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Communication in Waste Management

Promotion of Waste Separation in Households

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Abstract

Separation of waste in households is a widespread practice in modern waste management systems. Waste separation programmes are dependent on the voluntary agreement of the public to do the separation and success of it is considered to depend on promotion and public information. The purpose of the thesis is to explore various communication tools that can help overcome specific barriers to public participation in waste separation. Such barriers and relevant communication tools are identified through the literature review, applied to the context of a Ukrainian case and analysed based on experiences from western countries and major pilot projects conducted in Ukraine.

Executive Summary

Over the last decades, due to increased population and consumption levels, waste has become an issue of growing concern. The waste hierarchy clearly prioritizes waste prevention and reuse/recycling. Successful recycling programs rely on the quality and quantity of materials for recycling, therefore waste separation is an essential prerequisite. Waste separation can be done either at Material Recovery Facilities or at the household level. The latter approach is considered to be more beneficial; however it depends on the willingness of public to conduct the activity, which is perceived to be a big challenge for municipalities in many countries.

The question why some people separate waste while others do not is asked by researches from different fields. Although the factors influencing behaviour are examined to a large extent, the application of these varies and results show that they do not always lead to desired results. Also, municipalities lack knowledge about which communication tools are better to overcome certain barriers. Thus, although public information and promotion is considered to be fundamental to the success of source waste separation programmes, some local authorities do not adequately promote and advertise waste minimization and recycling, or do it in an inefficient way.

The purpose of the research is to explore various communication tools to help overcome specific barriers to public participation in waste separation. The research was initiated with an analysis of studies on pro-environmental behaviour with the aim to identify various factors influencing behaviour which are useful for communication approaches. In parallel, reports and communication strategies were analysed as examples of communication tools and the results of their implication. The identified barriers influencing public participation in source waste separation were found to include: lack of environmental knowledge and awareness; lack of responsibility and perceived ability to contribute to the problem; lack of knowledge on "how to separate"; lack of personal incentives and benefits; weak social norms; perceived barriers about situational factors; old habits; and insufficient feedback. The list of communication tools explored includes such approaches as participation in decision making, school education, mass-media, visits to recycling facilities, monetary rewards, prompts, public surveys, goal setting, internet, interpersonal communication, advertising, public commitments etc.

The case was conducted in Ukraine. It is a country with an economy in transition and which faces waste management problems due to increasing amounts of waste generated and shortage of waste treatment facilities. Although the introduction of source waste separation could decrease the amounts of waste being landfilled and gain material value municipalities in these countries perceive a great difficulty in gaining public participation in waste separation and tend to consider technical solutions. On the other hand the results from the conducted survey and the analysis of major pilot projects on source waste separation in Ukraine have shown that the large majority of population have a positive attitude to source waste separation, ready to try the behaviour on environmental grounds and do not expect financial rewards for it.

The analysis of pilot projects shows that source waste separation could gain public participation; however there is a need for continuous and well-planned work on public education and motivation for source waste separation practice. The most important findings for promotion of source waste separation are presented further.

Environmental knowledge of population on waste issues and its negative impacts was found to be rather low and coupled with an "out of eyes out of sight mentality". The primary communication tools to eliminate these barriers are organizing surveys as a form of participation in decision making process with provision of balanced information that could raise awareness and help people to realise their role in problem resolution, organising school

education in districts where source waste separation is introduced and involving mass media. The important aspect is that the information should be presented in a way to target both responsibility feelings and to show how citizens can contribute to the problem with MSW. Additionally such communication tools as calculation of ecological footprint – to show the personal impact on environment, exhibitions aimed to shift "paradigm of waste" to "resource", visits to recycling facilities or video showing how recycling facilities work could also be utilized. Providing straightforward environmental information in promotional materials for the need of waste separation and visits to landfills are considered to be less efficient communication tools.

The main personal incentives for source waste separation identified are (1) contribution to the cleanliness of the district and (2) investment of the profits from selling the recyclables into local infrastructure. Personal financial and regulatory measures are least efficient for Ukraine since it is difficult to design such systems and enforce them.

The social norms could be enhanced by provision of the results of surveys showing that the majority of citizens support waste separation, which should shift the general opinion that other citizens are not willing to participate. Communication campaign could also include social and environmental advertising, currently almost absent, prompts, posters on the entrances to houses and public events.

The two main situational barriers identified are lack of space in the kitchen and refuse chutes in the multi-storied houses. However, it was found that many people already keep paper and glass bottles separate. The first issue could be addressed through personal assistance on how to arrange easy waste separation. The refuse chutes ought to be closed since they constitute a convenient system and pose a challenge to overcome old habit among people. The closing of the refuse chute system should be done with communication based on arguments about the unsanitary conditions and also with the fact that caretakers afterwards could spend more time on district cleaning rather than taking out garbage. Among communication approaches, interpersonal communication and involvement of caretakers are appropriate tools to help people arrange their waste separation in an easy way and also identify and overcome other barriers.

Providing feedback information is of high importance in Ukraine. Municipalities should provide citizens with achievements and proofs that their participation really helps to solve problems with waste in the cities. The possible benefits of source waste separation - cleaner district area or investments in local infrastructure are efficient ways of observable feedbacks to community. The method of goal setting and internet could be used as additionally tools.

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1 Introduction

Over last decades due to increase of population and consumption levels, waste became an issue of growing concern in many countries. The three main problem areas related to the generation and management of waste are: loss of material and energy resources, environmental pollution and negative impacts on human health.

Agenda 21 gives a general framework on how to reach a sustainable management of waste. The major program areas concerning waste are: waste minimization; maximizing environmentally sound waste reuse and recycling and promoting environmentally sound waste disposal and treatment. These programme areas are covered by waste management hierarchy (See Figure 1), which is the common framework for waste management in a sustainable society (OECD, 1999).

Figure 1 Waste Hierarchy (Source: www.raceagainstwaste.ie)

The waste hierarchy clearly puts highest priorities on waste prevention and reuse that reduces the costs and environmental problems caused by not generated waste. However, it is not always possible to avoid and reuse waste and, thus, recycling should come as the next solution to be considered. And only afterwards such options as energy recovery and landfilling should be taken.

Successful recycling programs rely on the *quality* and *quantity* of materials for recycling, therefore waste separation is an essential prerequisite. Waste separation can be done either at Material Recovery Facilities[1] or at the household level. The latter approach produces low air and water pollution, reduces amount of garbage and has low start up costs and moderate running costs. Waste separation in households is considered to be more beneficial as materials are not contaminated with other waste and have higher quality than the one that could be achieved by material recovery facility. However, source waste separation entirely relies on the willingness of public to conduct the activity, which is perceived to be a big challenge for municipalities in many countries (Murrey, 2004; UNEP & ISWA, 2004).

The question why some people separate waste and others not is asked by researches from different fields. They are analysing various factors influencing pro-environmental behaviour of source waste separation to increase public involvement in municipal waste management programmes. Although the factors influencing behaviour are examined to a large extent, their direct implementation does not always lead to necessary results. For example, one of the

[1] Material Recovery Facilities use mechanical processes to separate certain fractions from mixed waste.

major factors for public participation in source waste separation is environmental awareness, which is based on environmental knowledge (UNEP & ISWA, 2004). Although when municipalities provide public with straightforward environmental information it leads to only small changes to actual behaviour (Gardner & Stern, 2002). What can explain this phenomenon?

First of all, there are many barriers of different nature which have to be considered (OECD, 1999). The barriers and contexts need to be seen from a systems perspective, since focusing on one factor and forgetting the other might reduce the level of success of information campaign. Second of all, the information can be presented in a number of different ways. The way the information is presented may help get attention and increase its credibility and in this way influence the outcome of a communication campaign.

It has been suggested that some local authorities do not adequately promote and advertise waste minimization and recycling or do it in an inefficient way. Although public information and promotion is considered to be fundamental to the success of source waste separation programmes, it is often a last minute consideration by municipal decision-makers (Read, 1999). It was also mentioned that many decision-makers do not know how to incorporate a communication strategy in their environmental project life cycles and, hence, are not willing to invest in this (OECD, 1999). EPA collection of waste minimisation practices in Europe and OECD[2] publication on environmental communication conclude that in order to accomplish higher participation in waste management programs there is a need for intensive communication campaigns (Jakobsen & Kristoffersen, 2002; OECD, 1999).

Not many studies have been found that provide an overview and analysis of various communication tools relevant to the factors influencing behaviour of source waste separation. Several researchers that studied environmental behaviour called for further investigation of most effective ways to develop pro-environmental behaviour and the best forms to carry out messages that are able to motivate citizens to participate in the waste separation programs (Kollmuss & Agyeman, 2002; Valle, Reis, Menezes, & Rebelo, 2004). This study responds to this call and investigates various communication tools, experiences and ways to present information to households with the purpose to eliminate certain barriers to environmental behaviour of source waste separation.

Special case – countries with economies in transition

Although source waste separation is a common practice in industrialized countries, households from countries with economies in transition should also become active participants in the efforts to reduce the amount of waste destined to landfills and incinerators. As a general pattern, waste generation increases proportionally to GDP[3] growth and nowadays municipalities are facing the problem with shortage of waste treatment facilities. Unfortunately, they usually consider technical approaches, such as incinerators, pyrolises, material recovery facilities or other expensive waste treatment facilities to be the main solution to the waste management problems, neglecting the importance of involving public in waste management programmes.

Introduction of source waste separation practice could eliminate the amounts of waste being landfilled and gain value from secondary raw materials; however authorities perceive gaining public engagement as a great difficulty. In general, countries with economies in transition

[2] Organization on Economic Cooperation and Development

[3] Gross-Domestic Product

could be characterised with low level of knowledge on waste related issues, absence of discussions in media, difficult economic situation and almost no public participation in decision making on local level. Moreover, municipalities do not practice public education in this field and very few studies are carried out on public perceptions and attitudes to source waste separation. Thus, the analyses of the factors influencing public participation in source waste separation on example of one of the country with economy in transition and provision with practical recommendations on organizing information campaign based on experiences from western countries might help municipalities from these countries to reassess the feasibility of source waste separation and look at it as a practical solution to waste management problems.

1.1 Research Questions

Considering the aforementioned importance of involving public in waste management practices and the role of communication tools in this, the aim of the study is to explore what communication tools exist that could help overcome specific barriers to public participation in source waste separation. The outcomes of the research can be utilised by policy makers and municipalities in the development of successful communication strategies and promotion campaigns for source waste separation.

In order to achieve the above stated purpose, the following research questions will be explored in this thesis:

What are the barriers for waste separation in households?
How communication practices can eliminate these barriers?

1.2 Scope and Limitations

The scope of the study is separation of waste by households and its separate disposal, which is further referred as "source waste separation". The "waste" in this research refers to MSW and specifically - packaging, newspaper and organic waste fractions. Hazardous, electronic, bulky and construction and demolition waste is not included in the study.

The approaches for communication planning and tools examined are limited to only those that could be used by municipalities and therefore, municipalities are potential users of the study results.

One of the limitations of the research is that successful examples in one municipality could have completely different impacts in another one and therefore it is difficult to define the factor of "success" of each of the tools. However, the main purpose is to collect different practices and analyse them. Another difficulty is that municipalities usually present communication approaches in promotion strategies, however they don't reflect on its efficiency afterwards or at least do not post it on their official websites.

Ukraine was chosen as a case study for a number of reasons. First of all, it is a country with economy in transition which represents one of the former Soviet Union countries facing similar waste management challenges explained in introduction. Although source waste separation is not introduced on a large scale the analysis of the main barriers and recommendations on gaining public involvement could bring changes in waste management sector towards source waste separation. Secondly, there are not many studies developed on analysis of public perceptions to source waste separation in Ukraine to help municipalities in introduction of waste separation practice. And finally, this country is chosen because of the personal interest of the author, who originates from Ukraine. The language knowledge is

important factor since all information is presented in Russian or Ukrainian or available only through personal interviews.

Since there were only few pilot projects on source waste separation conducted in Ukraine, experiences from Russia and Belarus were also used. These countries are former Soviet Union countries and are in the phase of changing their economic, political, and social systems. The political situation and directions in policy making vary to some extent: Ukraine wishes to become a member of European Union, while Russia and Belarus do not. Nevertheless, the municipalities in all three countries rely on EU Directives in their decision-making, recommendations and experiences as examples of efficient policy directions[4]. All these facts justify the relevance of conducting a research, which will combine and analyse all available information from these countries.

Since countries with economies in transition have many similarities, the results could find application not only in Ukraine, Russia and Belarus, but also in other countries with economies in transition from former Soviet Union and Eastern Europe.

1.3 Research Methodology

1.3.1 Framework Development

The research was initiated with analysis of studies of pro-environmental behaviour with aim to identify different factors influencing waste separation behaviour. For these purposes various literature sources were examined: books on environmental psychology and behaviour and journal articles with cases from different countries with analyses of surveys for examining attitudes of both groups of people – those who participate in source waste separation and those who do not.

The next step was analysis of literature sources on communication theory and planning in order to identify the main concepts on planning of communication programs. This analysis helped understand which communication concepts could have importance for certain barriers in waste separation and how information should be presented.

The information with examples and analyses of communication tools used in municipalities was taken from a number of available sources. Secondary data was obtained from books on theory of environmental behaviour, articles and case studies; however enough information was not found on analyses of various communication tools for promotion of source waste separation. Primary data was received by examining existing communication strategies on source waste separation and waste minimization. The strategies analysed are mostly of English speaking countries – UK, USA, Canada, New Zealand and Australia. Some examples were obtained from a report on municipal practices for promotion of waste minimization and recycling provided by Belgium Institute IBGE-BIM[5]. Since the author has been studying in Sweden and visited a number of waste management facilities during studies, many examples are taken from this country. During the study author had carried out personal interviews with Lund municipality, NSR waste management company, IlRecycling (paper collection and recycling company) and PressRetur (producer responsible organization) and obtained information was also used in the thesis.

[4] Ministry of Natural Resources of Belarus, personal interview

[5] The Brussels Institute for Management of the Environment

Personal Interactions
During 6-10 June the author attended the training course "Integrated Solid Waste Management" for 2 groups of Ukrainian representatives organized by COWI[6] in Copenhagen. The personal interaction with waste management experts and seminar helped to gain the overall picture of waste management and discuss particular aspects on communication in waste management. At the same time informal interaction with Ukrainian delegation helped to observe and tackle different issues and views of people representing different sectors – municipality, research institute, waste treatment facility and sanitary agency. Moreover, groups were representing two cities with different views on source waste separation – Kharkiv, where municipality has already introduced source waste separation and Donetsk, where the project on source waste separation is run by Tacis and municipality representative was still sceptical about possibility to gain public participation.

During 14-15 of June the author attended the conference in Malmö "Sustainable City Development" and workshop on public participation. The main focus of the workshop was "*How to build a partnership for Sustainable Development programs and how to come from pilot projects to Sustainable Development in everyday life*?" The workshop consisted of two parts – (1) short presentations and following discussions and (2) the group work aimed to come up with most important measures on how to achieve the task of "development of new ways to mainstream partnership working to create the economically, socially and environmentally sustainable city". The scope of the workshop was rather wide, however many issues are similar for promotion of different sustainability projects. The personal interaction with experts from different fields in informal way helped author to look at promotion of environmental projects from wider scope and understand common challenges and possible measures.

The last interview was conducted with Marilyn Mehlmann, psychologist and general secretary of Global Action Plan (GAP) International – non-governmental organization which works in many countries throughout the world with main aim "to empower people to live increasingly sustainably". The author was kindly invited to spend 3 days with GAP in Stockholm. The aim of the interview was to learn what NGO[7]s are doing on raising awareness and promotion of environmental lifestyle and to understand the factors for success of their programs. Another purpose was to discuss contradictory issues identified in literature on environmental behaviour.

1.3.2 Case

In order to gain insight in Ukrainian case, the author has spent 3 weeks in Ukraine (19 July – 6 August). The case study was initiated with general overview of Ukraine, waste situation, national policies, plans for source waste separation and overview of relevant pilot projects carried out. Source waste separation is not introduced in Ukraine and in order to understand why, the practice of source waste separation was analysed from perspective of different actors: national level, municipal level, housing organizations, recycling industry and households.

The information was obtained from national waste management website (www.ukrwaste.com.ua), report for RECO[8] project on Ukrainian case, National waste

[6] Consultancy Company in Denmark

[7] Non-Governmental Organization

[8] Project financed by SIDA and developed in cooperation with IIIEE on Development of Networks for Regional Co-operation in Waste Management

management strategy developed by COWI, unpublished report from a study on "Ukrainian municipal solid waste management" carried out by students and IIIEE[9] teachers in spring 2005 and several articles from news websites. In order to understand the reasons and perceptions for not introduction of source waste separation in Ukraine, an interview was conducted with the main executive organisation on planning of the MSW management strategy on the national level – Derzhzhytlokomungosp and municipalities, which will be discussed later. Additionally, results and observations from the capacity building study on "Municipal Waste Management in Minsk (Belarus)" conducted by author together with other students and teachers of IIIEE were also utilized.

For the case analysis three main pilot projects were examined: DANCEE[10] financed project in Kiev, Tacis financed project in Donetsk region and Kharkiv municipal project. These projects are the only major experiments of source waste separation conducted in Ukraine. First project was conducted in Kiev; however experiment on source waste separation has not become ongoing practice yet. The second project, financed by Tacis covered not only Donetsk city, but also 2 small cities which could give a basis for generalization of public readiness to source waste separation. Kharkiv is the only major experiment initiated by municipality, which creates an interesting case for analysis. From all the projects the author received reports – either from official websites or through personal interaction. Additionally, personal interviews were organized in Kiev municipality with representative of waste management department and representative of NGO, who cooperated in public education program. In Kharkiv municipality the author spent one day with the specialist working on development of informational materials and planning and fulfilling communication program with general public, housing organizations and schools.

