argued that buying products in larger quantities is more convenient and in some cases even cheaper.

"For some supermarkets three litres of Dixan (detergent) costs 5 euros, and one litre costs 4 euros... and that is with me bringing my own bottle along. It costs me more!" (Naples FG2, P3)

4.2.2 Waste management in the household

The participants mentioned several barriers and concerns regarding waste management in the household. First, the participants mentioned that the waste management system in the household tends to become a bit complex for certain people, especially elderly people.

"I think many old folks don't correctly understand the procedures, because they are not used to do things different from how they have been doing it forever..." (Milan FG2, P2)

Furthermore, some of the participants indicated that people in general might not have an incentive to separate waste because they have no idea of what will result from their effort to separate waste.

"Just because we don't know what happens to the waste, we are less motivated, and so in the end we don't separate all the waste." (Naples FG2, P5)

Another concern that was mentioned by the participants is that products lack information for consumers on how to correctly dispose of them after usage.

"I need to see written on packaging 'this box must be thrown into this, the inner package into that'... otherwise I am left there holding the box and the packet in my hand and I ask myself what to do with it? Where do I throw it? What do I throw where?" (Naples FG2, P3)

The participants also mentioned that certain types of waste are assembled from different types of material. This can make it quite confusing for people to separate correctly, as people will have no idea what to throw where.

"Take for example the milk tetra pack. You have a part that is of plastic, inside has aluminium and on the outside it is made of cardboard. Where do I throw that?" (Milan FG 1, P9)

Moreover, some participants explained that not only do they lack knowledge of what happens to waste after they dispose of it, but also that they feel that their effort of separating waste is not being rewarded.

"We don't know where the waste goes. That's a frustration! I won't do an effort for something if there is no incentive for me in it, like paying less tax or something." (Naples FG3, P4)

Different participants mentioned that some people do not separate waste in the home because of inconvenience. They are either too lazy, or do not have proper knowledge and therefore no interest to separate waste correctly. A few participants argued that recycling and reuse is a sacrifice for them, which they prefer not to do.

"To reuse and recycle things is annoying. I prefer to go to the store and buy a new one." (Milan FG 1, P8)

One participant specifically mentioned that it depends on the attitude of the people you are living with that determines to what extent waste management in your household takes place. If not everybody in the house separates waste it becomes difficult for those who do separate to stick to their plan.

"The main barrier for me to sort waste is that not everybody in my family, well my son in particular sorts waste according to plan. I often have to dig into the rubbish bin to correct his mistakes." (Naples FG3, P2)

A final barrier that was mentioned with respect to separating waste in the household is that it takes a lot of

space to separate waste in the house, because of the extra bins that are needed. This is considered inconvenient. "I go to all that trouble to sort glass, paper and so on... but I have got a small flat... so where do I put it all?" (Milan FG2, P7)

4.2.3 Waste disposal and pathways

When it comes to waste disposal and pathways, the participants discussed various barriers and concerns. One of the concerns mentioned by several participants was whether everybody recycles correctly. Furthermore, the participants wondered what the implications might be if not everybody separates waste.

"An obstacle is that not everybody respects the waste collection rules. People throw things away however the heck they want to, without separating it." (Milan FG 1, P1)

Furthermore, some participants talked about the lack of information they have about the exact time schedule that waste will be collected. Others mentioned that they are aware of the fixed time schedule, but they are not always able to stick to it. People with irregular working hours, for example, are not always able to stick to the municipality's schedule of waste collection.

"I'm a flight attendant and therefore I can't always throw away the waste on the specific designated dates. In my municipality they come to collect waste on certain dates and there are no bins on the streets. I find myself sometimes with the balcony full of bin bags because I don't know when to take them out." (Milan FG 1, P2)

The time schedule is not the only concern. The participants also argued that there are not enough waste collection points throughout the region, which forms a barrier for those who want to dispose of their waste separately. Furthermore, the participants indicated that the waste collecting bins for separate collection have different colours throughout Italy, which can be confusing.

"Information is lacking on the bins as well. Throughout Italy the bins aren't the same colour for paper and glass, so it is a problem of information. If I go to Sicily the glass bin might be yellow, I come to Milan then it is blue, I go to Cremona and there it's another colour." (Milan FG 1, P 1)

Lastly, an important concern that was discussed by participants from all three focus groups in Naples was that there is a general disbelief and mistrust in the local authorities who are responsible for the disposal of waste. The participants mentioned that the political system has links with the Camorra and is not transparent. Therefore they, as citizens, are demotivated to separate waste.

"The obstacle is the mistrust in those above us. I believe there is a lack of frankness in the things that are done." (Naples FG 1, P4)

"I think that there is mismanagement in the landfills... unfortunately we also live in a context with the Camorra... I don't trust the system." (Naples FG2, P10)

The participants mentioned that their major concern is that waste will not be disposed of correctly and it will pollute the planet and affect the health of the citizens.

"A really important question is: Where is our waste going to end up? Is it going to landfills? To incineration? I think of diseases for our health and pollution of our planet." (Naples FG 1, P10)

"The health of our children and our grandchildren and the beautiful countryside is at risk... and what are the politicians doing.... Sitting and watching it happen...?" (Naples FG3, P3)

4.3 Citizens' ideas on how to realise a 'zero waste society'

This section presents participants' ideas for achieving a 'zero waste society'. A distinction is made between ideas related to environmental sciences and technology, and ideas related to policy, management and communication. Below, these ideas are described separately in tables. For each idea in the table, the research category is mentioned as well as the aim of the research and the proposed target group. In addition, the priority

of the research idea as perceived by the participants is indicated in the tables, using stars to indicate the number of stickers assigned to a specific idea by the participants. Only ideas that were prioritised by the participants are described in this section. Ideas that were not prioritised are included in the full list of research ideas which is provided in Annex 1.

4.3.1 Environmental sciences and technology

TECHNICAL, PHYSICAL, CHEMICAL, ENGINEERING

When it comes to the domain 'environmental sciences and technology' the participants mostly mentioned ideas related to technical, physics, chemical and engineering research. Generally, these ideas involve the development of some kind of machine or device, which would facilitate the effective use of waste, the elimination of waste or improve recycling.

