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THE „MIX" WASTE SEPARATION PROJECT ORGANISED BY THE ASSOCIATION OF MUNICIPALITIES „DOLINA REDY I CHYLONKI"

1. Introduction

The Association of Municipalities "Dolina Redy i Chylonki" (KZG) was established by six Pomeranian communities: Gdynia, Reda, Rumia, Wejherowo, Sopot and Kosakowo based on municipal government regulation. The names Reda and Chylonka come from the river and the stream that cross the area of the KZG association. The basic aim of KZG is to focus on the public duties of the member communities connected with environmental protection, water supply, sewage disposal and heat supply. In 1990 the authorities of the six communities decided to gather, in order to undertake activity more effectively and on a larger scale. The KZG association gathers six communities which cover an area of 85 km^2 with over 400 000 people living there (see Table 1).

Table 1. The communities belonging to KZG

Community	Amount of inhabitants	Area [km^2]
Gdynia	250,000 (61%)	136
Sopot	46,700 (12%)	17
Rumia	39,500 (10%)	30
Reda	15,000 (4%)	26
Wejherowo	48,000 (12%)	26
Gmina Kosakowo	4,600 (1%)	50
Total	403,800 (100%)	285

Waste is currently disposed at the existing dumpsite at Łężyce. The main project, which has been conducted since 1997 in KZG, is a modern waste management system based on a West – European model. It is called "MIX" – it consists of collecting glass, plastic, paper, green waste and hazardous waste. Recycling turns materials that would otherwise become waste into valuable resources and generates a host of environmental, financial, and social benefits. After collection, materials are separated and sent to facilities that can process them into new materials or products. The program was started on a small area including one district in Gdynia. In 2001 the project was extended on wider area and included 170,000 inhabitants. In this year, 2002, the project is being realised over the whole area of KZG. By exploring public opinion, we found out that 90% of the population is in favour of the project. It is assumed that the dumpsite at Łężyce will be closed in the near future and be replaced by a waste treatment plant, including various measures on reuse and recycling, followed by a modern landfill for the disposal of remaining types of waste. The final element of waste management in KZG is ZUO (Zakład Utylizacji Odpadów) – "Waste Treatment Company". This company has been responsible for the provision of technical infrastructure and the setting up of the Łężyce II waste site and its management following the completion of the building works. The company co-operates closely with KZG, which is responsible for the collection and transportation of waste. ZUO is mainly financed by the EU and Fund for Environmental Protection Foundation in Gdańsk. The "MIX" project is a practical attempt to realise European directives.

2. The strategy of the project, organisational and technical realisation

2.1. Selective waste management

In the KZG area selective waste management is organised using a system of containers. Coloured containers are situated in the city near houses, blocks of flats and schools. The containers are divided into:

– Red ones – for plastic, for collecting: PET bottles, foil LDPE, packaging of household goods.

– White ones – for paper, for collecting: magazines, books, cardboard etc.

– Blue ones – for glass.

On each container information is provided about what we should put in and what we must not put in. We can also find there the names of waste disposal companies. The containers should be emptied twice a month, or more frequently when necessary. The segregated waste collected in the city is transported to a simple sorting plant, which is situ-

ated near to the waste dump in Łężyce. After more precise sorting the raw materials are sold to be reused.

Table 2. Number of containers for separate collections

Year	KZG (403 800 inhabitants)	Gdynia (250 000 inhabitants)
	containers	
1998	724	315
2001	1191	474

The bag system is only conducted in two districts of Gdynia, in a very small area of Sopot and in Wejherowo. Each family (who wants to segregate) can get free coloured bags for three types of waste. The bag system is analogous to the container system, due to the colours. The segregated materials are taken once a month on the second Saturday of each month. In exchange for full bags people get new ones.

Secondary materials management. After separating and cleaning in the sorting plant in Łężyce the secondary mateials are taken by:

- Plastic materials:
  - PET bottles – taken by ELANA – PET from Toruń.
  - Foil LDPE and packaging of household goods – taken by Trumwirat from Czernin near Koszalin
  - Screw caps – Plastopak from Wejherowo.
- Cullet/broken glass: Krynicki company (delivered to glassworks in Wyszkowo).
- Paper is collected in containers of about 35 m^3 and taken by Regional Company for Recyclable Materials (Okręgowe Przedsiębiorstwo Surowców Wtórnych).

Table 3. Number of people involved in the bag systems

City/district	Amount of people involved
Gdynia Orłowo	7 200
Gdynia Witomino	2 400
Gdynia Mały Kack	6 400
Sopot	4 190
Wejherowo	20 000
Total	**40 190**

– In the case of huge amounts of paper gathered in Łężyce we call other firms such as "Złomowiec".

2.2. Hazardous waste – selective collecting

Households often discard many common items such as paint, cleaners, oils, batteries, and pesticides, that contain hazardous components. Left over portions of these products are called household hazardous waste (HHW). These products, if mishandled, can be dangerous to health and the environment.