Another type of interview was conducted with mass media representative with the aim to obtain independent view on a number of issues: the discussions on environmental issues and waste management in media, the public attitudes towards local authorities, political activity and public interest in environmental news. The author also has discussed the main findings on the waste situation in Ukraine, which were presented in the program on Radio Liberty with author interview.

1.3.3 Survey

A survey was carried out in order to investigate whether the general public in Ukraine is ready for source waste separation. It was developed in a form of a small questionnaire which was placed on the major news web site in Ukraine Korrespondent.net. It was posted on the main page for 7 days in the period 8-15 July 2005 and received 5055 answers.

Since people have never practiced recycling programs for source waste separation such as conducted in Western countries, questions were asked about how they would react to introduction of recycling programs for source waste separation in their district. The questions and the screenshot with the survey are presented in Appendix 1.

Audience of Korrespondent.net (Sputnik Media, 2005):

- Number of visitors - 40 000 - 80 000 people per day
- Number of pages reviewed - 22 000 000 per month

[9] International Institute for Industrial Environmental Economics

[10] Danish Environmental Assistance to Eastern Europe

- Geography - 69% Ukraine, 71% Kiev (capital)
- Unique audience per month - 1 000 000 people

Audience of Ukrainian Internet Users (Sputnik Media, 2005):

- 82% with high education
- 70% access to the internet from the office
- 52% with income higher than average

1.3.4 Analysis

The analysis part was developed by analysing the Ukrainian case with the factors identified in the literature review. Each of the barriers identified in LR was analysed using empirical data from surveys during pilot projects in Ukraine and reflecting upon findings from literature analysis. In order to substitute and confirm the accuracy of data, results and experiences from Russia and Belarus were also utilized. Communication tools were examined through practical experiences from the pilot projects with reflections on what could be improved and which communication tools could be used additionally.

The generalized structure of the research is presented in *Figure 2*

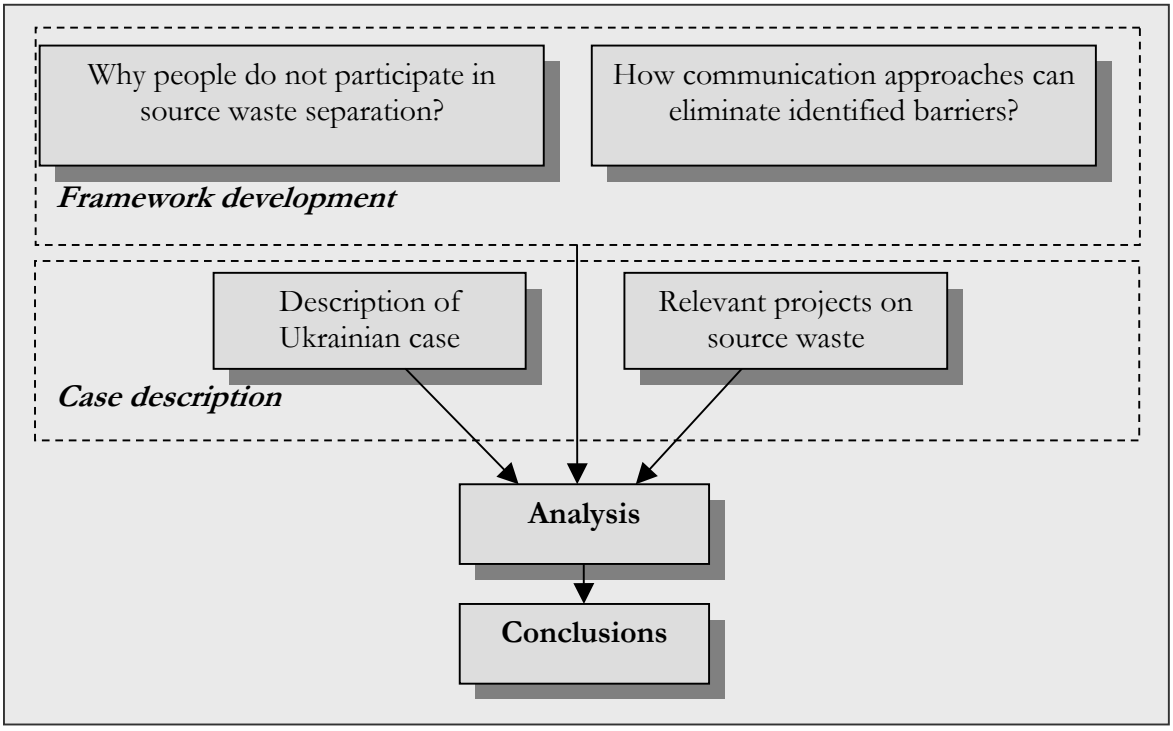

Figure 2 Structure of the research

2 Barriers to Source Waste Separation and Communication Approaches

Said is not heard,
Heard is not understood,
Understood is not accepted,
And accepted is not yet done (OECD, 1999).

This chapter starts with literature review of studies on source waste separation from various fields. It will help to understand the scope of different factors influencing behaviour and present the framework of barriers to source waste separation. The following sub-chapters will present each of the barriers with detailed explanation of its nature and communication tools which could be used to overcome it.

In order to help municipalities to enhance public participation in source waste separation and reach assigned targets, either externally given or volunteer, researches from different fields try to understand which factors influence people's behaviour and how to shape successful programs. Waste separation behaviour has been studied in such academic fields as economics, law, engineering, psychology, sociology, communication, and social marketing (Hornik, Cherian, Madansky, & Narayana, 1995).

Economists have analysed the role financial incentives and introduction of pay-as-you-throw systems; researchers of administrative instruments analysed the effects of regulatory mechanisms such as mandatory recycling laws and ways to enforce them. The main conclusion from the studies reviewed is the evidence of the interactive influence of information and material incentives on promotion of proenvironmental behaviours (Gardner & Stern, 2002; P.Stern, 1999). Thus, lack of personal incentives could be a barrier to participation in source waste separation.

Environmental psychologists are trying to investigate characteristics of both groups of people - those who participate in recycling programs and those who do not – in order to understand their values, attitudes, motivation and explain what leads to environmental behaviour (Kollmuss & Agyeman, 2002; Valle et al., 2004). The factors identified in these studies are (1) environmental knowledge, which gives a basis to shaping attitude and intention to activity, and (2) perceived behavioural control which is defined as the person's belief about how difficult or easy it will be to carry out the behaviour (Ajzen, 1988). Another psychological model explained separating waste as an altruistic activity when the individual accepts the behaviour as a personal responsibility for the environment and for the sake of good. Not doing so might lead to feelings of guilt, while otherwise makes people proud of their contribution (Borgstede & Biel, 2002). Additional factor is that an individual should believe that his/her contribution will bring positive changes, which is defined as "perceived ability to contribute to the problem". The barriers identified from above mentioned studies are lack of environmental knowledge, situational factors and lack of responsibility.

Sociologists investigated recycling behaviour as a social activity and how social norms and pressure from family, friends and neighbours can influence it (McKenzie-Mohr & Smith, 1999). Although the social pressure was not found to be strong factor, the observation has shown that the best results in reuse and recycling programmes are those organized by local communities and only afterwards systems organized by municipalities and producers (Murrey, 2004). The success factors of community organized programs and principles were studied to find approaches on how to introduce them in municipality organized programs to enhance

general promotion. Social norms in community were found to have effect on public involvement in source waste separation program (Borgstede & Biel, 2002; Gardner & Stern, 2002; McKenzie-Mohr & Smith, 1999).

The communication theory and particularly concept of innovation and decision making process suggest such important factors as overcoming old habits and provision of sufficient feedback (Rogers, 1983; Gardner & Stern, 2002). Finally, information on "how to perform" the activity is the necessary prerequisite for participation and absence of such information was found to be one of the major barriers to source waste separation (Kollmuss & Agyeman, 2002).

Recently, researches have turned to more thorough investigation of the role of active promotion of source waste separation and application of marketing concepts. Recycling is seen as an activity "to sell" with the same approaches as promotion of any other product, where messages should be developed for different audiences within society, mainly focusing on personal motivator factors and eliminating any perceived barriers. Such factors as message design, its structure and content, source of information and how often it has to be repeated are also stressed (Evison & Read, 2001; Mee & Clewes, 2004; Smallbone, 2005).

Summarising, the identified barriers for participation in source waste separation are:

1. Lack of environmental knowledge and awareness;
2. Lack of responsibility and perceived ability to contribute to the problem;
3. Lack of knowledge on "how to separate";
4. Lack of personal incentives and benefits;
5. Weak social norms;
6. Perceived barriers about situational factors;
7. Old habits and
8. Insufficient feedback.

The following sections will present identified barriers to environmental behaviour of source waste separation with thorough investigation how communication approaches and various experiences can overcome these barriers.

2.1 Lack of Environmental Knowledge and Awareness

Environmental awareness is defined as "understanding the impact of human behaviour on environment". Providing information on environmental impacts and threats related to waste management can influence awareness because of the threat of environmental problems and serve as stimuli for behavioural change (Åberg, 2000). For example, in Japan, after the Ministry of Health and Welfare released the data on dioxin concentration in emission gases of incinerators, the issue of dioxin became a topic of environmental concern, giving rise to a number of articles in newspapers (over 1500 in one year). As a consequence to a repeated reporting on the issues, the public has become deeply concerned about not only dioxin issues but about waste disposal facilities as a whole (Ishizaka & Tanaka, 2003). But does it lead to pro-environmental behaviour? Baldassare & Katz stated that people who "perceived that environmental problems pose a very serious threat to their health and well-being are more likely to engage in environmental practices, specifically recycling, conserving water, buying environmentally safe products, and limiting their driving"(Baldassare & Katz, 1992). Personal environmental threat was also found to be a stronger factor than demographic characteristics or political factors.

However, a number of experiments in promotion of source waste separation as well as other sustainable behaviours, such as energy and water conservation, have repeatedly shown that providing straightforward environmental information does not lead to action and could have effect only with easy and low cost activities (Gardner & Stern, 2002).

Literature suggests several different reasons underlying this phenomenon. First of all, most environmental problems are complex and connection of many factors is not always clear. We are often unable to comprehend complex problems and tend to simplify them (Preuss, 1991; quoted from(Kollmuss & Agyeman, 2002). For example, people usually will relate waste landfilling to the space taken for dumping, but not as soil and groundwater pollution, water and air pollution, fires, explosions, diseases etc. The results of the focus groups in different researches showed that people have misconceptions about what happens at a landfill (ChristchurchCityCouncil, 2004).

Secondly, most environmental degradation is not immediately tangible (Preuss, 1991 quoted from Kollmuss & Agyeman, 2002). People cannot perceive many environmental degradation factors directly such as nuclear radiation, the ozone hole, or the accumulation of greenhouse gases in the atmosphere, etc. Negative effects might happen after a long period of time and the relation of environmental degradation and negative effects on people is not definitely evident. Also, many changes occur even without our awareness. It was found that the effects of pollution or destruction are realized only when experienced personally. The reliance on secondary information about environmental destruction relates us emotionally from the issue and often leads to non-involvement (Kollmuss & Agyeman, 2002).

Thirdly, when the personal experience of the effects of pollution and destruction is too high, people feel emotional stress and it leads to their unconscious reaction is to gain relief from the negative feelings, which is also called "defence mechanism". For some people these mechanisms result in denial to accept reality and in living in a "bright dream". Scientists and environmentalists who are frequently exposed to "bad news" live in a way of "rational distancing" - they are aware of the problems but have stopped to feel any emotions about it. Some people start feeling apathy as the result of pain, sadness, anger, and helplessness. At the same time such people refuse to accept any personal responsibility and blame others for environmental destruction, e.g. the industries, the multi-nationals, the political establishment and so on (Kollmuss & Agyeman, 2002).

Finally, not accepting the messages happens because "we unconsciously seek consistency in our beliefs and mental frameworks and selectively perceive information". (Festinger 1957 quoted by (Kollmuss & Agyeman, 2002). People tend to not accept future or even current environmental threats if it contradicts with personal view on perceptions of economic prosperity and quality of life (Kollmuss & Agyeman, 2002). However, identified people's values and beliefs are utilized in communication campaigns which will be discussed in more details in chapter 2.3.

In order to understand how to raise awareness on environmental issues and overcome listed barriers Valle used following method: the author has surveyed environmental activists to identify what shaped their values. Again, the most important factors identified are positive experience of direct interaction with nature in the childhood and personal observation of environmental destruction, followed by factors such as proenvironmental values in family, pro-environmental organizations, role models played by teachers and friends and, finally, education (Valle et al., 2004). Thus, when it comes to environmental concern among the general public, the territory of environmental consciousness seems to be localized and dependent on personal observation and experience (Gooch, 1996).

Among values and direct interactions with environment emotions and beliefs are suggested by Pooley and O'Connor to be an important part of the environmental education. The authors state that environmental educators interested in changing environmental attitudes should focus on emotions and beliefs, rather than on knowledge (Pooley & O'Connor, 2000). The need for emotional involvement also indicates why campaigns to protect big mammals or pandas enjoy much broader public support than more abstract issues such as climate change (Kollmuss & Agyeman, 2002).

Finally, the research aimed at identifying primary information sources for environmental information in adults showed that the personal experience of local environmental problems, interpersonal communication and level of trust from news sources have more substantial effects than information communicated through the press (Gooch, 1996).

2.1.1 "Waste" in Society

"Waste" in English language has two meanings – the first means something that we do not need anymore, while the second relates to action of wasting something. In one word there are two important concepts, which are used in some cities for a municipal strategy on waste reduction calling for "Zero waste", which means both waste reduction as such and zero wasted resources (Murrey, 2004).

Waste commonly has a negative connotation: one thinks of garbage, rubbish, or maybe even dangerous or toxic material (Dijkema, Reuter, & Verhoef, 2000). It also comes as reaction to mass media articles reporting on the correlations between "living close to landfills" and "diseases", the danger of dioxins from incinerators and others. Porrit from Green Futures highlights also the difficulty in getting people's attention about rubbish: "As a heartstrings-tugging and passion-inducing environmental cause, rubbish just isn't sexy. Rainforests, mountain gorillas and solar power may all conjure up a positive image – but rubbish?" (Porrit, 2002)

Looking back to history, municipalities started taking care of waste because of sanitary situation in the cities and dissatisfaction of citizens. Still for many people waste is associated with sanitary and environmental problems. For example, from experience in Danish municipality every time there is a need to discuss environmental problems the first that comes to people's mind is waste (Kernel, 2005). Thus, because landfills and incinerators have negative connotation offering recycling as an acceptable alternative was found to be a successful marketing and advertising practice.

The second meaning of *waste* represents the imperfect utilization of raw materials, fuel, water, trees and other natural resources (Miller, 2004). That is why the concept that "waste is a resource" is considered as the first step in changing paradigm about waste in people's mindset (Byström, 2005). Media likes the examples of unusual products that could be produced out of recycled materials (Homann, 2005). In that way it is easier to attract media and present the concept in an interesting and exciting way. Couple of years ago UK launched a whole media campaign "Rethink your rubbish" aimed to change paradigm of waste. Number of designers and artists also made an impact by creating sculptures and different items made out of waste (examples are on www.rethinkrubbish.com, www.tomdixon.net, www.inspirerecycle.org) In Belgium exhibitions with such items were noticed as a good practice and used by municipalities (IBGE-BIM, 2005).

In general, the information to help people understand how much waste they produce to motivate them for its reduction and recycling is recommended to be presented in comparative

way and not with direct numbers since it is easier to relate to imaginative pictures. For example, in Stockholm, the famous sphere monument is used to send a message that "X" families during 1 week can fill it up with garbage (Mehlmann, 2005).

Only waste in U.S. (Miller, 2004)

- Enough aluminum to rebuild the country's commercial airline fleet every 3 month!
- Enough tyres each year to encircle the planet almost three times!
- About 18 billion disposable diapers per year, which if linked end to end would reach to the moon and back seven times!
- Enough office paper to build a 3.5 - meter high wall from New York City to San-Francisco

The experience from Christchurch, New Zealand shows that messages to the public in the future should generally refer to "rubbish", rather than "waste". The national 2003 "Reduce Your Rubbish" campaign found that "waste" was perceived as being related to industrial and toxic, while "rubbish" was something that the groups related to putting out for curbside collection for disposal (ChristchurchCityCouncil, 2004).

Just realizing that waste is resource is not enough; people should understand that our planet has limited resources and that we consume more than required. With growing population the message becomes more and more accepted. One of the successful examples on helping people to realize their impact is the calculation of the ecological footprint[11]. In Brussels, the questionnaire from this tool was distributed in printed form to households and was also posted on IBGE-BIM's Web site, so that each inhabitant could calculate his/her footprint (IBGE-BIM, 2005). Another means of raising awareness on this subject developed by Belgium Association of Cities and Regions is "comparing a number of consumption scenarios that meet a given need, indicating their costs and effectiveness as well as their environmental impact". The aim was to evoke the question, "What do I really need?" and "Is our planet for sustaining life or to be thrown away?" (IBGE-BIM, 2005)

The main findings from this section are that provision of environmental information has more effect when environmental threat could be observed personally or with negative information from mass media and that information should be presented in a comparative and visual way. Nevertheless, the environmental information might not be accepted by adults to a number of reasons. The following sections will give an overview how different municipalities approach raising public awareness on environmental issues.

2.1.2 School Education

Education in schools is considered to be the best way of raising awareness over a long period of time. Many municipalities introduce subjects in curricula on the concepts of waste reduction, recycling, composting and other waste management techniques (O'Learly & Walsh, 1995). Children are engaged in environmental education as a future generation to make changes in society and indirectly make parents aware of waste issues, because they usually discuss information they learned in school with them. Children still don't have specific behaviours they have to compete with and it is easy to convince them in doing right things.