One of the most highly prioritised ideas concerns a waste disposal unit that can be placed in the home and converts waste into different forms of energy, such as electricity, gas and heat. The target group for this 'waste-to-energy' converter is consumers. In most focus groups, this idea was presented as some sort of a 'domestic incinerator' that would burn waste and produce heat to heat a building, for example.

"How it works? Basically it is like a hole in which you can throw anything in it and it will then be funnelled to a boiler compartment in which it can be burnt. The heating that comes out can be used to warm the entire house." (Naples FG 1, P9)

There was a variant to this idea in another focus group, where it was stated that this converter would not burn waste, but instead it makes use of lasers to decompose molecules and transform them into energy. Other focus groups also developed this idea. As they explained it, such a converter could be installed in such a way that it would heat an entire building or industry.

"[...] how to use household waste for each block. Each block should have their own little waste-to-energy plan, so that each block can do its own recycling..." (Milan FG2, P6)

A second idea that was highly prioritised concerned a machine that is able to decompose any kind of waste into small molecules, and then create a new product out of those molecules. The participants called this a 'molecular synthesiser and de-synthesiser'. The participants did not elaborate extensively on this idea. One participant, however, mentioned that this idea was inspired by the already existing 3D-printer.

"They have already invented the 3D-printer, which creates objects out of nothing, so they can also create a 'printer' that destroys them and transforms them into something else." (Milan FG 1, P8)

This idea was highly prioritised for different reasons. The first is that with this device 100% of the waste is recovered and effectively reused. Furthermore, it was argued that this idea seems both convenient and efficient.

Another idea that was mentioned and well received among the participants concerned the development of a car fuelled by waste. This idea, which targets consumers, aims to both eliminate waste and make use of waste more effectively. Although the participants believed the idea to be quite 'out of the box', it was still ranked as high priority.

"[P9] [...] and then a car that uses waste as fuel.

[P6] That is out of this world.

[P10] He said to put more absurd things too.

[P8] Maybe in a hundred years they will do it." (Naples FG 1)

The participants also came up with an idea that entails the creation of a household box that would convert and separate waste into a vaporising liquid and solid parts. The vaporising liquid can be used to generate electricity, while the solid parts can be used as construction material. The predominant aims of this device are to

eliminate waste and to make effective use of waste.

"Our idea is a local liquidiser. You can put everything in it and everything gets mixed..Then centrifugal spinning separates the stuff, and a liquid part remains on top. The solid parts can be used to make for example building materials, blocks and maybe fuel briquettes. The liquid will be brought to a higher temperature and with the steam can be used to run a small electricity generating station." (Milan FG3, P3)

Furthermore the participants talked about a system of channels or tubes that would connect different households with the main waste collection point. The system is controlled by some machine placed in each household that would sort each item of waste correctly before releasing it via the channels and tubes. The participants mentioned that this idea is appealing because it seems very convenient.

"[...] a channel where it goes and sorts the waste, so elderly people wouldn't need to go downstairs, or worry where to throw the waste." (Naples FG2, P10)

Another idea that was discussed in various focus groups was to install a waste disposal unit beneath the sink that eliminates or grinds down almost all (organic) waste. It was mentioned various times that this idea was inspired by the American system. The participants argued that such a system would be very convenient as it reduces the amount of waste significantly.

"Then we have a food waste disposal unit, like in the American movies, that would grind all the leftovers when you are washing dishes." (Naples FG2, P2)

"A garbage eater... the standard thing in the American sink that reduces the volume of the waste." (Milan FG3, P7)

Furthermore, the participants talked about a technology that melts and merges all kinds of material and makes new products out of this. The aim of this idea, which targets waste management companies and producers, is to make more effective use of waste.

"The idea is to melt different kinds of material and waste, including food waste... transforming them, by means of special equipment, into a single final product derived from all this." (Milan FG 1, P 1)

The participants also talked about technical ideas that involved machines that would be able to convert waste back into raw materials or some other useful product. The idea is that the waste gets treated, by chemicals for example, and transformed into raw materials. The aims of these ideas are to make effective use of waste and to use fewer resources. The target groups of these ideas are both waste management companies and consumers, as this machine can be used in households as well as by waste management companies.

"All materials will be converted back to raw material. It is the purest form of recycling." (Milan FG2, P3) "This material converter is a thing in which you put dirty paper, and it will give you clean paper. Or it converts plastic in a raw material that you can exchange or sell. Also, organic waste it can convert into fertiliser." (Naples FG2, P6)

Furthermore, the participants discussed the idea of having an automatic robot that helps separate waste for every household. The idea was not discussed in great detail. Participants prioritised this idea mainly because it seemed convenient.

Finally, the participants introduced some ideas on which they did not elaborate much. Some of these ideas involved the disposal of waste in outer space, e.g. shooting waste to the moon or sending waste to the sun. The participants also came up with the idea of a plasma incinerator that is able to burn every type of waste, e.g. plastic, glass, metal. These ideas all target waste management companies. Although most of these ideas seem less feasible on the short term, the participants were quite excited to talk about them.

Table 4.3.1 Ideas within the category 'technical, physics, chemical, engineering' that received priority, ranked accordingly

Category	Idea	Aim	Target Group	Priority
Technical/ Physics/ Chemical/ Engineering	Domestic incinerator: create a waste disposal unit that converts waste into energy which could be used to heat an apartment block or building	Effective use of waste/ Eliminate waste	Consumers	****************
	A device that converts and separates waste into vaporising liquid (to generate energy) and solid parts (raw material for construction) using a centrifuge system	Eliminate waste/ Effective use of waste	Consumers	******************
	Molecular synthesiser and desynthesiser: a machine that can convert waste into small molecules and then create a new product from those molecules	Effective use of waste	Consumers	ជជជជជជជជជជជ
	Create a car that gets fuelled by waste	Effective use of waste	Consumers	***
	A machine with channels/tubes that will sort waste from a household and send it to the main collecting point	Improve recycling/ Convenience in the home	Consumers	************************************
	Install waste disposal units under the sink that can eliminate/grind 95% of organic waste	Eliminate waste/ Convenience in the home	Consumers	ά άάάάάά
	Plasma incinerators that can burn everything	Eliminate waste	Waste management companies/ Consumers	**
	Technology that melts and merges all kinds of material and makes a new product out of it	Effective use of waste	Waste management companies	拉 拉拉
	Convert all materials back to raw materials	Effective use of waste/ Less use of resources	Waste management companies	社
	A 'material transformer', a machine that converts old paper in new paper, old plastic in new plastic, etc.	Effective use of waste	Consumers	拉 拉
	An automatic robot that separates waste and helps in the household	Improve recycling/ Convenience in the home	Consumers	垃
	Send waste to the sun	Eliminate waste	Waste management companies	益
	Shoot rubbish to the moon	Eliminate waste	Waste management companies	立

MATERIALS

A second category related to the domain of 'environmental sciences and technology' contains ideas that focus on the 'material' dimension. These ideas generally involve research that focuses on the production and packaging of products. Most of these ideas target producers.