Detour system. The detour system is organised in Gdynia, Sopot, Reda and Kosakowo. A special car with containers for hazardous waste travels through the district and takes hazardous waste from inhabitants. The car is equipped with a characteristic signal and a sign informing what kind of waste the car takes. This is organised once a quarter, always on a Saturday.

The inhabitants of Rumia and Wejherowo may bring hazardous waste to a stationary point called PZON (see the stationary system). Of course people from Gdynia, Sopot, Reda and Kosakowo may also use PZON. If they do not want to wait three months for the special car, they can bring it to the stationary point in Rumia or Wejherowo on their own.

The following are among the most common hazardous domestic waste: paint and varnish containers, organic solvents, batteries, accumulators, used oils and out of date medicines.

Stationary system. The stationary system contains three elements:

– Medicines are collected in chemist's shops (85 containers in the whole area of KZG).

– Batteries – collected in schools (115 containers – whole area of KZG).

– PZON (Punkt Zbiórki Odpadów Niebezpiecznych – 'Dangerous Waste Selecting Point'). PZON is a huge container, which contains 10 smaller containers for hazardous waste, such as. one container is for batteries, one is for oils, one is for paint tins etc. It is important to collect each kind of hazardous waste separately. One person is in charge of it and takes care of security all the time. There are two stationary points (PZON) where people can bring hazardous waste at any time they want. They are organised in Wejherowo and Rumia.

All hazardous materials collected are delivered to the firm "Verso" in Gdańsk, where different types of waste are separated for further utilisation.

2.3. Green waste

This type of waste includes: leaves, grass, branches from private gardens or allotments. Collection is organised twice a year: spring (April) and autumn (October). The waste disposal company places containers for green waste in Gdynia, Reda and Rumia. This system is going to be applied on a larger scale, as it is not sufficient at the moment. Green waste is composted in Łężyce and the compost obtained is used in the reclamation of waste disposal in Łężyce.

In the near future KZG would like to make modifications of the system. It is necessary to begin collection of kitchen waste (bio-waste). This is a very complicated issue, and it will take a few years before kitchen waste collection will function properly.

2.4. Results

Table 4. Amount of selected materials collected and delivered to the waste disposal in Łężyce [t]

Type of waste	1998	1999	2000	2001
Separated waste	339	521	892	1145.2
Plastic	60	66	108	138.4
Paper	110	193	391.5	582
Glass	169	262	393	424.8

Table 5. Amount of hazardous waste collected during 8 months (from April to November 2001)

Type of waste	Total [kg]
Paints, glues, resins	766
Solvents	2
Insect repellents	52
Fluorescent lamps, mercury containing waste	17
Batteries	591
Accumulators	2 854
Medicines	25
Used oils	366
Packages after aerosols	15
Acids	106
Adhesives	67
Total	**4 861**

Table 6. Comparison of the stationary system and detour system in Wejherowo

Type of waste	Detour system (November 2000)	Stationary system (September 2001 – January 2002)
Batteries	92 kg	6 kg
Accumulators	35	23
Paints	101 kg	20 kg
Oil packages	1	—
Used oil	93 litres	—
Solvents	12	—
Fluorescent lamps	216	7
Insect repellents	—	4 kg
Medicines	10 kg	10 kg
Chemical reagents	1	—
Thermometers	4	—
Photographic reagents	10 kg	2 litres

There was a huge discussion of whether the detour or stationary system is better. KZG had the opportunity to compare these systems in Wejherowo. It seems that the detour system is more efficient. It also has an educational role. It is better when once a quarter something happens in a district, people notice the car and hear the characteristic signal.

2.5. Informative activities and education

It is very important to provide good information. Therefore we, take great efforts in creating good information. Each inhabitant receives a letter and a leaflet about separating waste, a schedule of ours activities and other information. We also contact housing administrators. They help us and place the posters or other information on staircases. All the information is also published in newspapers (three titles) and people can hear about it on the radio. Each year we ask people for their opinions and suggestions, which helps us in projecting next year's activities.

The second main activity in KZG is education. Educational projects are organised for children, youth and teachers all year round, including ecological trips, competitions and workshops.

3. Conclusion

Recycling prevents the emission of many greenhouse gases and water pollutants, saves energy, supplies valuable raw materials to industry,

creates jobs, stimulates the development of greener technologies, conserves resources for our children's future, and reduces the need for new landfills and combustors.

The KZG region is seen as one development for which a new and expanded waste management system is necessary. In order to satisfy public health and environmental criteria, there is a need for major investments in the improvement of waste treatment and disposal facilities.

However, it will not be easy to change the habits and attitudes of people, who are often simply indifferent to the link between throwing a plastic bottle or paper packaging onto the pavement and the quality of our life in general.