[11] This Ecological Footprint estimates how much productive land and water person needs to support what he/she uses and discards (source: http://www.myfootprint.org)

Understanding the issue comes with realizing of the consequences of the environmental degradation and often terrifying facts. Adults usually filter such kind of information, while children might take it too closely, which also might effect in a very negative way - children start feeling helplessness and impossibility to bring the changes (Mehlmann, 2005). Therefore, it is important to develop educational materials which will give more hopes for the better future and enlighten children. It is also recommended to cooperate with professional organizations which will develop educational materials.

In Sweden, trips to landfills, composting plants and recycling facilities for schools are generally offered to students one time during elementary school to give understanding of what waste is and its negative environmental impacts. It also gives the understanding for the need of source waste separation and raises awareness to perform activity in a right way since children are aware how important it is for recycling.

2.1.3 Visits to Recycling Companies and Video

"There is no point in separating our waste" was one of the common complaints in Ecostaden community project in Malmö district in Sweden. However, when residents have seen how things actually work, visited regional recycling plant and even followed waste up to paper mill they changed their attitudes radically. As a result sixty households helped to shape the recycling system in a pilot project, to design waste collection centre and to prepare methods of informing and enthusing residents for source waste separation. The "recycling rates have risen and the old refuse chutes were closed" (Ecostaden, 2002).

Sweden uses visits to recycling facilities as a method of increasing public awareness through direct interaction with social dilemma of waste disposal and removes all rumours about what happens to waste. Although general public generally is not a common visitor, the fact that it is possible gives more trust and respect to operators of waste treatment facilities.

Since not many people are interested to such visits, more practical way is to show videos which shows the "life after disposal" of glass, paper, plastic, aluminium cans or mixed waste in waste treatment facilities which are utilized as alternative to present information on TV with the same purpose as actual trip.

2.1.4 Participation in Decision Making

A number of studies and waste management literature support public participation in decision making process as it benefits both citizens and governments: policies and programs are adopted to citizen concern and perceived as their own decision. Waste management projects developed together with public, do not only acquire support in its successful implementation, but also eliminates conflict possibilities (Tacis, 2003). Another side of public participation is bringing interest to the waste management issues, making sure that information provided to citizens is considered and even more, people might seek for more information.

Although the need for public participation is clear, there are not so many examples of its effective implementation (Eden 1996 cited in Fenech, 2002). One way of organizing public participation is through procedure of public hearings – people are invited on a certain day to the municipality or local community department to discuss waste collection system and infrastructure and to develop communication campaign where citizens themselves will recommend which information would influence their behaviour. However, engaging people in such procedures is seen as a challenge as only few citizens participate in them (Sustainable City Development, 2005). Although it is a recommended practice and is even compulsory in

some countries, the experience and common impression is that people are usually not interested in such procedures; municipalities in Denmark have abolished it decades ago and try to find other methods for getting feedback and assuring that public opinion is taken into account.

Another example is taken from Lund municipality in Sweden, where households were encouraged to contribute to the planning process by using "the work-book" method. On the first stage all households in one of the districts received a workbook asking for recommendations on how residents want the provided services to be customised. Afterwards the best ideas derived from the workbooks were compiled into an action plan and delivered with the second workbook which was again distributed to residents in the area. In parallel, the same procedure was done with employees working in municipal services (Hambraeus, 2004).

Another example of arranging public participation is organizing surveys on identifying public opinion on preferable waste treatment options. People usually participate in the surveys and when they are accompanied with balanced information on the issues, the respondents not only become more aware of environmental problems, but also act accordingly. When people are asked about waste treatment option they prefer – it is likely that it will be recycling since recycling programs usually arise from opposition to landfills and incinerators. The assumption that taking personal choice for recycling will influence behaviour comes from psychological studies explaining that "first, when people go along with an initial request, it often alters the way they perceive themselves; and second, they have a strong desire to be seen as consistent by others" (McKenzie-Mohr & Smith, 1999). A study in US on the effects of surveys based on two-sided messages confirmed that it is a good way of making people accept the preferable waste treatment options (McComas & Scherer, 1999).

2.2 Lack of Responsibility and Perceived Ability to Contribute to the Problem

A meta-analysis of environmental lessons and programs in the United States revealed that 543 out of 700 addressed environmental knowledge. Surprisingly, despite these environmental educational programs national surveys reported that the general knowledge on environmental issues is still low and as a consequence, "ecologically concerned citizens armed with ecological myths are ready to protest on environmental grounds but lack of conviction about their own role and responsibility in these problems" (Gigliotti, 1993). Although the study is old and the level of environmental awareness might have changed over last decade, the argument on the effectiveness of providing only environmental knowledge without pointing on the role of people in problem resolution has to be considered.

Ecological behaviour is commonly perceived as moral responsibility, which relates to the moral concepts towards environment and welfare and the rights of others beyond personal interests (Kaiser & Shimoda, 1999). Moral responsibility depends on at least two things: understanding the consequences of certain behaviour (which was discussed in the previous chapter) and self-ascription of personal responsibility (Kaiser & Shimoda, 1999). The latter increases the person's attention to the issue and also has indirect effect on behaviour, thus further increasing the total effect (Thogersen, 2000). The nature of waste should be presented as a *social dilemma*, because without such understanding the person might never think whether to cooperate at all (Eek 1998 cited from(Borgstede & Biel, 2002). The lack of self-ascription of personal responsibility might happen because of the general belief that the government, not an individual, has the responsibility of solving environmental problems (Valle et al., 2004).

Together with responsibility individual should perceive the ability to contribute in the resolution of the environmental problems (Kollmuss & Agyeman, 2002); (Thogersen, 2000). Thus, communication programs should highlight that efforts of each individual counts (ChristchurchCityCouncil, 2004; O'Learly & Walsh, 1995).

2.3 Lack of Knowledge on "How to Separate"

Surprisingly, the absence of "how to separate" information was found to be one of the main factors for people not to participate in source waste separation (Åberg, 2000). Evidence from the USA also suggests that non-recyclers do not participate because of the lack of information on how to do it (Smallbone, 2005). Moreover, there is an evidence that the quality of the material delivered to the recycling stations is dependent on the quality of the information given to the households (Berg & Petersen, 1994).

The literature suggests several important factors in designing and delivering information. First of all, Read stresses that informational materials have to be easy to understand and user-friendly (Read, 1999). In his further study with Evison on the effectiveness of waste reduction publicity materials he concludes that public knowledge and awareness should be maintained on a regular basis with quality promotional leaflets (Evison & Read, 2001). Marketing approach suggests that information has to be provided close in time and place where it occurs (Windahl, Signitzer, & Olson, 1992) which corresponds to careful consideration of information on waste containers, in recycling centers and in kitchens. One of the practices in Lund municipalities was to provide households with a sticker containing a list of recyclable materials to separate and common mistakes occurred. As a general advise, information should contain less text and be visually presented (Christensen, 2005). The following sections will present distributed leaflets as a communication tool.

2.3.1 Distributed Information Materials

Such printed information materials include leaflets, brochures, newsletters etc. This source of information is mainly used by municipalities rather than other communication tools. Reams and Ray's (1993) study of residential participation in recycling schemes indicated that in comparison to general information approach, distributed information materials and personal approach are more effective in gaining people to participate (Mee & Clewes, 2004).

The effectiveness of such tool depends on whether people actually paid attention to the advertisement - they are usually overloaded with information and know very well how to separate junk mail from the necessary information. Two aspects found to be important with the sent information: assuring that information was not discarded without even paying attention to it and making the information easy to understand.

For the first aspect some municipalities practice attaching information directly to the utility bills. Lund municipality instead of sending only leaflets prints calendars each year which, have practical application and play a role of a constant reminder. In addition to nice pictures illustrating nature, the calendar contains all rules and instructions on how to separate waste, why recycling is important, what are the hazardous household products and materials that need special treatment and where to bring them, information on how much waste is generated per person, asking for no-littering, how to dispose electronic and other special waste and, finally contact information for questions or suggestions. The last page is used for thanking the community for taking care and sorting waste, bringing hazardous materials to collection centers etc.

For the second aspect the general advice of many municipalities and literature is that information has to be very clear, short, presented in pictures and graphs and easy to understand (Read, 1999). Another issue which should not be forgotten is contact information in the case if residents have questions or more information.

2.4 Lack of Personal Incentives and Benefits

A number of studies have found that positive environmental attitudes usually have a small direct impact on proenvironmental behaviour (Kollmuss & Agyeman, 2002). Surveys showed that both recyclers and non-recyclers have same level of environmental attitudes while the level of adoption of behaviour is additionally influenced by the relative personal efforts and costs (Valle et al., 2004).

One can make recycling a compulsory activity through *regulatory* measures and make people behave in the public interest as obligation (Gardner & Stern, 2002). However, practice shows that the legislation for compulsory waste separation is very difficult and resource consumptive to administrate and police (Wilhelmsson, 2005). In Sweden households are obliged to separate waste; however it is hard to enforce and therefore the public participation is gained through number of other measures.

Early researchers in the 1970s and 1980s viewed *financial incentives* as main drivers to initiate and sustain recycling behaviour. However, later it was found that financial incentives are good to initiate activity, but in order to sustain it there is a need to involve internal incentives such as social and psychological motivators (Hornik et al., 1995). Indirect financial incentives are introduced with pay-as-you-throw systems and when mixed waste is disposed off for higher prices than separated recyclables. The studies and results are controversial and there is no simple answer on the effectiveness of such measures - in some communities, such systems did nothing to reduce the weight of disposed material and increased the recycling rates only slightly while in others, a similar systems led to a chain reaction: "people started unwrapping their groceries in the supermarket which in turn led the supermarkets to redesign and reduce their packaging to a minimum level" (Kollmuss & Agyeman, 2002). However, the observations support that financial incentives and information can work in synergy with higher outcomes than single approach (Gardner & Stern, 2002). The research on information, incentives and proenvironmental consumer behaviour also gives evidences of the interactive effects of information and material incentives (Stern, 1999).

Since the financial incentives are not always present and less emphasised, communication planners search for other possible benefits for the person. *Social marketing approach* is based on a concept that people take action in exchange for benefits (Gibson, 2002; Palmer, Goldstein, & Curnow, 1995). The idea of this approach is to offer a choice that provides more benefits and solves barriers rather than to educate. Social marketing techniques have been widely used in the field of public health, in anti-smoking campaigns and AIDS awareness campaigns. The development of community-based social marketing (CBSM, www.cbsm.com) for environmental behaviour arose out of concerns about the "ineffectiveness of environmental campaigns that relied solely on providing information" (Kollmuss & Agyeman, 2002). Some municipalities provide citizens with waste bins to support the activity and residents welcome such support. For example, a study on recycling attitudes in Finland has shown that 65% of respondents wanted free samples of waste bins being installed in the kitchens (Read & Pongracz).

In searching for effective messages programme managers must start with the characteristic of specific behaviour and identify the existing benefits, the possible new benefits and barriers to

overcome. At every stage it is community and the individual that determine which benefits are the most important (McKenzie-Mohr & Smith, 1999). The project aimed to help developing education campaigns to care about earth suggests at first one has to observe the behaviour, identify what people like about it and what not and ask what matters and how the target behaviours fits their overall style. People should perceive "behavioural experience that environmental change is not only possible but can be positive and beneficial for them today, as well as for future" (Palmer et al., 1995).

A team of communication specialists from Christchurch municipality has identified the following factors to empower and motivate people (ChristchurchCityCouncil, 2004):

- Desire for a better future – parents desire better futures for their children and this desire can help motivate a change in attitudes and behaviour;
- National and civic pride - people are proud of the image of a clean and green country and city;
- Structures to achieve goals (discussed in the section 2.8.2);
- Belief in the power of individual – people are more likely to participate if they believe their efforts can make a difference and
- Environmental concern (discussed in the section 2.2).

A study on pro-environmental behaviour in terms of situational factors and concern for the sake of good has also found that strong sense of environmental citizenship may help people to overcome number of barriers to environmental behaviour (Borgstede & Biel, 2002).

It is important to mention that people are more willing to act with an understanding of how much they waste by not acting than with an understanding of how much they could gain. The difference is based on the principle that people are more sensitive to loosing something than gaining something of equal value (Gardner & Stern, 2002).

2.4.1 Monetary Rewards and Lotteries

Extrinsic incentives, such as monetary rewards, are generally successful only at activating a desired behaviour (Hornik et al., 1995). Studies have found that desired behaviour initiated with monetary rewards usually last only as long as the incentive lasts (Reid et al., 1976 cited from Hornik et al., 1995). Experiences from North America show that rewards are not cost-effective to administer (McKenzie-Mohr & Smith, 1999). However some municipalities use various lotteries and other promotion events to get people's attention and involve them in a certain activity. For example, in The Netherlands the municipality has organized a lottery to promote the habit of putting six folded milk packs into one unfolded to reduce the space of the cardboard being disposed. Nevertheless, analysed communication strategies did not rely on these instruments. One of the explanations could be that in these municipalities source waste separation was introduced many years ago and there is no need for such programs now.

2.5 Weak Social Norms

Social norms guide how people should behave and what is considered a good or bad behaviour (McKenzie-Mohr & Smith, 1999). There are two distinct ways in which norms can affect behaviour: conformity and compliance. Conformity occurs when individuals observe what is the "right behaviour" having as example their friends and neighbours. In compliance people alter their behaviour to provoke a favourable reaction from others or to avoid being punished. The change in behaviour occurs not because people are committed to do the "right

thing", but rather because there is a consequence of not doing it in the eyes of other people, such as friends, family or neighbours (McKenzie-Mohr & Smith, 1999). When we observe neighbours or other members of community engaged in certain activity we are more likely to adopt similar behaviour. Other authors call it "social context" and claim that it has a strong, independent effect on behaviour change and give examples on recycling attitudes (Derksen, and Gartrell, 1993 cited from Pan, 2005).

Although social norm is less important than personal attitude and intention to recycle, it is important to use it for promotion of source waste separation in communities (Thogersen, 2000). First of all the personal decision to participate in social activity is based upon two factors: norms in society and personal values. Thus, even if the personal norm is stronger motivator factor to participate it is social norm which shapes it (Borgstede & Biel, 2002). Secondly, according to the general observation when citizens assume that others are not participating in the program, there will be less motivation to participate (Valle et al., 2004).

In order to use norms effectively the information programs to promote sustainable behaviour have to communicate what acceptable behaviour is and provoke people to talk about it to family members and friends. McKenzie states that to be effective, the norm has to be visible and people have to be reminded in which situations it is appropriate to exercise their proenvironmental attitudes and in which situations others expect them to act so. This usually achieved with advertising tool and reminding prompts.

However, research on personal motivation indicates that when behaviour is motivated by extrinsic social pressure there is often a small difference from compliance to defiance. An explanation to this is that social pressure evokes compliances in some individuals and defiance in others (Thogersen, 2000). This happens because feeling of a strong – "commanding or controlling" – social pressure on source waste separation may make some individuals do exactly opposite. In order not to be over-pressurising and commanding some place should be left for individuals to take conscious personal decision (Thogersen, 2000). One of the experiments in Florida was aimed to investigate the influence of prompts on residents with different socio-economic levels. First, the participation level was monitored in four residential areas with different incomes and showed a strong correlation between recycling levels and incomes – people of higher socio-economic position recycled more. Then, residents were given prompts and monitored again in four to six weeks. The study has found that in the middle and upper-middle classes where participation was already high it has increased by another 10-15%. However, in the lower classes it didn't bring any changes (Gardner & Stern, 2002).

2.5.1 Prompts

Prompts are used to challenge such human feature as *forgetting*. They are small and usually self-explanatory stickers to remind person to fulfil the activity and encourage them in various ways by repeating the information they already know or by short instructions on the waste separation rules and common mistakes. To be more effective they are placed close to where activity occurs. Another type of prompts is designed to make the activity visible for other people and enhance social norm in society.

In Halifax, Nova Scotia, a waste minimization campaign was conducted, utilizing a community participation approach. Residents were asked to place this self-adhesive sticker in their front window to demonstrate their households' commitment to waste reduction. Placement of the sticker in window not only enhanced commitment to waste reduction, but also served to build community norms for waste reduction (source: www.cbsm.com).

2.5.2 Public Events, Celebrity Involvement

Public events are used as a supplementary tool to gain more interest from both general public and local media. At each festival or event hundreds or thousands of people gather to enjoy themselves and are provided with information in informal way (ChristchurchCityCouncil, 2004). Such public holidays involve games and quizzes for children, celebrity involvement, music bands, respectful and trusted politicians, environmental organizations and others. Apart of the informing of people who took part in event it is also important to report on success to local media. Public events usually give a feeling of waste as a social problem which can be solved only through cooperation within community.

2.5.3 Advertising and Mass Media Campaigns

Advertising in mass media usually takes place when there are minor barriers to the activity and there are clear benefits (Kassirer). The mass media sources for advertising are TV, Radio, Newspapers, Internet, and Billboards etc. Usually it is used for messages reminding about activity and to stimulate face-to-face conversation through creative and humorous messages.

In Belgium TV advertisement shows the teenager saying that "recycling is not compulsory", while the middle aged man in a suit was seriously answering that "washing yourself is also not compulsory".

Example of mass-media campaign on promotion of sustainable behavior

A water conservation campaign in Kamloops, British Columbia, consisted of a mass media campaign that incorporated public participation. A "Tip of the Week" contest was run with the cooperation of a local newspaper and radio station. Once a week, a water saving tip was published in the newspaper and radio listeners were invited to call in the tip. The first people to call received a WaterSmart t-shirt, a mug, or a low-flow showerhead. Once a month, the name of one winner was drawn for a grand prize of an irrigation system, landscaping books, or a gift certificate for a local garden centre. A poster contest was also run for the children of Kamloops. The winners' names were published in the newspaper and each received a t-shirt as a prize.