One of the ideas that was mentioned and well received among the participants involves the production of biodegradable packaging, e.g. biodegradable plastic. The predominant aims of this idea are to eliminate waste, to use as few resources as possible, and to have a positive effect on the state of the planet. Participants from various focus groups argued that materials should be durable but also easy to get rid of.

"We want materials to have a fixed lifespan. Think of napkins or cigarettes. Once these are used and thrown in the environment they stay there. These things take ages to decompose or disappear. These things should be made differently... biodegradable." (Milan FG2, P6)

"There should be bio-bottles, which are biodegradable... without causing damage to the atmosphere." (Naples FG3, P2)

The participants also talked about using organic material in production processes. As an example, the participants mentioned that organic fibre could be used in the production of clothes. The main aim of this idea is to have a positive effect on the state of the planet.

Finally, the participants also talked about developing a new kind of material that could be used to replace plastic, paper and glass. The purpose of this idea is to use less plastic and fewer resources.

"[P9] So, coming up with a single product which totally replaces plastic, glass and even paper... where all you have to do is wash it out.

[P8] This is obviously pure fantasy.

[M] This is great, no problem.

[P3] I think it is possible.

[P8] And you use it over and over again... you wash it." (Milan FG3)

Table 4.3.2 Ideas within the category 'material' that received priority, ranked accordingly

Category	Idea	Aim	Target Group	Priority
Material	Produce packaging that is durable and biodegradable	Less use of plastic/ Effect on planet/ Eliminate waste	Producers	<u> </u>
	Usage of organic fibre for the production of clothes and other materials	Effect on planet	Producers	ቱ ቱ ቱ
	Produce a new single material that can replace plastic, glass and paper, and that can be reused	Less plastic/ Less use of resources	Producers	*

BIO(TECHNO)LOGY

A third category related to the domain of 'environmental sciences and technology' contains ideas that focus on the 'bio(techno)logical' dimension. These ideas generally involve research that focuses on biological processes and animals. The ideas target both consumers and waste management companies.

Although more ideas were discussed for this category, only one idea was prioritised. This was the idea of having bacteria or other organisms (plants) that would eat garbage. The main aim of this idea is to eliminate waste. The participants did not further elaborate on this idea.

Table 4.3.3 Ideas within the category 'bio(techno)logical' that received priority, ranked accordingly

Category	Idea	Aim	Target Group	Priority
Bio(techno)- logical	Bacteria/plants that eat garbage	Eliminate waste	Consumers/ Waste management companies	ቷ

ICT

The final category related to the domain of 'environmental sciences and technology' classifies ideas that focus on the 'ICT' dimension.

For this category, the participants prioritised the idea of the development of a smart rubbish container, or intelligent bin, which regulates the correct separation and disposal of waste. The aim of this idea is to improve recycling among consumers. The smart container would either only open if a sensor detects the correct type of waste, or it would have a 'voice over' signalling mechanism that would shout at consumers that throw incorrect waste into the bin.

"The container only opens if you put a can, like a tuna can...it senses that it is aluminium and it will then open up." (Naples FG2, P7)

"An intelligent bin is one where you throw something in, and if you make a mistake he makes a sound that you have made a mistake. It will shout at you." (Milan FG3, P9)

Another idea was a telephone app that allows consumers to scan the barcode of their waste, enabling them to keep track of their waste. The aim of this idea is to raise more awareness about waste pathways among consumers. This idea appealed to many participants, since they have no idea of what happens to their waste after they dispose of it.

"Since we don't know what happens to the rubbish after we throw it away, this app will tell us where it is." (Naples FG2, P3)

Table 4.3.4 Ideas within the category 'ICT' that received priority, ranked accordingly

Category	Idea	Aim	Target Group	Priority
ICT	A rubbish bin that only opens when it senses the correct waste (smart/intelligent container)	Improve recycling	Consumers	****
	A telephone app that scans the barcode of your rubbish so you can keep track of it	Awareness	Consumers	***

4.3.2 Policy, management and communication

POLICY

Ideas related to regulations and incentives came forward in all focus groups. These ideas are grouped in the category 'policy'. In general, these ideas aim to increase recycling, make more effective use of waste and to trigger a behaviour change.

One of the ideas that came forward in four focus groups is the idea of creating incentives for consumers to stimulate recycling. The participants believed that a rewarding system will improve recycling among consumers. The participants argued that this could be done in a variety of ways. The most commonly mentioned incentive is to have an economic incentive. When consumers bring waste to recycle centres, or if they recycle their products correctly, they receive some money for it in return. Another way to create an economic incentive is to enforce a tax reduction law for those who recycle correctly.

"We should pay tax not according to the square meters of our homes, but according to the quantity of waste. The more rubbish I sort and recycle, the less tax I pay." (Naples FG3, P7)
"An incentive may be that when you bring empty bottles of beer to the supermarket they give you €0.10." (Milan FG 1, P8)

A second idea that was highly prioritised among the participants was the idea of enforcing a policy that would force producers to reduce the amount of packaging. The participants mentioned that producers could receive financial incentives in the form of tax reduction.

"[...] recycling exists, sure, but we should start from the base line of production, the packaging..." (Milan FG2, P9)

Furthermore, the participants talked about regulations that force or encourage producers to produce as much as possible from recycled materials. The participants did not elaborate in great detail about this idea, however, they did mention that using recycled products in the production line would help to reduce pollution.

"A great starting point would be if you eliminate waste pollution at the source already... in the production line." (Naples FG 1, P10)

It was also mentioned that producers should be forced to accept and dispose of returned goods. This idea should be translated into a law, making producers responsible for the proper disposal of their produced goods. The participants mentioned that this should be so for all types of goods: televisions, mobile phones, batteries, computers, cars, etc.