2.6 Perceived Barriers About Situational Factors

Participation in source waste separation program is a unique social behaviour because it demands that the individual spends personal resources such as time, space, money and effort and does it not "for him/herself, but as a personal bit in caring for environment" (Murrey, 2004). A number of social and behavioural studies have found that the positive attitudes to recycling do not always lead to behaviour and a set of convenience and situational barriers stand on the way to the actual participation. Less demanding recycling programs concerning fewer numbers of recyclable materials to be sorted frequently report a higher participation level (Gamba & Oskamp, 1994 quoted from (Valle et al., 2004). The easier behavioural change

seems to be the more likely people are to start acting. Moreover, they will believe that others are also willing to act for common good. In the other case, the rational thinking behind is that if the behaviour is difficult to perform and very little people do so there will be no outcome for the social problem (Borgstede & Biel, 2002).

Some of the situational barriers have to be arranged through other means rather than communication; nevertheless, providing practical examples on how to arrange activity in an easy way might solve some problems and overcome barriers. This section is aimed to look at what kind of situational barriers are related to source waste separation and what are the possible communication solutions for elimination of the perceived barriers.

Time & complexity. Time to be spent on recycling is associated with arranging waste bins for recyclables, rinsing of plastic, metal and cardboard packaging[12] and, afterwards different waste bins have to be taken out to recycling centers. Studies consistently show a positive relationship between collection centers proximity and higher levels of recycling behaviour (Valle et al., 2004)

Space. The statement that having insufficient storage space is a factor able to influence recycling is confirmed in number of studies (Valle et al., 2004). But the study aimed to compare if people are more likely to recycle with increased space area showed that that "people are using this opportunity to enhance consumption and waste generation rather than improving the recycling standards" (Valle et al., 2004).

Money as an issue comes when a household has to arrange several waste bins. Some municipalities provide households with containers if households agree to engage in waste separation activity. There are number of examples on promoting home-composting by providing households with compost bins for free or with discounts.

Refuse chutes. It is observed, that in multi-storied houses with waste pipes people recycle less than in other types of houses. If municipality decides to close refuse chutes in an old house there are some issues to consider: people might oppose to such a decision and old or sick residents might simply be unable to go down to dispose off waste. In Stockholm in one of the earliest cases when caretaker decided to close refuse chutes some tenants were coming to him with a message "Who will carry my waste downstairs?" on what caretaker was answering "Who has brought it upstairs?" (Mehlmann, 2005)

Refuse chutes are associated with some negative aspects, which could be used for communication of closing them (ELCRP, 2004):

- They are smelly, especially in the summer
- Plagues, flies and cockroaches are common inhabitants in such places.
- Rats in particular pose a very real problem because of the diseases they carry.
- Waste chutes can be highly problematical through cardboard being folded, pushed into the chutes and then blocking the access.

In general, tips on arrangement of containers and practical assistance helps to make people realize that "then it's simple to recycle as it is to throw it away" (www.recyclenow.com). One of the latest campaigns on recycling in UK tells consumers that "Recycling is easy" with a new logo "I love recycling" (ENDSReport, 2004).

[12] Clean materials have higher qulity on the market of secondary materials and easier to recycle

Following sections present an overview of a number of communication tools utilized not only to overcome perceived situational barriers, but also to overcome barriers discussed in previous sections (responsibility, personal benefits etc) since some of the tools have multiple application.

2.6.1 Interpersonal Communication

Interpersonal channels involve a face-to-face exchange between two or more individuals. Interpersonal communication plays important role on the stages of persuasion, decision and implementation (Windahl et al., 1992). In this section we will look at planned programs based on interpersonal communication. The main channels found in literature and communication strategies of waste management companies are: interpersonal education and workshops, involvement of caretakers (block leaders) and waste management crew. Important factors to be taken into account is that for more effective communication to occur change agents[13] have to be (1) similar to the people they talk to and (2) talk in the language of understanding of their values, beliefs and appealing to past experiences of the social system (Rogers, 1983).

Research in Canada has shown that the use of home advisors to promote environmentally responsible behaviour in home is a particularly successful form of service communication (McKenzie-Mohr & Smith, 1999). In Spain, in Barcelona during introduction of waste separation the education through personal communication was chosen to be main factor to raise awareness and assure participation as financial incentives were not sufficient. A number of educators were visiting each household and provided information on source separation and explained why and how to practice home-composting (Herbolzheimer & Colom, 1999). In UK, in order to increase recycling and public participation rates authority reduced local newspaper adverts and posters and concentrated efforts on the so-called Road-Show (Read, 1999).

The green Team – driving forwards recycling

The team, dressed in recycling shirts and armed with an assortment of leaflets, stickers and badges went to the streets and knocked on every door in the chosen area talking to all residents that were at home. This communications programme aimed to inform residents of the doorstep recycling service and to attempt to persuade non-recyclers to try the service, and raise general awareness surrounding waste management issues. (Read, 1999)

The face-to-face contact promotions are quite known in product advertisements. The main advantage of such promotion of source waste separation is that "the team is trained on the benefits and issues of recycling and can thus provide the necessary supportive evidence and arguments often required by unsure residents" (Read, 1999). It is also useful for the local authority as they can get feedback from residents on the problems with collection system. It was found that residents are more likely to change behaviour after conversation with an officer and even those who already were recycling didn't use the system to its optimum.

[13] An individual who influences clients' innovation decisions in a direction deemed desirable by a change agency (Rogers, 1983). The agent often points out the need for change, establishes communication relationship, sees to it that adoption and change really takes place, and, in the end, tries to transform adopters into change agents.

Despite positive effects, the Road-Show approach faced some problems: (1) the 'salesman syndrome' when residents would not listen to what an officer says but conclude that they are trying to sell them something; (2) many residents would state that they were simply too busy and (3) the residents thinking you are a council official would then deliver a list of demands, requests or problems expecting you to provide them with answers and solutions. Another aspect is that Road-Show is a particularly intensive and time-consuming experience, often taking an hour for each assessment of the household to be made and specific recommendations to be suggested (Read, 1999).

Such technique was further implemented in other municipalities showing different results. The study of the city Oulu (Finland) showed the increase in recycling rates, however another British municipality reported that in comparison with other communication tools Road Show was not the prominent one. However, the success of the latter municipality was explained through constant dialog with residents about improving both convenience and communication (Mee & Clewes, 2004), that is also indirect aim of Road-Show.

2.6.2 Waste Management Crew

Waste management crew can help people to avoid mistakes in waste separation by explaining and pointing at wrong separation. Such practice is possible and for example, used by IL Recycling paper Collection Company in Sweden. Drivers check the quality of material being collected and contact representative directly or through manager to inform about wrong separation. However, it is applicable only to the big collection points (Skoglund, 2005) and such schemes are not used on a large scale for household waste collection.

Transportation is usually outsourced by municipality to private companies which are pressured for the profits and financial effectiveness of the business (Christensen, 2005). People might not be at place when collection occurs or crew is just not interested to be involved in such type of additional duties. Nevertheless, there is an example in one municipality in Denmark where both waste collection and transportation are organised by municipality and waste collection crews are trained to communicate with people in case of improper sorting of waste. But this is rather an exception than a common practice (Christensen, 2005).

2.6.3 Block-leaders or Caretakers

Block leaders or caretakers are considered as important actors in promotion of source waste separation (McKenzie-Mohr & Smith, 1999). Caretakers are responsible to clean surrounding area and take care of garbage and sometimes for contracts with waste management companies or municipalities. In Denmark, some municipalities practice training caretakers on waste related issues and pay additionally for promotion of source waste separation. The idea behind is that caretakers are known and respectful by households and if they are additionally provided with external incentive on proper waste separation, they might be very effective for behaviour change (Christensen, 2005).

In Colorado, USA researchers arranged for a sample three groups of houses: in the first group the houses were visited by volunteer caretakers who spoke with people about recycling and provided with a reminder notice; the second group received a prompt about recycling program and dates for collection; the last group received just flyer with information about recycling program, explained which items are to be separated and dates for collection. The results showed that households which were visited by block leaders were more likely to change behaviour and they reported that they "felt guilty if they disposed off recycled materials and

felt an obligation to recycle them", while the prompt and information had no influence upon these beliefs (McKenzie-Mohr & Smith, 1999). Thus, the norm for recycling is most likely to develop through personal contact between people rather than on prompts and least with flyers.

2.6.4 Video Modelling

Another practical solution is videotape showing how to arrange for source waste separation in the easiest way, promoting behaviour as a positive and easy action. It uses visual medium of television and to demonstrate on the average conditions which the audience can easily identify as similar to their and imitate (Gardner & Stern, 2002).

2.7 Overcoming Old Habits

In the ideal case individual tries new behaviour and it becomes his/her new habit. However, as studies show even with the presence of positive attitudes & knowledge and with no external barriers to act people do not always do what their values prescribe them to do. One of the common examples is that people, who separate waste on fractions, save recyclables at home for a long time, but never "get around" to take them to the collection centre (Gardner & Stern, 2002). This problem corresponds to such factors as *attention* and *commitment*. People should remember to take action at the proper moment, oppose inertia of old behaviour and make a commitment to act regardless competition with other demands at a time (Gardner & Stern, 2002; McKenzie-Mohr & Smith, 1999).

The simplest way to make people to act according to their attitudes is to ask them to do so. The slogans like "Keep city clean and beautiful", "Love the streets you live in", "Every Litter Bit Helps" are designed neither to provide information nor to change attitudes, but simply to remind to act according to the knowledge and positive attitude households already have. Various communication tools could be used for reminding – mass media, prompts, printed materials and so on (Gardner & Stern, 2002; McKenzie-Mohr & Smith, 1999) Research indicates that to make reminders more effective, they have to be very close in time and space to the activity being performed. Community-Based Social Marketing suggest supplementary tool – "public commitments" which is discussed in following section.

2.7.1 Public Commitments

The main principle of public commitment as a communication tool is that people who publicly agree to engage in activity have much higher rate of further participation than people who did not. "In a wide variety of settings people who have initially agreed to a small request, such as to wear a button saying they support the purchase of products with recycled-content, have subsequently been found to be far more likely to agree to a larger request - such as actually purchasing these products" (McKenzie-Mohr & Smith, 1999). McKenzie-Mohr explains that it happens because "first, when people go along with an initial request, it often alters the way they perceive themselves; and second, people have a strong desire to be seen as consistent by others". Commitments may be verbal or written, but a number of cases confirm the fact that written commitments are more effective. The important fact about commitments is that they must be voluntary (McKenzie-Mohr & Smith, 1999).

In Annapolis and King County, Nova Scotia residents were asked if they composted. Those who composted were asked if they would place a sticker on their garbage or recycling container. Of those who composted, 80 per cent agreed. Placement of the sticker helped to enhance household commitment to recycling, develop community norms that supported composting, and prompt personal conversations regarding composting (source: www.cbsm.com)

For example, the communication strategy in New Zealand uses the following approach: people are asked to register their names on the Internet website if they separate waste at source. Afterwards, the names are printed in local newspaper every week (ChristchurchCityCouncil, 2004). The recycling campaign in the UK (www.recyclenow.com) included "BIG recycle" project on an official website, which is also built upon the same principle: people can send their pictures as active participants in recycling, which will be posted on the webpage.

2.8 Insufficient Feedback

When time passes and no additional information is provided people tend to gradually start forgetting about source waste separation programs. The community needs to be (1) constantly reminded (this was discussed in previous section) and (2) given feedback on the progress done in the waste management strategy (ACTWaste, 2000). Such feedback provides information about whether municipality or waste management company is attaining or failing to attain its goals. The study on the consumer attitudes to source waste separation in Finland found that 82% want evidences that recycling saves natural resources, 72% want to see savings for national economy, 66% want evidence that recycling saves landfill area (Read & Pongracz). Such information can act as reinforcer as people receive conformation that they do a good job.

Indirect positive effect of feedback provision is breaking such rumours as "all collected waste is mixed", "all separated waste ends up at landfills", "recycling in terms of money and efforts spent by people is not beneficial" or "transportation costs are higher than the benefits and energy savings from recycling". Such rumours are distributed to undermine recycling from political opposition, representatives of traditional waste treatment methods or companies interested in promotion of separation through technical means. Murrey, the author of Zero Waste concept says that there is "nothing more harmful to recycling industry and principle than statements against recycling" (Murrey, 2004). Such issues come up even in societies with high knowledge on waste issues like Denmark and Sweden, with open access to recycling facilities for verification that it is actually not true. The fact that people really take statements against source waste separation closely and passionately is another evidence of social reasons for recycling (Murrey, 2004).

Although the need for providing feedback is generally recognised, Evison and Read (2001) state that it is relatively little used in communication campaigns to date (Read, 1999). One of the excellent examples is provided by community in Sweden which has used local newspaper to create a debate on the most controversial issues in source waste separation which turned

out to be a good strategy. Messages were either modelled or actually sent by local public to editor like "All waste is anyway mixed", "There is no reason in waste separation" and others. When published, each negative or controversial statement was followed with a comment from municipality, which in a very clear and polite way explained the need for source waste separation, the beneficial factors confirmed by actual facts in favour of recycling and that municipality does its best. The benefits of such approach were low costs; information was presented in a way to get high attention and gain credibility at the same time. Through these articles inhabitants were also invited to visit landfills or recycling facilities to see what's happening there in reality and break rumours. Although only few citizens came; getting those who actually wrote to editors and make them visit facilities was done with a purpose that if people are active enough to write to editor they will become strong public agents to actually promote source waste separation.

Another way of feedback provision is also provided by municipality in Sweden: when the residents were complaining about odour from composting plant the municipality brought bags with compost to the recycling centers with a note that households are welcome to take it for free for their gardens. As a result, the complaints about odour vanished with 15-20% increase in general organic waste collection!

2.8.1 Internet

It is rather common for municipalities to have a website with all information available about the organization, different specific information of the services, instructions for waste separation and contact details. There is also a possibility of forums where residents can ask all necessary questions and consult for specific issues. Often, internet is used for making information easily available and getting feedback. The reports show that residents do not use internet for such kind of information to a large scale (Mee & Clewes, 2004; Swedish Association of Waste Management, 2003), however in UK when respondents were asked to indicate how they would like to be informed about recycling program – 10% indicated that through e-mails (Mee & Clewes, 2004).

2.8.2 Setting Targets

D. McKenzie-Mohr says that providing targets for a household or community to achieve can enhance motivation for participation (McKenzie-Mohr & Smith, 1999). The following feedback is seen as a barometer of how successful the community action has been. One of the interesting examples with setting targets is through providing feedback on the results from different regions. When it is known, that city Y is the last in the list; it motivates its citizens to put more effort.

> The communication strategy in Canberra has a goal to reach "No Waste by 2010". When it was started in 1996, the first year the collection rates were quite high, but in following years the results became worse. One of the decisions of communication committee to reinforce the program was to provide citizens with regular information on levels reached in certain year and other achievements which had positive effect.

2.9 Summary

This chapter provided with thorough investigation of the nature of main barriers to source waste separation activity and suggested a number of communication tools and approaches to

present information to increase public participation. Table 1 presents barriers with aspects shaping these barriers and a list of relevant communication tools. Since some communication tools could be utilized for several barriers, each of them is presented with all applicable approaches.

Table 1 Aspects shaping identified barriers and relevant communication tools

Section	Aspects shaping barrier	Communication tools
2.1	Lack of environmental knowledge and awareness	
	Threat information; Values; Observation of environmental destruction; Environmental Knowledge	Media; School education; Participation in decision making through public hearings, work-books and surveys including background information Visits to landfills and recycling facilities; Video about recycling facilities; Ecological Footprint; Exhibitions with sculptures from waste
2.2	Lack of responsibility and perceived ability to contribute to the problem	
	Environmental concern; Feelings of responsibility; Belief that each effort counts	Almost all communication tools
2.3	Lack of knowledge on "how to separate"	
		Distributed informational materials; Posters on containers, in recycling centers; Prompts for the kitchen; Interpersonal communication
2.4	Lack of personal incentives and benefits	
	Regulatory measures; Financial incentives ("pay as you throw" system); Non-material factors such as desire for a better future, civic pride, etc.	Monetary rewards and lotteries; Almost all communication tools for non-material factors
2.5	Weak social norms	
	Conformity; Compliance	Advertising; Prompts; Public events and celebrity involvement; Caretakers
2.6	Perceived barriers about situational factors	
	Number of fractions to separate; Containers proximity; Time; Space; Money; Refuse chutes	Interpersonal communication; Caretakers; Waste management crew; Video-modelling
2.7	Old habits	
	Forgetting; Commitment	Advertising; Prompts; Public Commitment
2.8	Insufficient feedback	
		Media; Distributed informational materials; Internet; Setting targets

3 Waste Management in Ukraine

This chapter will present Ukrainian case. It starts with country introduction, waste situation, current waste management practices and recycling in particular. Afterwards, it presents different initiatives in Ukrainian cities with more detailed presentation of the major pilot projects which will be used for further analysis. The last section of the chapter will analyse the opinions of different actors for introduction of source waste separation.

3.1 Ukraine: Country Introduction

Ukraine is the biggest European country after Russia which is situated in the Eastern part of Europe with a land area of 603 700 sq km, and a population of 48million (See Figure 3). Until 1991, it was part of the Soviet Union with administratively planned economical system and national income accompanied by intensive use of natural resources. Although only 3% of the territory of the former USSR was covered by Ukraine, its industry counted for 25% of the overall Soviet industry. About 5% of the world mineral resources is still produced in Ukraine, however outdated technologies and worn fixed assets cause significant losses of raw materials and lead to high levels of pollution and waste accumulation. Thus, the Donetsko-Prydniprovsky industrial complex in the eastern part of the country is ranked as one of the most significant sources of pollution in Europe.

Figure 3 Ukraine (source: www.travel.yahoo.com)

The Chernobyl nuclear explosion in 1986, another environmental tragedy is the major man-made environmental disaster which contributed significantly to not only Ukrainian, but also to the global ecological crisis (Miller, 2004). The health effects on population have been significant with high risks of cancer and a number of other diseases, however it is difficult to trace to the accident. The 30 km area around the plant is still not inhabited; however recent studies by European scientists have shown that it could become one of the most successful natural reserves as now there are already many rare species living there.

In 1991, Ukraine became an independent state and is defined as a country in transition to market economy. With collapse of Soviet Union the industrial sector of the country went down with many plants being closed. The transition has had negative economic impacts; however the decrease in industrial production resulted in improvements in the environmental area due to lower pollution levels. Nevertheless, according to reports of foreign scientists, inefficient and irrational use of natural resources and total environmental pollution cause annual economic losses of about 15-20% of Ukraine's Gross National Income (GNI).

In the end of 2004, Ukraine went through the "Orange revolution". Apart from political considerations, the positive changes observed among the people who took part in revolution are that they have feeling that they can bring changes by their active and united participation; that they can choose the government that they want; and that they are more proud of their country and happy about their contribution for the common goal. After the revolution people have been much more politically active and interested in what is happening in their country (Kostyuk, 2005).

The new government is now attempting to move Ukraine, which is Europe's fastest-growing economy with 9.6 percent GDP growth in 2003, closer to Western European standards of economic and political behaviour (Ash & Snyder, 2005 cited from SED Ukraine).

3.2 Municipal Solid Waste Management in Ukraine

In Ukraine the municipal solid waste generation in 2003 was around 17 millions tons that is 125 kg per capita annually (COWI, 2004). Waste accumulation and composition differs significantly in the densely populated cities from rural parts of the country. Thus, large cities with a million or more inhabitants account for the majority of generated waste with waste composition similar to industrialized countries. In rural areas waste generation is much less with mostly organic fractions. MSW management services are limited to only cities and larger towns, while in rural areas there is no waste collection at all and waste is mainly dumped on illegal landfills.

Over the last decade there is a tendency of increasing in amounts of waste generation and municipalities nowadays face a problem of finding new waste treatment options. So far waste is mainly dumped on the landfills, which cover over 150 000 ha and have already reached or reaching their capacities. The dumped waste causes a number of environmental risks as existing landfills were poorly constructed and operated; almost all of them are used further even after reaching their capacities; hazardous waste is not collected separately and, thus, landfills are the potential polluters of surface and ground water, soil and air.

Since 1984 four waste incinerators were built in Ukraine: in Kiev, Dnepropetrovsk, Kharkiv and Sevastopol. By now 3 facilities have been closed due to high pollution levels and the only one working facility is "ENERGIA" plant in Kiev, which is quite often attacked by public because of the air pollution, smog and odour in the nearby districts. In general, the national waste incinerator industry was assessed as potentially dangerous; while high prices for gas to burn waste and absence of district heating systems made it non-profitable business (Suprunenko, 2001).

Recycling as a waste treatment method is recognized in National legislation and in the recommendations to local authorities as a higher priority option than other waste treatment methods. However although large potion of waste could be recycled or recovered only 5% is recycled (Mont, 2005). The amounts of recycled waste are decreasing each year and it was calculated that on the level of 2001 the country looses 3.3 million tons of waste paper, 550 thousand tons of metals, 660 thousand tons of polymers and 770 thousand tons of glass

annually (Suprunenko, 2001). However, this data is rather difficult to estimate as different resources show different results. One of the recent estimation of the composition of waste in Kharkiv is presented on the Figure 4.

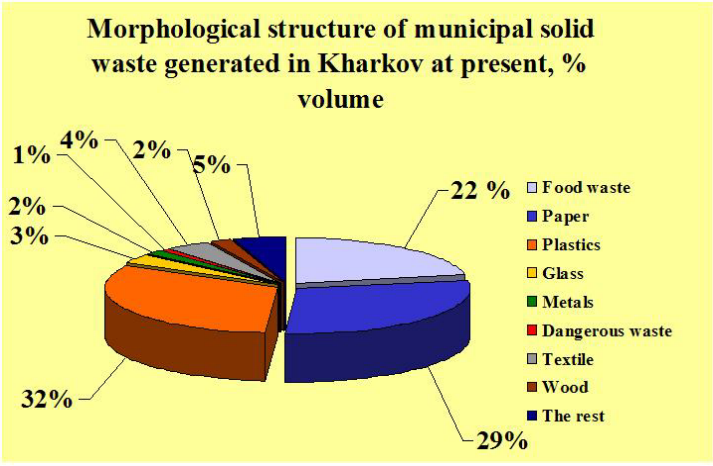

Figure 4 Morphological structure of MSW generation in Kharkiv 2004 (Abashina, 2005)

The collection of recyclables is organized by private collection centers where people bring materials and exchange them to the money equivalent. The fractions being collected are glass, metal, paper and cardboard with recently introduced PET bottles collection. Regarding glass, from the Soviet Union times there is still a deposit-refund system running; metal, paper, PET bottles and textiles are taken for their value which is rather low to give financial incentive for the majority of citizens.

Going back in history, while being a part of the Soviet Union, the country had a relatively efficient collection system for recycling. The citizens were bringing materials to special collection centers where waste paper was exchanged for books; refillable bottles for shopping bills or money equivalent and so on. Schools were also organizing waste paper collection on certain days when pioneers were collecting waste paper from neighbours and bringing it to the school. Usually it was organized in a way of competition between different classes or individuals "Who will be a champion in paper collection?" The waste paper then was collected from schools on exchange to study books. The collection system was organized with awareness raising programs – children in schools were educated about value of the paper, almost each book or notepad contained a message "Recycle paper and save the forest", while the collection of glass and other fractions was driven mainly by economic incentive. Until the end of 1980's the biggest cities, such as Moscow, Saint Petersburg, Kiev etc. had collection levels not lower than in most European cities at that time (Butrin, 2003). It was expected that with the market economy that was introduced in 1990s, the system would become more widespread and profitable. However, this change did not occur and now it is only poor people who collect glass bottles and take out waste paper directly from containers to earn small money.

Nowadays the image of people who bring back recyclable materials is associated with poorness and regarded as being of low social standing by most societies (Tacis, 2003). According to the survey in Donetsk region 38% of population bring back refillable glass (but this number won't be the same in big cities), 4% bring paper and metal and only 2% plastic.

As present collection system does not assure potential material recovery, the private companies invest in material recovery facilities. Thus, Grinko-Center in Kiev has recently opened a sorting facility for mechanic separation of mixed waste, on 6th June of 2005. The

facility is constructed for separation of paper, plastic, glass and textiles and compacting of other waste for landfilling. The owners claim it was built on private investments and costs 9 million Euros[14]. After 1 month of running it was temporarily closed due to non compliance with sanitary norms and the economic feasibility of the project is also being questioned since the quality of sorted materials is very low and the recycling companies deny accepting it (Ignatenko, 2005). Nevertheless, the same types of facilities are being built in Donetsk region, Poltava and probably in other regions as well[15]. Kiev municipality has also started constructing the MSW facility, this time using tax money (Babushkin, 2005). It is slowly becoming an issue of concern in newspapers (Kostyuk, 2005); however the information presented does not reflect true situation and presents material recovery facility as a positive solution to the problem with waste.

Another private sector that could play an important role in waste reduction and recycling are producers of goods with packaging, who are required to pay a packaging fee to the state association "Ukrecocomresources". It is the only government company in Ukraine founded for collecting, processing and utilization of secondary raw materials. Although the collected fees are almost on the same level as in any other European country, neither separate waste collection nor any recycling system initiated by this company is in place which is confirmed by almost all organizations, committees and ministries interviewed (Slabiy, 2005; Ignatenko, 2005; Abashina, 2005). The collected funds are going to the state budget and are not redistributed back to the municipalities for developing separate waste collection infrastructure or recycling facilities.

3.3 Relevant Projects on Source Waste Separation in Ukraine

In Ukraine the majority of projects on separation of the waste in households and selective collection were initialized by international organizations or funds: Tacis project in Donetsk region, DANCEE in Kiev and EBRD[16] fund in Kharkiv as the first initiative. Although the first experiment in Kharkiv was organized as a requirement from ERBD, later municipal waste management company initiated its own project. On the municipal level only few cities try to organize pilot projects on source waste separation: Ivano-Frankivsk has introduced containers with separate collection on some of the city streets; in Rivne the selective waste collection was introduced in 4 multi-storied houses; and in Lviv 15 containers for separate waste collection were introduced in one of the districts. The biggest and ongoing project on source waste separation is in Kharkiv municipality which will be presented below.

3.3.1 Kiev

Kiev is the capital of Ukraine with population 2.666 million people (KMV, 2005). In 2003 DANCEE sponsored a project "Modernisation of the Kyiv Solid Waste Sector". The project was conducted by COWI with focus on recycling and landfilling facilities. In order to assess the possibilities and opportunities to introduce source waste separation in Kiev, an experiment in 3 districts of Kiev was carried out between February and August 2003 with residents of 1600 apartments. The districts were chosen in a way to (1) represent different housing types: with refuse chutes, without refuse chutes and single houses and (2) identify the most appropriate combination of fractions to be collected. Thus, people in the first district were asked to keep dry recyclable waste separately from other waste; citizens of second district were separating paper, PET-bottles, glass and other waste; while inhabitants of the third district

[14] This number could be overestimated, moreover unofficial sources claim that it was money-laundring

[15] COWI seminar for Donetsk and Kharkiv municipality representatives.

[16] European Bank for Reconstruction and Development

were separating organic from other waste. The project aimed at identifying technical factors for organizing a separate collection system as well as human factor and readiness of public to participate in source waste separation programs.

The survey after 6 months of pilot project showed that 87% of respondents in all three districts participated in source waste separation and 95% out of these were ready to continue separating waste. Majority of the respondents were positive to further extension of the number of fractions to be separated (50.7%). However, the efficiency of waste separation in all three districts does not overcome the level of 45%. The low efficiency of separate collection of recyclables (housing organization 512) was explained by poor people taking out materials to bring for collection centers and, thus, the data does not reflect the actual amount of materials being separated.

Table 2 Source Waste Separation Efficiency (Kyiv Municipality Report)

housing organization number	Waste fractions	Waste fractions collected (%)	Waste fraction potential (%)	Source Separation Efficiency (%)
HO 203	Recyclables	10.9	26.0	41.9
HO 512	Paper & Carton	0.58	18.1	3.2
	Glass	1.5	5.8	25.9
	PET-bottles	0.77	2.1	36.7
HO 1018	Organic	21.01	46.6	45.1

3.3.2 Donetsk Region

The main goal of the project in Donetsk region supported by Tacis was to create a sustainable waste management system which will increase quality of life of the local population and eliminate negative environmental effects from waste in Donetsk region and further expansion of the experiences to other regions of Ukraine.

In line with overall support for planning of waste management in the region, the project comprised a thorough investigation of waste fractions, made investments in the infrastructure, carried out a number of surveys on public opinions and knowledge of waste related issues and the readiness to source waste separation. The experiment on source waste separation was carried out in several cities: Slavyansk, Kramatorsk and Donetsk with involvement of different stakeholders and NGOs in both project development and implementation. Public awareness campaign was organized with a number of promotional techniques and quality materials with following analyses on the readiness of public to source waste separation and publications with recommendations in organizing source waste separation for other municipalities.

The conclusions from the project on source waste separation show that the source waste separation is largely supported by the population and that the majority is ready to sort waste at home and dispose off in different containers. The analysis of the public survey showed that people have very limited knowledge on waste related issues; but also that they are very concerned about waste situation, which is rather related to the quality of waste collection service provided. In general respondents stated their positive attitude to source waste separation and support to spending money on such projects.

In July 2005 Tacis has started second project on optimization of waste management in Donetsk region.

3.3.3 Kharkiv

The first source waste separation initiative has started as a requirement from EBRD which provided financing for organization of a separate municipal waste management company in Kharkiv and construction of new landfill. In October 2004 the company has initiated own pilot project and expanded source waste separation in Kharkiv with support of local municipality. The expansion of experiments is limited to external sources provided by municipality since there is no economic feasibility on such small quantities of materials collected. Nevertheless, it was calculated that source waste separation in the whole city could provide savings on waste collection, transportation and landfilling equal to 1.3 million US dollars and additionally 10 millions US dollars from selling the recyclables.

The source waste separation promotion program targets three main audiences: (1) employees of Housing Organizations (see also section 3.4.3), (2) general public and (3) schools, kinder gardens and teachers (Abashina, 2005). The promotion of the source waste separation is done by efforts of municipal company itself – organizing seminars in housing organizations and seeking their support; introduction of different containers and work on public education through different communication approaches: printed information is distributed to each apartment; students are involved for conducting surveys and interpersonal education, organisation of public events and lotteries etc. Schools and kinder gardens in chosen districts are also participating in the program and each class has an educational lecture on the negative environmental impacts from improper waste treatment and importance of source waste separation (Abashina, 2005).

People in pilot districts were asked not to mix waste at home and dispose off separately (1) glass, (2) paper and (3) PET-bottles together with metal in special containers in the yards. An experiment was started in October of 2004 and by August 2005 4 districts were covered and about 35 000 people engaged (14 500 households).

The first results of the experiment have shown that 83% of respondents in pilot districts support source waste separation and that majority of residents already separate glass, PET-bottles and aluminium cans (Abashina, 2005).

3.4 Stakeholder Analyses

The previous sections have shown that municipalities in Ukraine face a problem with increasing amounts of waste generated and shortage of waste treatment facilities and although there is a private collection system for recyclable materials it does nor assure potential diversion of recyclables from landfills. Introduction of source waste separation is a common practice in modern waste management systems to decrease amounts of waste landfilled and gain value from secondary materials, however it is still not recognized in Ukraine. To understand the main reasons why source waste separation is not introduced, the perspectives of different stakeholders will be analysed in this section: national level, municipal level, housing organizations, recycling industry and households.

3.4.1 National Level

On the National level there are at least three actors dealing with waste management planning process – Ministry of Natural Resources and Environmental Protection, Derzhzhytlokomungosp (the central executive power in municipal housing and economy and MSW management), Ministry of Health Protection. The structure and responsibilities of the different actors in waste management seems to be rather complex. Each of them deals with certain parts of Waste management planning which in many cases overlap or undermine accountability for the activities. Last year COWI has developed a National Waste Management

Strategy with recommendations for institutional, legislative, financial and informational aspects to be developed in moving towards sustainable waste management system.

However, for the National Strategy to be implemented on local levels there is a need for more detailed guidelines for municipalities to help them in planning of their local waste management system. Now the Committee of Municipal Services is working on such guidelines which will also include recommendations for municipalities on how to introduce source waste separation in households. So far municipalities do not have any support or recommendations on how to introduce source waste separation from national level.

Derzhzhytlokongosp argues that the main reasons why source waste separation has not yet been introduced include: (1) lack of resources needed to develop source waste separation infrastructure - containers, collection vehicles for recyclables etc. and (2) educational programs to change people's habits and behaviour for the habit of waste separation before disposal. Since the waste management sector is in many cases subsidized from the national budget, all questions about any possibility of improvement in MSW management are answered from the perspective that people "do not pay the full price of waste and tariffs have to be raised" (Ignatenko, 2005).

3.4.2 Municipal Level

Municipalities are responsible for the process of planning local waste management systems and waste treatment facilities. However, no major positive changes were happening in waste management sector so far. The general problems are lack of knowledge regarding what has to be considered in selecting waste treatment options and financial resources. But even more important issues are low political activity and limited administrative capacity of local authorities for improving waste management. As an indirect problem, people in local authorities are paid low salaries and it is reflected on motivation in bringing changes and extending the scope of the work.

Municipality is not managing waste from one department, rather it is organized in interaction between different actors such as landfills and waste treatment organizations, collection and transportation companies, housing organizations and Sanitary Epidemiological Agency. Each actor works on a specific part of the waste management and there is a lack of overall control and strategy for the sector. Moreover, looking separately at each actor, none is interested in source waste separation as it does not assure any profits (Gnedov, 2005).

The reports of pilot projects on source waste separation in Kiev, Kharkiv and Donetsk provide with conclusions on positive attitudes to source waste separation and readiness to participate in the program. However, the municipalities still perceive efforts on public education as a great challenge and support the need to build MWS facilities or other technical solutions for waste treatment (Kiev municipality, Donetsk municipality). The main arguments for possible public non-cooperation stated by municipality representatives are (1) refuse chutes in more than 80% of the houses which are more convenient than going outside to throw away rubbish; (2) low public awareness on waste issues and (3) the fact that western countries are working on the issue for more than 10 years, while Ukrainian municipalities need a quick solution to the problem of shortage of waste treatment facilities.

In Saint Petersburg Green Peace has organized pilot project and provided municipality with facts that source waste separation is a solution to waste management problems in the city and recommendations for its general introduction. However, this was not enough and Green Peace had to organize demonstrations in front of a municipality building with a model of incinerator that was using money of citizens as a fuel. It was done with the purpose to make

municipality administration consider source waste separation as a better option and form negative public opinion towards incinerators. NGO "Roza vetrov" which worked with Tacis in Donetsk has also mentioned specifics of work with local authorities in their book with recommendations on introduction of source waste separation. During the COWI seminar in Copenhagen for representatives from waste management sector in Kharkiv and Donetsk it was stressed that motivation of municipal workers for recycling or at least one "recycling champion" could help in introduction of source waste separation.