Another idea related to the dimension of policy entailed the enforcement of a law, which states that 50% of unsorted waste should be used to produce new fuel, and 50% to produce new raw materials. Waste management companies are the target group of this idea. Although the participants did not elaborate much about this idea, it was quite highly prioritised.

Furthermore, the participants talked about the reintroduction of the waste deposit and return scheme for plastic and glass. The participants mentioned that in the past such a scheme existed, but for some unmentioned reason it does not exist anymore. This idea would improve recycling among consumers, as it provides them with a clear idea of how the waste management system is organised.

The participants also mentioned that it would be a great idea if governments or other private companies could subsidise grinders for organic waste (composters). This would serve as a great incentive to improve recycling for families with less income.

"Subsidise grinders for organic waste, those that fit under the sink. It is a home comfort, but some families cannot afford it... for example single-income families." (Naples FG3, P2)

Finally, the participants discussed the possibility of a standardization of waste disposal at EU-level. This should make it clear and simple for all consumers how to recycle each type of waste.

"Standardization and simplification of management of waste disposal at the European level. For each product it must be clear for the consumer how it can be recycled... So you won't be standing downstairs and not knowing where to throw away the waste..." (Milan FG 1, P10)

Table 4.3.5 Ideas within the category 'policy' that received priority, ranked accordingly

Category	Idea	Aim	Target Group	Priority
Policy	Create incentives in the form of money or tax reduction for citizens to recycle	Improve recycling	Consumers	ជជជជជជជជជជ
	Producers should reduce packaging. Also companies have to be provided with incentives to reduce packaging	Less packaging	Producers	☆☆☆☆☆☆☆☆
	Enforce regulation that forces industries to produce exclusively from recycled materials	Improve recycling/ Effective use of waste	Producers	ជជជជជជជជ
	Policy that states that 50% of unsorted waste will be used to produce new fuel, and 50% to produce new raw materials	Improve recycling/ Less	Waste management companies	ដឋដដ
	Reintroduce the waste deposit and return scheme	Improve recycling	Consumers	ቱ ቱ
	Subsidise grinders for organic waste, for poor families	Improve recycling	Government	አ
	Oblige companies to accept returned products and to dispose of these	Improve recycling	Producers	*
	Standardization of waste disposal on EU level, to make clear how each product should be disposed	Improve recycling/ Awareness	Government/ Consumers/ Waste management companies	☆

MANAGEMENT AND LOGISTICS

'Management and logistics' is another category in the domain of 'policy, management and communication'. Many ideas were mentioned that require a certain amount of managerial or logistical changes. The aims of these ideas varied broadly, ranging from less packaging and less use of plastic to improved recycling and a more effective use of waste. Most of these ideas target producers, consumers or both.

The first group of ideas that was well received in various focus groups relates to the reduction of packaging in general. For example, the participants mentioned this could be done by using a reusable type of packaging that can be used over and over again, such as glass.

"If we want to eliminate plastic, and even use less carton, producers should use glass bottles for milk, water, fruit juices etc." (Naples FG3, P2)

Another way to reduce packaging is to minimise advertisement. The participants mentioned that more advertisement only adds to the amount of packaging, and therefore waste production. Producers should be creative in selling their products without having to make use of excessive advertisement.

"Instead of producing waste, let's go for the essence... make an advertisement that says 'I'll sell you this, I sell it without any fancy image, and be aware that by buying this you are producing less waste." (Milan FG2, P9)

Another idea that would stimulate less packaging is to place vending machines in supermarkets where consumers can refill their (liquid) products, such as water, detergents, shampoo, milk, oil, etc.

Finally, in two focus groups, participants discussed the idea of shortening the general consumption chain, and stimulating consumers to buy products directly from producers. This would stimulate local production, but also reduce the amount of packaging and waste production.

"If you can carry a product directly to the countryside with a wooden crate, you avoid lots of bags and useless transport. This will increase the sale of unpackaged goods..." (Naples FG3, P8)

A second group of ideas relates to the logistics of waste management. According to the participants, there should be more containers for recycling, and these should be placed closer to homes. This idea aims to improve recycling, and make it more accessible and convenient for consumers. The idea targets the local or national authorities.

"The containers for recycling should be placed every hundred yards or something. In my area, the one for the central zone is at the main square. And for some people it is so inconvenient to go there... really!" (Naples FG2, P6)

Furthermore, the participants introduced the idea to simplify the waste management system into two main streams: organic and non-organic waste. This would make waste separation much more convenient in households, especially for the elderly. This idea was not further elaborated by the participants.

Another prioritised idea related to the domain of management and logistics is to use non-organic and non-toxic waste for the construction of buildings. This idea, aiming to make effective use of waste, is targeted at both producers and consumers. The participants did not elaborate further on this idea.

"Just like organic waste can be used as fertiliser, a part of non-toxic waste can be reused in construction, as it is inert. It can be used to make bricks and build low-cost houses." (Milan FG2, P10)

A final idea is to send used products from developed countries to developing countries, instead of throwing them away as garbage. Examples of such products can be blackboards that are no longer used in schools, medical prostheses and wheelchairs. The aim of this idea is more effective use of waste.

"We also suggested an idea of solidarity... giving a second life to objects ... sending them to Third world countries and helping them to live better." (Naples FG 1, P9)

Table 4.3.6 Ideas within the category 'management and logistics' that received priority, ranked accordingly

Category	Idea	Aim	Target Group	Priority
Management/ Logistics	Producers should aim for less packaging in general, minimalism of advertisement and producing reusable packaging with less material	Less packaging/ Less plastic	Producers	*****
	There should be more containers for recycling, and these should be placed closer to the homes	Improve recycling/ Convenience	Consumers	ជជជជជជជ
	Supermarkets should have vending machines where liquids can be refilled in the consumers own bottle	Less packaging/ Less waste production	Producers/ Consumers	፟ ፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟
	Send used products to third world countries instead of throwing them away	Effective use of waste	Consumers	☆☆☆
	Nontoxic waste can be used for construction of buildings	Effective use of waste	Producers	な ጵ ጵ
	Simplify waste collection by only having 2 streams: organic and non-organic waste	Convenience in the home	Consumers/ Waste management companies	☆
	Shorter consumption chain, by having consumers buying directly from producers	Less waste production/ Less packaging/ Local production	Producers/ Consumers	☆

COMMUNICATION AND EDUCATION

Quite a number of ideas focused on communication and education, which is the third category in the domain 'policy, management and communication'. However, only a few of these ideas received priority from the participants.