Another aspect with introduction of source waste separation is the need for close cooperation of housing organization and caretakers with municipalities on one side and households on the other for implementation of source waste separation program. In order to assure this cooperation, the municipality in Kiev is waiting for appropriate regulations to oblige housing organization to introduce source waste separation and to have legal basis for provision of caretakers and housing organization with financial incentives. At the same time municipality representative admits that legislative norms to force implementation of source waste separation will not be efficient and that housing organization have enough work and lack personnel already. Also, housing organization staffs receive low salaries and thus want neither to have changes in their work nor to accept new responsibilities.

At the same time the example from Kharkiv municipality and other municipalities trying to implement source waste separation shows that all these barriers could be overcome and they are not a great difficulty in reality. Moreover, willingness and active approach of this municipality is transmitted to households which welcome the program, appreciate efforts of their authority and reply accordingly.

3.4.3 Housing Organizations

Housing organizations are responsible for providing municipal services to households and for collecting charges. Their responsibility is to keep buildings in good condition, to repair water linkages, to organize waste collection and to clean surrounding area etc. What is happening over the last decade is that the quality of the provided services is decreasing or at least not improving, however the charges are rising gradually all the time. By now many people are complaining about the situation with housing organizations and would like to move to private management of the houses they live in. There are even public organizations which are ready to take over housing organizations and claim that they would be able to organize better quality services to tenants at lower prices.

The structure and approach to work in housing organizations needs better management and work efficiency (Skrypin, 2005). The recent survey on the satisfaction of citizens with housing organizations showed that only 2% consider that they work well, 69% admitted that they work badly and 29% stated that they do not work at all (Skrypin, 2005). First of all, this dissatisfaction undermines public participation in proposed from housing organizations programs, however the pilot projects showed that people easily go for cooperation when reasonable program is introduced and housing organization works responsibly on the issue.

In general, it could be foreseen from the experience of industrialized countries that privately owned houses could bring more motivation for participation in source waste separation as it could directly be linked to the costs of the waste collection and transportation services. Nevertheless, in the present system with proper organization good results can be achieved as well, as it was shown in pilot projects.

The arguments from municipalities regarding non possibility to force housing organizations to develop source waste separation system and the experience from Kharkiv showed that

housing organizations and caretakers are important, however due to the lack of personnel and motivation on unknown activity all initial work on public education has to be done by municipalities. Moreover, not only households should find benefits for themselves, but housing organizations and caretakers as well (Abashina, 2005).

In Kharkiv public education, provision of containers and collection of recyclables are organized by municipality, while any savings on reduced waste landfilling and profits from selling of recyclables go back to housing organization, caretakers and sometimes for public infrastructure to the benefits of local residents as a feedback and incentive for further cooperation (Abashina, 2005).

3.4.4 Private Sector Recyclers

As it was discussed in the section about waste management situation in Ukraine private recyclers have a system of collection points and accept glass, paper, PET-bottles, metal and textile, however it is used mainly by waste pickers and does not assure potential material recovery. The fact that private sector invests huge amounts of money in material recovery facility could be an evidence that there is demand for recyclables. Representative of the Kyiv Municipality stated that in case of source waste separation some private recyclers are even ready to organize collection and transportation of certain fractions with their own money (Galushka, 2005).

3.4.5 General Public

The survey of public opinion towards introduction of source waste separation was organized on the leading news website in Ukraine www.Korrespondent.net (see section 1.3.3) showed that 83.08% have a positive attitude to source waste separation and will try it for the environmental reasons; 6.64% will sort waste only with monetary rewards; 4.38% need more information why source waste separation is needed and 5.90% pointed out that they have other problems to be bothered rather than waste (See Figure 5).

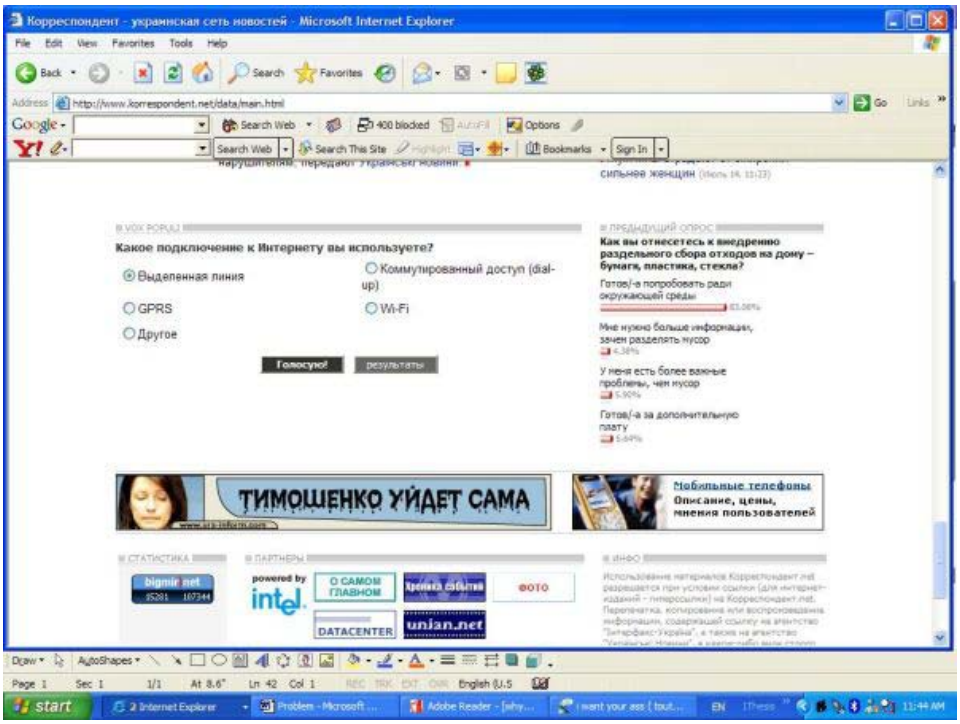

Figure 5 Results of the Survey on Korrespondent.Net (16 July 2005)

These results do not directly mean that in case of introduction of source waste separation 83% (even up to 87.5%) will participate in the program. The gap between positive attitude itself and action was discussed through various personal and social barriers. Nevertheless, the results indicate that (1) people know that recycling is good for the environment and (2) the majority of the respondents do not expect any monetary reward for participation in the program.

4 Factors Influencing Behaviour of Source Waste Separation in Ukraine

This chapter is structured according to the framework derived in literature analysis: each barrier is assessed against Ukrainian case and followed by an analysis of the applicability of suggested communication tools. The literature analysis presented a number of barriers to source waste separation, however since in Ukraine source waste separation is not yet introduced the analysis will take them as factors which could have both positive (motivators) and negative (barriers) aspects. Since the nature of factor itself plays an important role on the application of communication tools the context and detailed explanation of Ukrainian situation precede the analysis of relative communication tools.

4.1 Environmental Knowledge and Awareness

The level of environmental knowledge and concerns of population on waste issues was assessed through analyzing school educational program and interviewing students graduated from Kiev school in 2005, media coverage of the topic and results from the surveys in international pilot projects and experiments.

Educational programs in schools do not include classes on waste management issues, related environmental problems and desired resolution options. Ecology is studied as part of biology and covers only general principles of ecosystems, without focus on concrete issues. As a result, children and graduates do not connect waste to environmental degradation, underground water pollution, health risks and other problems. Natural resources depletion is studied in geography course as a global problem facing humanity; however it does not bring the understanding of the problem as acute locally. This is also confirmed by the study on consumption patters of young people in 24 countries over the world which shows that Eastern European youth tends to a lesser extent agree that they consume too much of natural resources. Moreover, a large percentage answered that it was the first time they happen to think about their consumption levels at all (UNESCO & UNEP, 2004).

Media as a public information organ does not add much to solving the situation. First of all, the issue is not covered enough – one of the biggest news portals "Korrespondent.net" has only 9 articles on municipal waste management over the last year with mostly information on mechanical sorting facilities as something positive. For-ua, the second leading news website has more waste management related articles – half of which are about problematic situation listing environmental problems from landfills, another half is about positive changes - "sorting facilities" and "incineration plans". Only one article was about new recycling technology which would produce construction material from plastics. In Kharkiv, the first pilot project was covered in media with the ending that anyway poor people will take out all recyclables. Instead of forming positive attitudes media made people feel that their efforts are not going for their community benefits, but for the benefits of waste pickers. The project in Donetsk also experienced problems from "inappropriate joke" in local newspaper in the beginning of the project.

Nevertheless, according to media representative, environmental problems are the issue of concern for Ukrainian population (Kostyuk 2005). In eastern industrial regions people are concerned about air pollution, south regions are disturbed with sea pollution and western parts are worried about deforestation and as a consequence destructive floods each year. Moreover, people perceive that environmental pollution influences their health.

Ukraine is a country where one of the biggest environmental disaster ever occurred – explosion of nuclear plant in Chernobyl which touched upon each person. Chernobyl tragedy demonstrated both the inability to create safe industrial systems and irresponsible attitude of the government to people – not informing in time about disaster which led to much higher negative health effects. Being witnesses and victims of environmental destruction people clearly realize the link between environmental accident and health of people and their children.

Regarding public concern of waste related issues, the survey from Tacis project in Donetsk showed that although people do not possess actual knowledge about waste related issues the majority of respondents (74-70%) are concerned with waste problems and dissatisfied with current system. However, it is to large extent is related to the quality of waste collection service provided by housing organizations. Odour form waste accumulatin (60%), waste being flowing around with wind (60%), waste around containers (38%), littering in parks and forests (30%), illegal dumping (25%) and poor people taking out recyclables from containers (20%) are the issues of concern about waste (DIAC, 2003). This general dissatisfaction with current waste management system is also largely used by political opposition to local authorities showing their incompetence in proper waste collection system.

As for sources of information on MSW, a survey in Donetsk region showed that people receive information on MSW mostly from television (42%), newspapers and magazines (41%), to less extent colleagues, friends, relatives etc (29%) and almost each tenth does not get information about MSW at all (DIAC, 2003).

All these facts lead to conclusion that public has inadequate understanding about what the waste is, how it is disposed off and related environmental problems of improper waste management, which causes "out of sight, out of mind mentality" and as literature review has shown, people have to realize the problem in order to form positive attitude to the recycling.

The literature analysis (see section 2.1) has suggested that negative environmental information, and especially, personal interaction with environmental degradation influences environmental awareness and motivation to participate in problem resolution. There are not many articles on environmental problems related to waste in Ukraine. Those which are of negative character mostly focus on environmental disasters without highlighting the role of each individual to problem resolution and mainly pointing at incompetence of local and national authorities to coordinate situation.

The example of direct interaction with environmental destruction in the case of Chernobyl accident have shown that it influences personal understanding on the importance of eliminating possible environmental problems. However in this case people are not in power to do anything for improving the situation.

The Kharkiv municipality experience of providing straightforward environmental information as a part of promotion campaign was not found to be effective in Ukraine and this confirms the experiences from western municipalities. People are not interested in such information, however one of the reasons could be that leaflet contained a lot of information, which requires time to read. Presenting such information in a visual and easy way (See examples from 2.1) could bring more effect. Calculation of ecological footprint as a way to realise the personal input to the environmental degradation is not likely to be relevant in Ukraine for general public distribution. However it could be as additional tool if provided in local newspapers or used in school education. Another tool of changing paradigm of "waste" to "resource" in western municipalities is organizing exhibitions with various sculptures made out of waste. Such tool could be used to raise both knowledge and interest to the issue.

Although general public is not interested in reading environmental information, providing lectures to housing organizations and caretakers on negative effects from improper waste management, illegal landfills, toxic and hazardous waste seems to be important for assuring their involvement in the program. Caretakers and housing organization employees work with waste and have to understand both the threats of improper waste management and positive effects of waste reduction. This knowledge helps create commitment to proper waste handling and the necessity of the sort waste separation programs.

One of the purposes of providing environmental information is to form positive attitude to recycling program and source waste separation. The above stated facts and the results from surveys on public attitudes for source waste separation (see 3.4.5) shows that although people are not aware about all environmental consequences of waste dumping, they know that "recycling is good for the environment" and this leads to conclusion, that the promotion should not be mainly based on raising of environmental awareness.

It was found that mass media remains the main source of information about MSW. However mass media should realize their vital role in forming public opinion, since often instead of forming positive public opinion about initiatives of source waste separation, journalists are searching for problems in projects to recall that "nothing good is happening in reality", "it is not for our mentality", "not with our government" and so on. However, such problems to different extent also happen in other countries as a strategy from political opposition, representatives of material recovery facilities etc. and municipalities should be ready to controversial articles.

The following sections will analyse in details the main communication tools for developing environmental awareness presented in literature analysis.

4.1.1 School Education

As it was mentioned in previous section, national school program does not include lectures on waste related issues. During the Tacis project in Donetsk schools were involved in a number of activities and lectures including visits to landfills. However, almost all teachers mentioned the problem of negative attitude of parents to home experiments of identifying the amounts of waste fractions and landfill visits. Moreover, many children are by themselves too sceptical about programs carried out by local municipalities and they perceive local authorities as separated from the community and doing nothing to solve local problems (TacisDonbass, 2004). In Kharkiv work with schools is also organized in the districts where source waste separation was introduced. The practice of cooperation with schools is perceived by public education specialist as effective way of raising awareness on source waste separation (Abashina, 2005). The issue is presented with both environmental information and video on how recycling facilities in foreign countries work. The work is also carried out with kinder gardens with specially designed books.

Global Action Plan[17] (GAP) works with a number of teachers and schools in Ukraine. In Cherkassy the GAP cooperation program with local school children resulted in letters to the mayor asking for introduction of source waste separation (Mehlmann, 2005).

Thus, school programs identified in literature analysis as a common practice to raise environmental awareness have been found to be a positive practice in Ukraine as well.

[17] A non-governmental organization which works in many countries throughout the world with main aim "to empower people to live increasingly sustainably"

Children take information with interest and very emotionally, which results in active participation at homes and in persuading parents and relatives in participation in source waste separation programs.

In the stakeholder analysis it was mentioned that National Governmental Bodies and some municipalities consider that only education from young age might result in feasibility of source waste separation in the future. The literature review suggested that work with children has to be designed carefully in order to assure that they can change the situation and not make them depressed about their country. Thus, educating without opportunity to act is much more damaging than not educating at all. At first the infrastructure for separate waste disposal should be present in place and only then such education should be introduced in schools.

4.1.2 Visits to Waste Treatment Facilities

Visits to recycling centers and landfills were suggested in section 2.1.2 as a successful practice of informing and motivating citizens through direct interaction with environmental problems and solutions, however not many of citizens actually go there. While visiting recycling facilities could be of some use, the visits to landfills are not the best approach. Landfills in Ukraine mostly do not comply with environmental standards and are in quite bad conditions. As a result it might happen that people receive emotional shock explained in the section 2.1 as one of the reasons for not participating in problem resolution further. Additionally people are not interested to be stressed as they could predict how landfills look like. The condition of landfills, risk of diseases and emotional shock could be an explanation to the fact from previous section why parents are against such trips for their children and it is understandable. Thus, it could be recommended to use movies about operation of recycling facilities as proposed alternative from literature analysis and which is already used by Kharkiv municipality.

Additionally, for the general public and also for journalists it could be difficult to get permission for a visit to landfills. During the study trip of IIIEE students to Ukraine for the project on "Ukrainian Municipal Solid Waste Management", the students could not get such permission. In the end they were allowed to visit landfill #5 in Kiev, which is considered the only one complying with environmental regulations. The literature analysis suggested that the fact of possibility to visit facility itself adds credibility, however since landfills are anyway in unsatisfactory condition it does not add to the issue.

4.1.3 Participation in Decision Making

The literature analysis showed that organizing public participation in decision making has many positive aspects; however even in western countries there are not so many examples on its implementation. The methods introduced are public hearings, workshops and surveys.

As per public hearings, recently in Kiev such procedure was initiated for the issue of building new houses. The problem was that municipalities were giving permissions to build new houses in old districts situated in commercially attractive places and as a result new houses were built very close to old ones, on the places of parks and children's playing yards. The frustration about the issue became so big that authorities decided to organize public meeting which ended up with "verbal fights" when local authorities tried to explain how many good changes are there in the city and that construction of new houses is happening according to "European standards". Another example is the cutting of trees in Kiev, one of greenest cities in Europe, which results in confrontation between municipality and general public that is fighting to prevent further harm to the city.

The municipalities in western countries do not report on public hearings as an effective method, since people are not so interested in such procedures. The above mentioned example from Kiev public hearings showed that when people are very frustrated about particular issue – they come to the meeting, however it is a question if it will lead to changes in municipal policy. People working in municipalities are also part of the local population and realise the number of problems to be solved. However due to the lack of resources, knowledge, necessary skills and sometimes simply desire they do nothing to resolve these problems.

The workbook method could be utilised, however it might be a rather expensive practice; while organising surveys with the same purpose as workbook could become a good practice. Personal observation showed that people want to be asked about their opinion and when they hear how much money was spent on construction of material recovery facility in Kiev the first reaction is "nobody asked us if we would separate waste at home!" and that "these funds could be used in a better way". The practice of involving public in decision making through surveys could be carried out in a way of seasonal public referendums or at least during the elections to national or local governments for not only waste issues as it is done in other countries.

4.2 Responsibility and Perceived Ability to Contribute to the Problem Resolution

In the literature review it was found that responsibility is formed within two conditions: (1) understanding the consequences of certain behaviour (discussed in previous chapter) and (2) ascription of personal responsibility to solve the problem. Another important issue is belief that individual contribution could bring positive changes to the problem resolution.

The pilot project in Saint Petersburg showed that responsibility and moral obligation is one of the two major reasons for participating in the recycling program (Babanin, 2003).