First, the participants argued that there needs to be some sort of a cultural revolution; a behavioural shift in the way people consume products in general. The participants stated that nowadays people are over-consuming in great quantities without really looking at the value of products. The participants only superficially mentioned how this behaviour shift should take place: for example, in the form of awareness or education programs, via schools, advertisements etc.

"The idea of changing values in everyday life. That is not to dedicate 90% of our time to shopping, to appearances, to always changing our phones, cars, TV... but to see the intrinsic value in things. [...] Starting from food products, that is, to reduce the quantity but to improve the taste and the quality of products..." (Naples FG3, P5)

Second, the participants discussed that more compulsory education on waste separation, recycling, ecology and the environment should be taught in schools, starting from primary school. This will increase awareness among younger people in society.

"Just like sex education, waste separation and recycling should be given in schools." (Naples FG 1, P5) "We should start with education at school, as a compulsory subject, right from the primary school. Education about ecology and the environment in every aspect... materials, disposal etc..." (Milan FG3, P3)

Besides education for children, the participants argued there should be some form of education for adults who are unemployed, where they can learn about practical and creative reuse, recycling and re-sale of waste.

"There needs to be some courses in recycling and reusing material... because I am unemployed, I'm at home, I've got lots of free time, I don't know what to do... so perhaps there can be a course run by the local council where I can learn how to make a lamp of maybe the carton of yoghurt..." (Milan FG3, P9) This idea, which is targeted at consumers, aims to create awareness on how to make more effective use of waste.

Furthermore, the idea was prioritised that producers need to be more transparent about the manufacturing cycle of products, in order to inform society how the manufacturing process of their products contributes to a 'zero waste society'. The participants did not clearly state how it should take form (i.e. guided tours, flyers, awareness campaigns, etc.).

The final idea that was prioritised is to create and install a television channel or mobile phone app, with some sort of a waste collection scheme that would remind consumers on which day they should dispose of which type of waste. The program should also provide additional information on how to correctly dispose of waste. The aim of this idea is to improve recycling and trigger a behaviour change among consumers.

"[P3] A television program which informs you 24/7 what type of waste you should throw away on that day, because all too often we have so many other things on our minds.

[P2] So some kind of a memo... or an iPhone app...

[P10] Or it tells you 'close them properly, because they don't take open bags'." (Naples FG2)

Table 4.3.7 Ideas within the category 'communication and education' that received priority, ranked accordingly

Category	Idea	Aim	Target Group	Priority
Communication and education	Cultural revolution. Change our behaviour of overbuying etc.	Behaviour change/ Less waste production	Consumers	☆☆☆ ☆
	Compulsory education on waste separation, recycling, ecology and environment at schools	Awareness	Consumers	拉 於 拉
	Companies need to be more transparent about the manufacturing cycle	Awareness	Consumers/ Waste management companies	☆
	A television channel or phone app that reminds you to throw away the right waste on what day	Improve recycling/ Behaviour change	Consumers	☆
	A course for unemployed people where they learn about practical and crea- tive reuse, recycling and resale of waste	Effective use of waste	Consumers	ቷ

LOCAL INITIATIVES

Some ideas that were put forward in the focus groups merely need a modest level of organisation. The category 'local initiatives' captures these ideas. During the focus groups only two of these ideas received priority.

The only prioritised idea in this category is to initiate a barter or exchange spot where people may sell their products or exchange these for other products. The aim of this idea is to reduce use of resources.

"I like the idea of the barter area... particularly for furniture and electrical goods... so they won't end up at garbage belts." (Milan FG3, P2)

Table 4.3.8 Ideas within the category 'local initiatives' that received priority, ranked accordingly

Category	Idea	Aim	Target Group	Priority
Local initiatives	Initiate a barter/exchange area where people could sell/exchange their products	Less use of resources	Consumers	☆

OTHER

There were also some ideas mentioned that were not directly related to waste management, but either to sustainable or alternative energy, ecology protection or something else. These ideas are clustered in table 4.3.9.

Table 4.3.9 Ideas within the category 'others' that received priority, ranked accordingly

Category	Idea	Aim	Target Group	Priority
Other	Encouraging and stimulating people financially to develop alternative energy initiatives	Less use of resources	Consumers/ Waste management companies	なななな
	Develop a washing machine that washes with ions instead of water or detergents	Less use of resources/ Effect on planet	Consumers	**
	Low cost rotating solar panels that generate energy	Less use of resources	Consumers	$\overrightarrow{\alpha} \overrightarrow{\alpha} \overrightarrow{\alpha}$
	A washing machine that separates pollutant liquids and dispose these in a friendly way	Effect on planet	Consumers	ተ
	Build Bio-homes: homes that are ecologically friendly	Improve recycling/ Less use of resources/ Effect on planet	Consumers	☆☆
	More engagement of citizens in initiatives, greater democracy in problem solving	Other	Consumers	☆ ☆
	Forbid the import of Chinese products, which are harmful for our society	Other	Producers	☆



5. Conclusion, discussion and evaluation

This country report presents country-specific findings from citizen focus groups in Italy. It is part of a wider consultation process called VOICES, which involves almost one thousand European citizens across 27 EU member states in discussing the European research priorities for the theme 'Waste as a resource'. In most member states, three focus groups were conducted. The bigger member states had six focus groups in two different locations. In Italy six focus groups were held.

The overall aim of the VOICES project is to identify citizens' preferences, values, needs and expectations with respect to research priorities for the theme 'Waste as a resource'. This provides input for the Consolidation Group that will define the actual priorities for the next work programme on 'Urban Waste' (call SiS.2013.1.2.1-2). In addition, it provides the methodology, the tools, the know-how and recommendations that can be adapted and used in coming years for similar initiatives.

Below, we present the main findings of the focus groups in Italy. First, we focus on waste management, barriers and concerns. Next, we go into the ideas identified and prioritised by the focus group participants. We close with a short reflection on the methodology of the study.

5.1 Waste management, barriers and concerns

Italy ranks 10th on the EU27 ranking list on Municipal Solid Waste Recycling. A couple of years ago the EU has set a target for all EU27 countries to reduce their amount of waste treated at landfills and bring it to 50% by 2013 and 35% in 2020. Data from 2010 suggests that in the last 10 years Italy has managed to reduce the amount of waste treated by landfills to 51%. Considering the trends in development of the amounts of waste landfilled, Italy seems to be on the right path to reach the target.¹⁵

The results of the focus groups show that nearly all participants separate their waste at household level to some extent and have access to facilities needed to separate waste. This is in line with the findings from the Flash Eurobarometer survey 'Attitudes of Europeans towards resource efficiency' 16 (see Annex 2) in which 91% of Italian respondents indicated that they separate at least some waste for recycling or composting. The results also show that most of the participants know how to separate their waste correctly.

During the focus groups, various barriers and concerns for managing waste appropriately were identified. When it comes to waste prevention and production the participants expressed their concerns regarding overpackaging and the lack of information written on products about the correct way of disposal after usage. The participants furthermore mentioned that nowadays many people have an over-consumerist attitude.

Concerning waste management in the home, the participants mentioned that some people lack proper knowledge to separate waste correctly. The participants also stated that separating waste is not always convenient and takes extra efforts to dispose of it correctly.

Furthermore, some challenges emerged regarding waste disposal and pathways. The participants mentioned that there are not enough containers for separate waste collection. This is in line with the Flash Eurobarometer Survey where 86% of the respondents mentioned that more and better drop-off points for recyclable and compostable waste would convince them to separate waste more. Participants also expressed their concerns regarding other people who do not dispose of their waste in the designated containers, which they consider a threat to the environment. Many participants wondered whether the treatment of waste at landfills was being done in the right manner and expressed their concerns regarding soil pollution and overall hygiene. Lastly, the participants from the focus groups in Naples in particular expressed their concerns regarding the lack of transparency in how the waste management system is operated by the higher authorities.

5.2 Ideas for achieving a 'zero waste society'

The results are divided into two main research domains, 'environmental sciences and technology' and 'policy, management and communication'. Both domains are further divided into more categories.

Ideas from the first domain focus mainly on new technologies (machines) that facilitate effective use of waste or improve recycling. These ideas are classified into the category of technical, physics, chemical and engineering ideas. Consumers are the most prominent target group, followed by waste management companies. The ideas in this category include developing innovative machines which can convert all kind of waste into energy (electricity, heat), compost or other raw material. The second category focuses on producing various packaging materials that are biodegradable, reusable or eatable. All these ideas target producers. The third category focuses on biological and biotechnical ideas, mostly aiming to eliminate waste. The main target group are waste management companies. In this category, creative ideas such as rubbish-eating microorganisms are presented. The final category in this domain focuses on ICT ideas. In this category, a telephone

¹⁵ European Environment Agency (2013). "Managing municipal solid waste - a review of achievements in 32 European countries" EEA Report No 2/2013

¹⁶ Flash Eurobarometer No. 316 - The Gallup Organisation (2011)

app which enables users to keep track of their waste was introduced, as well as a smart rubbish bin that regulates what type of waste would get thrown in it by warning users.

The second domain includes ideas focusing on policy, management and communication to improve recycling, provide incentives for behavioural change and contribute to more effective usage of waste. Consumers and producers are seen as the most prominent target group, followed by waste management companies and the government. Ideas in the category 'policy' that received high priority from the focus group participants include the formulation of policies that aim to create incentives for consumers to separate waste, ensure that producers reduce packaging and enforce regulations that force industries to produce exclusively from recycled materials. In the category 'management and logistics', ideas that received high priority concerned the reduction of packaging and the placement of more collecting points for separate collection. In the category 'communication and education', ideas that focus on educating children and changing the over-consuming attitude of citizens received priority. Finally, in the category 'local initiatives', ideas initiating a barter or exchange area was considered worthwhile.

Of the three most highly prioritised ideas, the first is a domestic incinerator: create a waste disposal unit that converts waste into energy which could be used to heat an apartment block or building (15 stickers). The second involves a device that converts and separates waste into vaporising liquid (to generate energy) and solid parts (raw material for construction) using a centrifuge system, followed by producing packaging that is durable and biodegradable (14 stickers). The third idea regards the production of packaging that is durable and biodegradable (13 stickers).

5.3 Reflection

Overall, the participants were positive, appreciative and excited about the focus groups. They mentioned liking the idea of exchanging opinions with interesting people from different backgrounds. In one focus group, the participants expected that they would be presented with European projects on the topic of waste management, but they were pleasantly surprised with the opportunity to discuss and express their own ideas. In general, the participants liked the idea of achieving a 'zero waste society', and were very anxious to creatively think about out-of-the-box ideas. However, some participants would have preferred to talk to experts as well during the focus groups. Other participants expressed that they would have preferred a greater age mix among the participants, so that younger participants could compare notes with older members. In some of the focus groups in Naples, there was clear concern about the management of waste by powerful parties with vested interests and criminals, and the political role of citizens in being part of the decision-making process. The participants felt that this area needs attention. However, in general, the participants tried to keep political discussion to a minimum.



Annex 1: Full list of ideas for research and innovation, policy, management and communication

This table includes all ideas for research and innovation, policy, management and communication that emerged from the focus groups. For each research idea the research category is mentioned, as well as the aim of the research and the proposed target group. In addition, the priority of the research idea as perceived by the participants is indicated in the tables, using stars to indicate the number of stickers assigned to a specific idea by the participants.