During Tacis project in Donetsk region it was found that people understand their roles and the role of their government in resolution of problems with waste in the following way: 48% consider that the government is mostly responsible, while 46% agree that the problem could be solved only by cooperation of government with general public. Only 1% stated that citizens have responsibility to deal with waste problems in the city. Nevertheless, Kharkiv municipality after 10 months of work on source waste separation says that "people are rather cooperative and we just have never given them opportunity to show themselves from the good side" (Abashina, 2005).

The Kharkiv municipality works a lot to shift the paradigm that waste situation is someone else's problem and to highlight that "the problem lies within us", "authority needs your cooperation" and simply to ask people to put efforts for the resolution of common problem (Abashina, 2005).

As for the believe in positive effects from participation in source waste separation the majority of residents who took part in the experiment (72% in Donetsk, 95% in Kiev and 83% in Kharkiv) stated that they are willing to continue participation in recycling program and even support spending money on such programs (DIAC, 2003).

The description of Ukrainian case and issues covered in media from the previous chapter give a ground to consider that there is not enough information provided on positive effects and benefits from source waste separation and that people do not understand their role in various environmental problems. As a result, the general public does not know how they can

participate in improvement of the situation and what to ask from the local authorities. On one hand, people either do not know how they can help, and on the other, they are not provided with opportunity to treat their waste in other way.

Another factor influencing feelings of responsibility found in section 2.2. is that people might prescribe that it is the government who is responsible for waste issues and not citizens. The authority has traditionally been seen as a responsible body for communal services and that is why people consider that it is not their own obligation to decide on the waste management. Thus, there a need to emphasise more that people are the cause of the problem and explain how they can contribute to the resolution of the problem.

However one should remember that asking people for cooperation and responsibility means that authorities also have to be responsible to their obligations - households will consider their responsibility in a way municipality is fulfilling their responsibility in the program.

4.3 Knowledge on "How to Separate"

People in the projects conducted are mainly asked to separate paper, PET bottles, metal and glass in containers which are situated close to each multi-storied house. The surveys in Donetsk have shown that around 20% of people already separate certain fractions for household use.

The best sources of information on recycling program and knowledge on "how to separate", as used in the Kiev project, include:

- Text or picture signs on containers (which are also coloured differently);
- Posters on the entrances to the houses;
- Distributed leaflets.

Regarding attention to the materials, a majority of resident from experiment district (70-80%) read the brochures and leaflets provided and considered themselves to be well informed (Kiev project). Regarding the regularity of materials sent, in Kharkiv leaflets are distributed to households almost each month.

The literature analysis suggested the importance of quality and regularity of information provision. A general impression is that the quality of materials depends a lot on the financial part of the project, while in all projects the information was provided rather often. For "how to separate" information the following places were suggested to consider: recycling centers, containers and also the kitchens. The prompts for kitchens could be needed if the system of waste separation was rather complex. In a way it is working now, there is no need to have reminder with the separation instructions. What is needed is that all people informed and aware about experiment and do not unconsciously contaminate container for recyclables with mixed waste. Thus, for the efficiency of distributed materials literature analysis suggested information to be easy to understand and provided in a way to assure that it will not be disposed off with junk mail. The survey results from pilot projects in Ukraine shows that majority of residents from experimental areas read information provided, however the actual state of containers shows that not all people were aware of the program 3.3.1.

4.4 Personal Incentives and Benefits

The literature analysis suggested three sets of personal incentives: financial incentives ("pay as you throw"), regulatory measures and nonmaterial motivators (desire for a better future, civic pride, belief in personal input).

Regarding the current charges for waste collection service, the Tacis survey in Donetsk showed that the majority of respondents (83%) were not aware of the waste collection and disposal fees. However people are very much concerned about lowering the costs of municipal services in general - they perceive them as too high. In recalculation to the average salary, the waste fees in Kiev are around 1.22% to the minimal salary of a person, while the overall European practice is up to 2%, but per household.

As for regulatory measures, authorities do not seem to be interested in such measures for promotion of source waste separation, however introduction of fines to influence people's behaviour in relation to MSW is seen by citizens as the most effective way (41%) (DIAC, 2003) and probably it is mainly related to problem of illegal dumping. The same survey has identified that people do practice illegal dumping and burning of waste, mainly because they do not have any other opportunity, much due to the poorly organised waste collection system.

When people were asked about their beliefs on what actually could motivate them to participate in source waste separation, 38% stated that people's behaviour on MSW could be changed with more information in mass-media, 22% believed in changes with environmental educational programs in schools, 19% were in favour of promotion campaigns and 18% considered monetary incentives as a motivator factor (DIAC, 2003). Answering the question on the necessity of information campaigns towards MSW majority agreed (75%) and also expected positive changes as a result (DIAC, 2003).

The two cases, Saint Petersburg and Kharkiv, showed importance of another type of personal incentive. It was already mentioned that people are dissatisfied with the existing waste management system and are interested in the cleanliness of their city/area. The introduction of source waste separation programs actually contributes to the problem of cleanliness of the area in the following way: the majority of the houses are provided with refuse chutes and caretakers spend almost all their working time by taking out waste from refuse chutes and very little time is left for cleaning nearby areas and houses. In the areas of pilot projects on source waste separation the territory became cleaner as a result of less mixed waste and less work for caretakers with refuse chutes and the gained time was used to make the district look better. Thus, the second biggest reason for participation in source waste separation comes with the reason "to make the district clean" (the other major reason is feelings of responsibility).

As for intrinsic motivator factors, the Kharkiv municipal waste management company has developed a slogan "We are for the clean city" and invites people to show to others example of the "civilized waste handling" and uses the motivator of desired better future in the promotion campaign as well.

Analysing the situation, following issues are of importance in Ukraine and have to be taken into account. Regarding financial incentives, the stakeholder analyses presented that national and municipal authorities are to a large extent rely on raising tariffs, which they perceive as (1) possibility to finance the system and also would like to see as (2) a financial incentive to reduce and recycle waste.

The tariffs are already rising constantly over the last decade, but no improvements have been made in any of the municipal services. It is very likely that raising tariffs without any positive changes might lead to protests that are already being used by political opposition to local authorities. Although the level of charges is perceived as high for citizens, many services are subsidized from state or city budget, particularly waste collection and disposal and it means that it is not feasible to lower costs for WM services. As it was mentioned in the previous section (3.4.5), people support spending money on such projects as source waste separation.

Thus, the first step for authorities could be the introduction of a more reliable service and as a second to raise tariffs or even covering partially from the savings on waste landfilling.

Regarding financial incentive as such, the experience from other countries has shown that financial incentives are not the major motivator for source waste separation and could be efficient only on initial step. Technically it is very difficult to introduce a "pay as you throw system" or a system with differentiated tariffs for mixed waste and sorted waste with multi-storied houses in Ukraine. Due to the cultural reasons and dissatisfaction with local authorities it is also likely that government will not be able to regulate such a system, control illegal dumping and what is even more important - to explain to people that it is a motivator for them to reduce and separate waste.

The closer look at the current collection system for recyclables with collection centers (described in section 3.2), which is based on financial incentive predicts that (1) to keep system economically feasible and still attractive for households to participate in a way it is organized now is not possible and (2) that people might not participate because nowadays bringing recyclables to these collection centers for small money is associated with poorness, which is not what people like.

By analysing the experiences from pilot projects and current situation the strongest appropriate factors of personal incentives are: (1) "to make district clean" and (2) possibilities to invest the profits from selling recyclables into local infrastructure. Non-material motivator factors such as civic pride and desire for a better future suggested in section 2.4 could be also utilized in promotion campaigns.

4.4.1 Monetary Rewards and Lotteries

The pilot project in Kiev was to large extent based on lottery principle. The leaflets included easy questions to answer about source waste separation; by answering and participation in source waste separation residents could receive presents. Nevertheless, the report concluded that lottery was not an incentive for citizens to participate in waste separation programme and more than a half of the respondents pointed out in the survey that they did not plan to take part in the lottery.

The Kharkiv municipality introduced lottery to get people's attention on compacting PET-bottles before disposal. People were asked to put a piece of paper with contact information, compact the bottle and dispose it off in the right container. The winner gets money equivalent of 150 Hr (30$).

The literature review showed that monetary rewards are good only for initiating the behaviour and that there is a risk that behaviour will last only as long as incentive lasts, thus the use of lotteries is not an efficient approach.

While municipalities and pilot project managers perceive that there is a need to create monetary interest in source waste separation, the example from Kiev project confirms that people do not take their decision to participate in source waste separation based on possibility to receive a reward. Since the source waste separation is a solution to social problem then benefits should be considered as for community.

4.5 Weak Social Norms

During Soviet times social norms were very strong and social systems were based on the principle "for the country" and "not for the individual" (Iwanyuk, 2005). For example, it was

noticed that elder population has mostly responsibility reasons for participation in source waste separation, while younger people are motivated by "cleanliness" factor. The values of the elder population are still more "prosocial"; however younger population is more oriented on personal benefits.

Kharkiv municipality is using the results of their survey that 83% approve waste separation program to make people believe that other citizens are also ready to participate and increase the social norm. They also ask people not to contaminate containers for recyclables as it puts in vain efforts done by other people.

In section 2.5 two distinct ways were identified in which norms could affect behaviour: conformity and compliance. Conformity is increased when people could observe that many neighbours and friends participate in source waste separation. The Kharkiv municipality has a suitable approach to show people that other citizens are participating. As for the compliance there is the following observation: while the majority of citizens realize that recycling is the "right thing to do", in almost all pilot projects the survey results on public participation and actual data on recyclables collected gives an impression that not all people claiming that they would recycle do so in reality. It was suggested that this happens because people feel guilty about not participating. The increase of social norm could persuade them to participate over certain time.

Social norms could be increased through prompts, posters and advertising which highlight what is the acceptable behaviour and giving provoking slogans. However, since the majority of people still remember Soviet Union times – social pressure could have both positive and negative impacts as it was suggested in literature analysis. Those who approve soviet times might follow social norms; but people who perceive it as coming back to old unpleasant times might not react on social calls.

4.5.1 Public Events, Celebrity Involvement

Both Donetsk and Kharkiv projects use public events to inform people about source waste separation. Donetsk project carried out a number of events in schools and for general public. Kharkiv municipality has recently organized separate collection of waste in the municipal zoo with interpersonal promotion for visitors.

The public events were not found to be an often used communication tool by western municipalities; however they have their positive effects and could be utilized in promotion campaigns. Celebrity involvement could be an effective communication tool, the video program or advertising with celebrity separating waste could increase social norm and influence personal motivation.

4.5.2 Advertising and Mass Media Campaigns

In Belarus, where source waste separation is introduced in the capital in the public parks and streets and in some residential areas, there are many mass-media campaigns mainly on TV addressing what people are supposed to do in certain situations and why. One of the most exciting approaches was an ad on TV for promotion of proper disposal of PET bottles. It showed a dog bringing PET bottle to the container and text behind "We managed to teach the dog to dispose off PET bottles separately in 1 day. How much time would it take for people to do the same?"

Since in Ukraine there is no overall infrastructure provided for source waste separation and there are only trial projects on separate disposal of waste, there is no need to advertise source waste separation in mass media for a large public and so far it is done on local level for certain districts. It was suggested that advertising in mass media should be used when there is a large audience to be informed and there are minor barriers to behaviour in a humorous and exciting way. In the case of the introduction of source waste separation for the whole city, it could be a useful communication tool.

4.6 Perceived Barriers about Situational Factors

The projects carried out in Ukraine for source waste separation were mostly investigating the readiness of public participation and feasibility of source waste separation as a part of solution with MSW. Thus, only Kiev project tried to choose 3 areas which would have different types of residential areas and different fractions to collect.

Analyzed pilot projects showed the lack of space and the presence of refuse chutes[18] are the major barriers to participation in source waste separation; however it was also found that many people already keep waste paper and bottles aside. Regarding space barrier, the communication expert in Kharkiv municipality, training caretakers, promoters and the general public, explains that "nobody needs four waste bins" and simply explains how people can organize separation in an easy way. Regarding refuse chutes the problem is that not all people use plastic bags yet which makes it impossible to organize a system with bags of different colours.

In Saint-Petersburg less than 8% of non-recyclers stated refuse chutes to be a reason to non participation. The results from Kharkiv municipality demonstrated that when people realize that the source waste separation program will help to make their living place look better they even decide to close waste pipes. In the district where source waste separation was running for 9 months 50% of households have approved closing of waste pipes (40% disagreed). The most vulnerable group in case of waste chutes closure are old people who cannot go down often, but by analyzing the situation it was found that it will be less time consuming for caretakers to collect waste from these people once a day than to keep waste pipe and take out the waste from it.

The condition of refuse chutes is identified in recent report on MSW management in Kharkiv as "not satisfactory". Because of the lack of resources in housing organizations they are almost not renovated if needed, with broken mechanical parts, they are not cleaned properly and are not disinfected. Moreover, because of improper waste collection schedules the waste is accumulated and sometimes reaches even higher stores. In Ukraine there are examples where

[18] Refuse chute is a waste pipe which allows tenants from multi-storied houses to throw away rubbish on their floors which then falls down and is taken away by caretaker.

almost all multi-storied houses do not have refuse chutes - cities Sumy, Vinnitsa (Ukrkomun NDI progress & KP"MKPV", 2005).

In section 2.6 it was mentioned that less demanding programs gain higher public participation. Only project in Kiev tried to investigate this fact. However due to the unequal background conditions in three chosen districts, the results are not comparable and it is difficult to assess the levels of public participation regarding the number of fractions to collect and the type of residential area. Nevertheless, some trends and situational barriers were found to be similar in all experiments, such as lack of space in the kitchen and presence of refuse chutes. However, the latter one is not as big barrier as municipalities perceive.

Provision of assistance on how to organize separation at home and make it easy is one of the approaches to overcome situational barriers (section 2.6), which is used by Kharkiv municipality. Another tool – modelling of the situation through video could be utilized when the program is introduced on a large scale. Regarding refuse chutes, it is confirmed by Kharkiv municipality that for gaining higher participation it is better to close them (Abashina, 2005). All arguments regarding the condition of refuse chutes could be communicated to citizens in order to close refuse chutes as it was done in Sweden.

4.6.1 Interpersonal Communication

Interpersonal communication approach with principles described in LA was used in almost all projects. In Saint Petersburg, it was done by the volunteers of Green Peace who knocked on each door, presented the project, delivered information materials and could answer arising questions. However, project managers concluded from observations that door-to-door communication with residents almost did not have influence on the level of participation in source waste separation and that such promotional materials as posters, leaflets and advertisements in mass media are more efficient (Babanin, 2003).

Kharkiv municipality uses interpersonal communication not on the stage of informing about activity, but in public surveys. For such promotions they employ students studying environmental sciences. The questionnaire is delivered to mailbox several days before visit of promoters so residents could fulfil survey and prepare their questions if there are some problems. During visit promoters collect questionnaires and talk to people whether they need some assistance. If household does not participate, students try to help them overcome barriers and persuade to take part in the project.

A report from the Kiev project concludes that emphasis in public education should be put on employees of housing organizations and waste collection companies.

The analysis of the interpersonal communication in section 2.6.1 showed that different municipalities report on the effectiveness of this tool differently. In Ukrainian and Russian projects the reflections of communication teams also report different results. While Saint Petersburg has not found the practice worthwhile, Kharkiv reports on the practice as positive for identifying specific barriers and overcoming them with needed arguments.

Regarding conclusion from Kiev project on the involvement of housing organizations and waste transportation companies in education campaigns - the first one is not justified by stakeholder analyses (section 3.4.3) – housing organization workers are already overloaded with work and additional duties will not add motivation to the source waste separation experiment. On the other hand their understanding of the importance of the activity by housing organization is vital and it is confirmed through successful examples from Kharkiv and the project in Saint Petersburg.

Regarding latter statement, about importance of involving waste collection companies in educational campaigns with population – neither literature review nor any other pilot project confirms this assumption. Employees of collection and transportation companies are even stricter in their responsibilities and time (section 2.6.2) than housing organization workers and since these companies are usually outsourced for efficient waste collection it is not feasible to ask them to become public educators.

4.6.2 Block-leaders and Caretakers

Caretakers have their own responsibilities and before the experiment of source waste separation is introduced, they cannot know about possible effects and rather sceptical about it (Abashina, 2005). However, when it turns out that source waste separation makes their work easier they become more positive. They welcome decisions of residents to close refuse chutes as their work afterwards becomes of a different level – instead of taking out the garbage with risks of diseases they are responsible for keeping the territory around and common places in houses nice and clean.

The LA suggested caretakers as an effective way of promotion of source waste separation. It is justified for the following reasons:

- caretakers are well known people in their areas and people might listen to them and feel guilty for not participation as caretakers in a certain way develop a social norm in society;
- caretakers might be paid additionally or have direct interest in source waste separation for savings on waste transportation and disposal if they are responsible for such contracts.

First of all it is not always the case in Ukrainian cities that caretakers know each household – in big multi-storied houses it is very often that caretakers do not interact with tenants. However, in older houses it is quite common for people to know their caretaker and for the caretaker to know residents. Another aspect to be considered is that the profession of caretaker is not the most respectful one in Ukraine and caretakers themselves might not feel confident to go and talk to people and promote source waste separation as a "social norm".

The observation that caretakers are sceptical on the first stage of the program leads to conclusion that all *initial work* on public education and promotion has to be done by municipality. Only when it is already being run for some time and everybody got used to it, can caretakers correct some mistakes or distribute leaflets for additional payment or through direct incentive based on the quality and quantity of materials separated in particular area.

4.7 Old Habits

Overcoming old habit as a reason for non-participation in the recycling program has been identified in surveys, but it was not found to be significant.

For many people who remember the Soviet collection system of waste paper, metal and glass the recycling program does not bring anything completely new. Although source waste separation is organized in different way, the principle itself is well known. On the other hand, people should overcome the habit of using refuse chutes (discussed in previous section).