ENVIRONMENTAL SCIENCES AND TECHNOLOGY

Category	Idea	Aim	Target Group	Priority
Technical/ Physics/ Chemical/ Engineering	Domestic incinerator: create a waste disposal unit that converts waste into energy which could be used to heat an apartment block or building	Effective use of waste/ Eliminate waste	Consumers	****** ****** ******
	A device that converts and separates waste into vaporising liquid (to generate energy) and solid parts (raw material for construction) using a centrifuge system	Eliminate waste/ Effective use of waste	Consumers	ជជជជជ ជជជជជ ជជជជ
	Molecular synthesiser and desynthesiser: a machine that can convert waste into small molecules and then create a new product from those molecules	Effective use of waste	Consumers	***** ****** *
	Create a car that gets fuelled by waste	Effective use of waste	Consumers	*****
	A machine with channels/tubes that will sort waste from household and send it to the main collecting point	Improve recycling/ Convenience in the home	Consumers	**** ***
	Install waste disposal units under the sink that can eliminate/grind organic waste	Eliminate waste/ Convenience in the home	Consumers	***** **
	Plasma incinerators that can burn everything	Eliminate waste	Waste management companies/ Consumers	_ተ ተ ተ ተ ተ ተ ተ ተ ተ ተ ተ ተ ተ ተ ተ ተ ተ ተ ተ
	Technology that melts and merges all kinds of material and makes new products out of it	Effective use of waste	Waste management companies/ Producers	***
	Convert all materials back to raw materials	Effective use of waste/ Less use of resources	Waste management companies	<mark>ጵ</mark>
	A 'material transformer', a machine that converts old paper in new paper, old plastic in new plastic, etc.	Effective use of waste	Consumers	垃垃
	An automatic robot that separates waste and helps in the household	Improve recycling/ Convenience in the home	Consumers	☆
	Send waste to the sun	Eliminate waste	Waste management companies	₩
	Shoot rubbish to the moon	Eliminate waste	Waste management companies	☆

	A machine that uses a substance and can separate unsorted waste in layers, extracting raw materials and transform non-recyclable materials into energy sources	Effective use of waste/ Improve recycling	Waste management companies/ Consumers	
	Improve the efficiency of incinerators and reduce their pollution	Effect on planet/ Other	Waste management companies	
	Use the ashes from incinerators as inert materials in construction	Effective use of waste	Waste management companies/ Producers	
	Build homes with special assigned spaces for waste separation	Improve recycling/ Convenience in the home	Consumers	
	Dispose of waste in black holes	Eliminate waste	Waste management companies	
Material	Produce packaging that is durable and biodegradable	Less use of plastic/ Effect on planet/ Eliminate waste	Producers	<u> </u>
	Usage of organic fibre for the production of clothes and other materials	Effect on planet	Producers	***
	Produce a single material that can replace plastic, glass and paper, and that can be reused	Less plastic/ Less use of resources	Producers	☆
	Edible packaging	Less waste production	Producers	
Bio(techno)- logical	Bacteria/plants that eat garbage	Eliminate waste	Consumers/Waste management companies	☆
	Technology that uses bacteria to transform waste into elementary molecular material	Eliminate waste	Waste management companies	
ICT	A rubbish bin that only opens when it senses the correct waste (smart/intelligent container)	Improve recycling	Consumers	*****
	A telephone app that scans the barcode of your rubbish so you can keep track of it	Awareness	Consumers	\$\$\$\$\$ \$



POLICY, MANAGEMENT AND COMMUNICATION

Category	Idea	Aim	Target Group	Priority
Policy	Create incentives in the form of money or tax reduction for citizens to recycle	Improve recycling	Consumers	###### ###############################
	Producers have to be provided with incentives to reduce packaging	Less packaging	Producers	\$\$\$\$\$ \$\$\$\$
	Enforce regulation that forces industries to produce exclusively from recycled materials	Improve recycling/ Effective use of waste	Producers	##### ###
	Policy that states that 50% of unsorted waste will be used to produce new fuel, and 50% to produce new raw materials	Effective use of waste/ Improve recycling/ Less use of resources	Waste management companies	***
	Reintroduce the waste deposit and return scheme	Improve recycling	Consumers	☆☆
	Subsidise grinders for organic waste, for poor families	Improve recycling	Government	☆
	Oblige companies to accept returned products and to dispose of these	Improve recycling	Producers	☆
	Standardization of waste disposal at EU level, to make clear how each product should be disposed	Improve recycling/ Awareness	Government/ Consumers/ Waste management companies	益
	Shorter consumption chain, by having consumers buying directly from producers	Less waste production/ Less packaging/ Local production	Producers/ Consumers	☆
	Increase product prices, and include a disposal fee	Other	Producers	
Management/ Logistics	Producers should aim for less packaging in general, minimalism of advertisement and producing reusable packaging with less material	Less packaging/ Less plastic	Producers	ជជជជជ ជជជជជ
	There should be more containers for recycling, and these should be placed closer to the homes	Improve recycling/ Convenience	Consumers	ជជជជជ ជជ
	Supermarkets should have vending machines where liquids can be refilled in the consumers own bottle	Less packaging/Less waste production	Producers/ Consumers	☆ ☆ ☆☆
	Nontoxic waste can be used for construction of buildings	Effective use of waste	Producers/consumers	**
	Send used products to third world countries instead of throwing them away	Effective use of waste	Consumers	
	Simplify waste collection by only having 2 streams: organic and non-organic waste	Convenience in the home	Consumers/ Waste management companies	☆
	Purification of tap water, so that people will buy less bottled water	Less packaging	Producers/ Consumers	
	There should be fewer waste bins, and people should incinerate their waste	Eliminate waste	Consumers	
	Setting up a compost park where people can bring their organic waste	Effective use of waste	Consumers	
	Increase domestic composting	Effective use of waste	Consumers	

Communication and education	Cultural revolution. Change our behaviour of overbuying etc.	Behaviour change/ Less waste production	Consumers	ቱ ተ
	Compulsory education on waste separation, recycling, ecology and environment at schools	Awareness	Consumers	ቱ ቴ ቴ ቴ
	Companies need to be more transparent about the manufacturing cycle	Awareness	Consumers/ Waste management companies	☆
	A television channel or phone app that reminds you to throw away the right waste on what day		Consumers	#
	A course for unemployed people where they learn about practical and creative reuse, recycle and re-sale of waste	Effective use of waste	Consumers	☆
	Products should have a label on them indicating how they can be reused or recycled	Improve recycling/ Effective use of waste/ Less use of resources/ Awareness	Consumers/ Producers	
	Provide more information/guidelines for recycling and waste separation	Improve recycling/ Awareness	Consumers	
	More awareness on how to reuse/repair, long product life awareness	Less use of resources/ Awareness	Consumers	
	Promote companies that recycle and reuse among consumers	Awareness	Consumers	
	Encourage the reuse of shopping bags	Less use of resources	Consumers	
	Educational campaigns on consuming less (bad) food	Less waste production	Consumers	
Local initiatives	Initiate a barter/exchange area where people could sell/exchange their products	Less use of resources	Consumers	☆
	Lease/rent clothing instead of buying	Behaviour change/ Less use of resources	Consumers	
Other	Encourage and stimulate people financially to develop alternative energy initiatives	Less use of resources	Consumers/ Waste management companies	ជជជជជ
	Develop a washing machine that washes with ions instead of water or detergents	Less use of resources/ Effect on planet	Consumers	***
	Low cost rotating solar panels that generate energy	Less use of resources	Consumers	***
	A washing machine that separates pollutant liquids and dispose these in a friendly way	Effect on planet	Consumers	☆☆
	Build Bio-homes: homes that are ecologically friendly	Less use of resources/ Effect on planet	Consumers	☆☆
	More engagement of citizens in initiatives, greater democracy in problem solving	Other	Consumers	☆☆
	Forbid the import of Chinese products, which are harmful for our society	Other	Producers	☆
	Energy recovery from volcanic gases	Less use of resources	Producers	