Public commitments approach was not used in any of the pilot projects and it is difficult to predict its result. However, public opinion polls and referendums could be used for the same purpose as "public commitments" described in section 2.7.1. The literature review showed

and surveys of pilot projects confirmed that it is very likely that when people are provided with balanced information on different waste treatment options and asked to choose the preferable one, it is very likely that they will point out "recycling and source waste separation". The personal preference could afterwards become a commitment.

4.8 Feedback

As it was found in the LR citizens have to be provided with the feedback and evidences that their efforts are not put in vain and that recycling program really has benefits in form of saved costs, natural resources and landfill area.

Providing feedback information is of high importance in Ukraine. First of all, there is a high dissatisfaction and distrust to local authorities and municipality (discussed in previous sections), which could decrease public belief in positive results of recycling program. At the same time people might participate *more responsibly* since they do not expect municipality to create a well organized program and educational campaign.

Secondly, because there is a high possibility of media instead of forming positive public opinion providing information on problems in the pilot projects on source waste separation to state again that "nothing good is happening in reality" or publishing articles with material recovery facility as a positive innovation which will solve problems with waste in the city.

Literature analysis has shown the importance and effective results from using feedback which could be directly observed (example with compost delivered to recycling centers). As it was already discussed in previous chapters, in Ukraine and Russia with introduction of source waste separation caretakers have more time for cleaning area around and the statement "I separate waste to support cleanliness" is the second major factor for participation. When real benefits from the projects are realized it adds enthusiasm for sustaining or initiating behaviour.

For municipalities it would be a good practice to have official websites on waste management issues; however in Ukraine they will be visited by even fewer citizens than in western countries, where this number is rather low. Moreover, the number of people with computers and access to internet is much lower than in any industrialized country.

The target setting method was suggested as a good approach to get public commitment to participate and to have a basis for the feedback and it could be utilized in Ukraine. Using this method would be even more beneficial if it could motivate housing organization and municipalities as well.

5 Discussion

This chapter consists of two sections. The first section provides with the bigger issues, which were found during the development of case study. The second section will give reflections upon method used in the research, data validity and to which extend the research results could be generalized.

5.1 Bigger Issues

The bigger issues discussed in this section are: (1) municipalities perceptions about source waste separation as an additional barrier, (2) the positive input of International projects on source waste separation in Ukraine and (3) whether there is a possibility for bottom-up initiative on source waste separation in Ukraine.

By analyzing the situation why source waste separation is not widely introduced it was observed that the reason partially lies in the perceived barriers of local authorities which due to certain reasons are less ready to changes, than society. In one case during the personal interaction with municipality the author was given a number of reasons why source waste separation cannot be introduced and at the same time provided with a report on successful pilot project on source waste separation concluding that general public is ready to source waste separation programs.

The level of commitment of municipality also reflects the level of responsible fulfilment of its obligations which will affect the level of credibility and indirectly public participation in the program. Moreover, due to specifics of media any mistake and any fact that "people's time and efforts go in vain" will hinder people from further participation. To gain credibility again could be much more difficult.

So do pilot projects organized by international organizations contribute to the change of both general public and municipality paradigm about source waste separation? It is difficult to underestimate the role of the international projects and support on introduction of integrated waste management systems in Ukrainian cities – all source waste separation experiments were supported by international foundations. Even in Kharkiv municipality, which does not receive any sources from international funds now, the first experiment was based on the requirement from EBRD and only after some years source waste separation was initiated by municipal waste management company. Such initiatives aim to assess public readiness to source waste separation, ways to introduce and promote new practice and provide municipalities with recommendations on source waste separation introduction. Another important goal of this cooperation is to motivate municipalities to introduce source waste separation afterwards as their own practice.

Comparison of 3 pilot projects – in Kiev (DANCEE), in Kharkiv (municipality), in Donetsk (TACIS) showed that results on the levels of public participation vary, but not to a very large extent[19]. The projects supported by international organizations have more financial resources and, thus, promotional materials are of higher quality and variety, with presents, public events and teams of NGOs to help in educational campaigns. In contrast, Kharkiv municipal waste management company has less financial resources, the educational work is organized by only one environmental manager, who develops promotional materials, organizes seminars in schools, kinder gardens and housing organizations.

[19] Validity of the data is discussed further

From this observation two conclusions could be made. First is that people welcome initiative itself and do not expect high quality promotional materials, souvenirs, events and lotteries. They are very aware that municipality have scarce resources and do not expect high level advertising on source waste separation.

Second is that organizing promotion campaign on a very high level probably does not motivate municipality. They cannot afford involvement of the team of professionals and assure high quality promotional materials and, thus, perceive the results from pilot project as not achievable by themselves. This leads to underestimating possibilities to gain public cooperation.

From the public perspective, there are also a number of factors which create unlikely conditions for grass-root initiative for source waste separation. The public knowledge on waste related issues was found to be rather low, while the majority of public mass media sources do not cover waste issues for creating a public opinion in favour of source waste separation. It is more often, that information of material recovery facilities is presented as something positive. NGOs, which could play important role in "watching the government decisions", could comment more on the material recovery facilities developed, however NGOs in Ukraine are not so active on this issue. Some changes could be achieved by institutional restructuring of the present housing organisations when there would be interest in lowering the costs of municipal services. There are also discussions that households by themselves could take over housing organizations and organize municipal services directly. This case could have a strong impact on possibility of creating community managed system for source waste separation.

5.2 Reflections upon Method Used

The framework for analysis was based on the full scope of barriers to source waste separation. Each factor was provided with relevant communication tools and reflections upon their use in municipalities. Developed framework was then applied to Ukrainian case and proved to be useful since it covers the entire scope of individual barriers to source waste separation with relative communication tools.

One of the limitations of the research was that successful examples in one municipality could have completely different impacts in another one and therefore it is difficult to define the factor of "success" of each of the tools and analyse its applicability in Ukrainian context. The examples are taken from the countries with very different cultural and social systems, but nevertheless, majority of communication tools have similar application characteristics.

One of the identified factors – lack of personal incentives – presented not only communication approaches, but also regulatory measures and financial incentives. Since personal incentives play an important role in the process of taking decision to participate, author kept the entire range of incentives. However, the technical possibilities of introduction of "pay as you throw" or other differentiated waste fee system were not examined deeply. The conclusions on the financial incentive were based on the public participation in present private collection system for recyclables, pilot project results and survey conducted by author. Moreover, the community incentive, such as cleaner district and investments in local infrastructure could have much stronger implication on the level of public participation in source waste separation.

The survey carried out on the news website was useful since it captured large audience and got high number of answers. However, the audience of the website is to large extent from Kiev with people of "more than average income" and cannot be generalized to all Ukrainian

population. Nevertheless, all results from other projects showed the same level of agreement to participation in source waste separation which verifies the readiness of Ukrainian citizens to source waste separation.

The approach of analyzing existing pilot projects rather than carrying out new survey proved to be an appropriate choice since the information was sufficient and covered different issues.

Data validity

With self-reported behaviour there is always a risk that respondents – deliberately or undeliberately – adjust their answers according to how they would like their behaviour to be or how they would like to be seen by others (NRWF, 2004). There is no way of controlling this bias and presented projects also have this problem.

Some suspicions could be given to report on pilot project on source waste separation in Kiev – the efficiency of sorted waste is not higher 50%, however the survey shows that 87% separate waste. Probably this could be explained with argument from previous passage. However, all reports have the same tendency in results, which guarantees to certain extent data validity. Another issue about Kyiv report is that the most important factor perceived by NGO representative was not even mentioned there – that people were constantly asking for a system which would assure lower costs for municipal services.

It could be contradictory to judge objectively municipality perceptions and barriers to source waste separation and generalize it, since whatever is said is not always corresponds to policies and programs implemented. However, the observations and personal interactions with a number of representatives show similar tendency and confirm arguments stated in the research.

To which extent the results of the study could be generalized?

One could question whether people from only big cities are ready to source waste separation or it could be a practice for small cities as well. The experiment of Tacis projects, which have organized source waste separation not only on Donetsk, but also in 2 small cities from the region, have shown that people from smaller cities are also ready for source waste separation practice.

The case was carried out in Ukraine, however due to similar conditions in Russia and Belarus it was assumed that results could be generalized to these countries. This was confirmed through analyses of pilot projects from these countries which have shown similar results of public attitudes to source waste separation and perceptions of authorities.

Some results from the analyses are very specific to case countries, however the personal interaction with representatives from Poland, Czech republic, Lithuania and analysing research on waste management for Georgia and Armenia[20] have shown that these countries have similar barriers and thus the research could help them and other countries with transition economy to build a communication strategy and not to follow the misleading track or omit important factors in organizing of this practice.

[20] Master Thesises in IIIEE

6 Conclusions and Recommendations

This chapter presents conclusions of the research, provides with recommendation on the planning on source waste separation programs and organising public communication campaigns and gives suggestions for further research.

6.1 Conclusions

Over last years waste became as issue of high concern in Ukrainian municipalities due to the higher amounts of waste generated and lack of waste treatment facilities. Although recycling is recognized in national legislation and there is a demand for secondary raw materials, only 5% of potential material is recycled. The present private collection schemes for recyclables cannot reach higher levels since the monetary value of brought materials is not a sufficient incentive for households. The material recovery facilities organized by private sector are not efficient since materials received after mechanical separation of waste are not taken by recycling companies since their quality is low.

Source waste separation could be a solution to the problem of shortage of waste treatment facilities and also as a more environmentally sound waste management option. However, source waste separation is not being implemented on a large scale in Ukraine. Interviews and observations helped to identify the two main barriers to wide introduction of source waste separation in Ukraine: (1) lack of recourses to introduce source waste separation infrastructure and (2) challenge of gaining public participation in source waste separation. The arguments behind the latter one are: low public awareness on waste related environmental issues; need for long-term educational programs; need for cooperation with housing organizations and caretakers and the fact that more than 80% are multi-storied houses with refuse chutes which are more convenient for residents than going downstairs for waste disposal.

The results from pilot projects have shown that it is possible to overcome the stated barriers and gain public participation in source waste separation. All reports and surveys organized during source waste separation experiments and the survey organized by author on biggest news website in Ukraine show that majority of residents are ready to participate in source waste separation. Moreover, the experience from Kharkiv municipality shows that source waste separation could be financially beneficial to housing organizations, caretakers and even households.

Although Ukrainian population has a positive attitude to source waste separation and ready to try new practice there are a number of barriers which could influence personal decision and commitment to practice of waste separation. Thus, a continuous and coordinated work should be organized tackling a number of factors and employing various communication tools.

6.2 Recommendations

This section presents the main findings on various factors for public participation in source waste separation and recommendation on the use of communication tools, which are classified as primary tools, additional tools and least efficient. Since some communication tools could be utilised for more than one factor, each barrier will be presented with all relevant communication approaches.

Environmental knowledge and awareness

Environmental knowledge of population on waste issues and its negative impacts was found to be rather low which creates an "out of eyes out of sight mentality".

The primary communication tools to eliminate this barrier are (1) organizing surveys with background information as a form of participation in decision making process, since provision of balanced information could raise awareness and help people to realise their role in problem resolution, (2) organising school education, however only in districts where source waste separation is introduced and (3) involving mass media. The important aspect is that the information should be presented in a way to target both responsibility feelings and citizens' role for problem resolution showing how they can contribute.

Additional communication tools are calculation of ecological footprint – to show the personal impact on environment, exhibitions aimed to shift "paradigm of waste" to "resource", visits to recycling facilities or video showing how recycling facilities works. Providing straightforward environmental information in promotional materials for source waste separation to general public and visits to landfills are less efficient communication tools.

Responsibility and perceived ability to contribute to the problem
The analysis has shown that people do not perceive their responsibility on the resolution of problem with waste and consider it as an authority responsibility. However, the majority has a positive attitude towards source waste separation and believes in beneficial effects of source waste separation on waste management situation and that waste separation and their participation will help to solve problems with municipal solid waste in the cities.

"How to separate" knowledge
The primary communication tools for this type of information are distributed informational materials and posters on containers, which have to be easy to understand, visually presented and contain less text information.

Personal incentives and benefits
The main feasible incentives for source waste separation found are (1) "contribution to the cleanliness of the district"; (2) investment of the profits from selling the recyclables into local infrastructure and (3) civic pride and desire for a better future as non-material incentives. Personal financial incentives through "pay as you throw" system and regulatory measures are least efficient for Ukraine since it is difficult to design such system and enforce it.

Social norms
Social norms could be increased with the provision of the results of surveys reporting that the majority of the tenants support source waste separation could shift the personal opinion that other citizens are not willing to participate and indirectly increase individual commitment. Social and environmental advertising, which is almost absent now, prompts, posters on the entrances to houses and public events should be utilized to educate what is the accepted behaviour in society towards source waste separation and community.

Perceived barriers about situational factors
The two main situational barriers identified are lack of space in the kitchen and refuse chutes in the multi-storied houses. However it was found that many people already keep paper and glass bottles aside.

Interpersonal communication and involvement of caretakers are appropriate communication tools to help people arrange their source waste separation in an easy way and also identify and overcome other barriers. However it is more practical to use these tools on the later stages of the program. Video modelling on how to arrange easy source waste separation could be utilized in the case of wide source waste separation program; while involvement of waste collection crew are less efficient tools.

Old habit
The basis for changing old habit is presence of refuse chutes in multi-storied houses and factor of "forgetfulness" to carry out new habit. Public surveys asking for most preferable waste treatment options could serve the purpose of "public commitments". It is likely that people make choice in favour of source waste separation and perceive it as a personal norm afterwards. The prompts, posters on containers and on the entrances to houses could also serve as reminders for source waste separation.

Feedback
Providing feedback information is of high importance in Ukraine. Thus, municipalities should provide citizens with achievements and proofs that their participation really helps to solve problems with waste in the cities. The possible benefits of source waste separation - cleaner district area or investments in local infrastructure are efficient ways of observable feedbacks to community. The method of goal setting and internet could be used as additional tools for feedback planning and provision.

The summary of recommendations is presented in the Table 3. The first column presents the main aspects of factors influencing behaviour which have to be targeted in Ukraine. The next three columns present relative communication tools classified as primary, additional and less efficient.

Table 3 Factors influencing participation in source waste separation and relevant communication tools: primary, additional and least efficient.

Aspect of the Factor	Primary tools	Additional tools	Less efficient tools
Lack of environmental knowledge and awareness			
Threat information; Observation of environmental destruction	Media; School education; Participation in decision making through surveys	Visits to recycling facilities; Video about recycling facilities; Ecological Footprint; Exhibitions to change "waste paradigm"	Visits to landfills; Participation in decision making through public hearings; Straightforward environmental information
Lack of responsibility and perceived ability to contribute to the problem			
Feelings of responsibility; Belief that each effort counts	Almost all communication tools		
Lack of knowledge on "how to separate"			
	Distributed informational materials; Posters on containers; Recycling centers	Interpersonal communication; Prompts for the kitchen	
Lack of personal incentives and benefits			
"To keep district clean"; Investments in local infrastructure; Non-material: desire for a better future and civic pride	For non-material almost all communication tools	Monetary rewards and lotteries	
Weak social norms			
Conformity; Compliance	Advertising; Prompts; Public events and celebrity involvement	Caretakers	
Perceived barriers about situational factors			
Space; Refuse chutes; Number of fractions to separate; Containers proximity	Interpersonal communication; Caretakers	Video-modelling	Waste management crew
Old habits			
Forgetting; Commitment	Advertising; Prompts		Public Commitment
Insufficient feedback			
	Media; Distributed informational materials	Setting targets	Internet

6.3 Further research

During the research on communication in waste management several areas were found which could be developed into further research.

The first suggestion is coming from the assumption that *brands* often can put a message through to its audience in a more effective way than, say, a government department. There are some examples when popular brands such as Coca-Cola, Nike and McDonalds use marketing ideas with parallel promotion of sustainability issues (Wright, 2002). While governments run campaigns with "no significant impact or not one that anyone noticed, brands could do a better job" (Wright & Earle, 2002). Then, supermarkets and shopping centers are considered in theory as effective places to put messages (McKenzie-Mohr, 1999), but still there are not so many examples how it might work in practice. Thus, there is a need for research which will identify the factors in favour of involvement business organizations for promotion of sustainable behaviour, the barriers for companies to not doing so and advantages in case of involvement.

The second suggestion for further research is analysing the wide scope of various actors which could be engaged in promotion of waste separation practices. An engagement process may include a great number of stakeholders, ranging from NGOs, Research Institutions, Media, Universities, Schools, or even Religious organizations. The analysis of particular role of each of the actors and the ways of involvement could help municipalities to enhance the promotion campaigns for waste separation.

Another suggestion for research is, based on already identified framework for factors influencing behaviour, to look at other pro-environmental practices such as water conservation, energy conservation, use of public transportation etc. and to suggest the most appropriate communication tools.

Finally, methods for waste avoidance and whether it could be achieved by communication need more investigation. By analysing communication strategies of various municipalities it was found that they lack information on how to teach citizens to consume wisely and, thus, generate less waste.

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Abbreviations

CBSM	Community-Based Social Marketing
DANCEE	Danish Environmental Assistance to Eastern Europe
EBRD	European Bank for Recon
EPA	Environmental Protection Agency
GAP	Global Action Plan
GDP	Gross Domestic Product
GNI	Gross National Income
HO	Housing Organization
IBGE-BIM	The Brussels Institute for Management of the Environment
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
NGO	Non-Governmental Organization
OECD	Organization for Economic Cooperation and Development
WM	Waste Management

Appendix 1 Questionnaire and Screen Shot from Korrespondent.Net (15 July 2005)

What is your opinion about introduction of separate collection of glass, paper and plastic in households?

- I am ready to try for environmental reasons
- I need more information why we need to separate waste
- I have more important problems rather that waste
- Ready only in case of additional financial reward