Annex 2: Attitudes of citizens from Italy towards resource efficiency

The data in this annex is based on the Flash Eurobarometer No. 316 - The Gallup Organisation (2011). The primary objective of the Flash Eurobarometer survey 'Attitudes of Europeans towards resource efficiency' (Flash No. 316) was to gauge EU citizens' perceptions, attitudes and practices concerning resource efficiency, waste management and recycling. In detail, the survey examined:

- · citizens' perceptions of Europe's efficiency in its use of natural resources
- the amount of waste EU households produce and whether they separate that waste for recycling or composting
- · preferred actions to improve EU households' and communities' waste management
- · citizens' views on how to pay for waste management
- EU households' food waste production and preferred ways of decreasing that waste
- citizens' perceptions of the importance of a product's environmental impact when making purchasing decisions
- · citizens' willingness to buy second-hand products and products that are made of recycled materials.

The survey obtained interviews - fixed-line, mobile phone and face-to-face - with nationally representative samples of EU citizens (aged 15 and older) living in 27 Member States. The target sample size in all countries was 1,000 interviews. Below we give the results from Italy.

Question	Answer	%	EU27 Average
	Yes	92%	87%
	No	3%	5%
	DK/NA*	5%	8%
3	Yes	38%	41%
too much waste or not?	No	60%	58%
	DK/NA*	2%	1%
Do you separate at least some of your waste	Yes	91%	89%
for recycling or composting?	No	9%	11%
	DK/NA*	0%	0%
What initiatives would convince you to separate (more) waste?	More and better drop-off points for recyclable and compostable waste	86%	76%
	Improve separate waste collection at your home	83%	67%
	More information on how and where to separate waste	82%	65%
	Legal obligation to separate waste	78%	59%
	Taxes for waste management	57%	39%
What initiatives would improve waste	Better waste collection services	87%	70%
management in your community?	Stronger law enforcement on waste management	80%	65%
	Make producers pay for collection and recycling of waste	65%	63%
	Make households pay for the waste they produce	65%	38%
Which one would you prefer: to pay taxes for waste management or to pay an amount	To pay taxes for waste management	15%	14%
related to the quantity of waste your household generates?	To pay proportionally to the quantity of waste you generate	83%	75%
	DK/NA*	2%	11%

Which one would you prefer: to pay taxes	To pay taxes for waste management	39%	25%
for waste management or to include the cost of waste management in the price of the products you buy?	Include the cost of waste management in the price of the products you buy	47%	59%
	DK/NA*	14%	16%
Can you estimate what percentage of the food you buy goes to waste?	None	4%	11%
	15% or less	75%	71%
	16% to 30%	15%	13%
	More than 30%	3%	4%
	DK/NA*	3%	1%
What would help you to waste less food?	Better estimate portion sizes (how much food you cook) to avoid excess food	81%	62%
	Better information on food product labels, e.g. how to interpret "best before" dates, information on storage and preparation	69%	61%
	Better shopping planning by my household	74%	58%
	Smaller portion sizes available in shops	71%	58%
How important for you is a product's	Very important Very important	53%	39%
environmental impact - e.g. whether	Rather important	39%	41%
the product is reusable or recyclable - when making a decision on what	Rather not important	7%	12%
products to buy?	Not at all important	1%	6%
	DK/NA*	0%	2%
Are you willing to buy second-hand products?	Yes	55%	68%
Base: all respondents, % of yes			
Would you buy the following products second hand?	Furniture	48%	56%
Base: all respondents, % of yes	Electronic equipment	39%	45%
	Textiles (clothing, bedding, curtains, etc)	24%	36%
What reasons prevent you from buying	Quality/usability of the product	62%	58%
second-hand products?	Health and safety concerns	42%	50%
	Less appealing look of the product	24%	25%
	Afraid of what others might think	9%	5%
Would you buy products made of recycled	Yes	84%	86%
materials?	No DK (NIA*	11%	11%
NA/I-sate consulation at the sate of the s	DK/NA*	5%	3%
What would be the most important factors in your decision to buy products made	Quality/usability of the product Environmental impact of the product	45% 34%	51% 26%
of recycled materials?	Price of the product	14%	18%
	Brand/brand name of the product	4%	2%
	DK/NA*	3%	3%
What prevents you from buying recycled	Health and safety concerns	48%	44%
products or products containing recycled	Quality/usability of the product	54%	42%
materials?	No clear consumer information on the	15%	32%
	recycled product		
	Less appealing look of the product	18%	17%
*Abbreviation DK/NA = Don't know / No Answer	Afraid of what others might think	8%	5%

NOTES

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Via Coroglio, 104 80124 Napoli, Italia cittadellascienza.it



VOICES, CITIZEN PARTICIPATION IN SOCIAL INNOVATION

VOICES is a Europe-wide citizen consultation process, led by Ecsite, the European network of science centres and museums, which helps set the agenda for the environmental research dimension of Horizon 2020 - the European Union's strategy to advance research and innovation.

VOICES represents a valuable insight on methods and procedure for engaging citizen participation to inform Europe's Responsible Research and Innovation framework. Focus groups, academic analyses of public consultations and dissemination of results will lead to an effective method through which to consult the public on science and technology related issues.

VOICES is engaging citizens in 27 EU countries through science centres and museums - all of which are expert, impartial and powerful partners in public engagement with science as members of Ecsite.

One thousand European citizens have joined VOICES focus group discussions on innovative uses and solutions for urban waste. The outcomes of this European consultation process are presented in the VOICES Reports Collection.







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