

Re-value of Municipal Waste – Strategic Approach

I. Sztangret and K. Bilińska-Reformat

Abstract—Municipal waste is a tool for building a pro-social image strategy by creating the conditions of social well-being in a strategic time perspective, especially thanks to the applied processes of the biological-mechanical processing and the closed-circuit economy. But, in the new approach, municipal waste is connected with the notion of “re-use” or re-consumption. It can be stated, that waste value is built in a system of relations between the market entities, the secondary market, business entities, and the involvement of government and non-profit organizations. Therefore, the aim of the article is to demonstrate the value of municipal waste, built through involvement of many entities and technologies. Especially, the strategies of building re-value by trade, on domestic and global scale is the main area of interest of the authors. In the article, conceptual and qualitative research methods of empirical research (case study), mainly were used. The results of the research show that the effective waste management and the subject of research - municipal waste has a strategic value and it is certainly a tool of implementation of the concept of social marketing. The research on the issues of strategic aspects of municipal waste in re-value perspective opens up a wide field of possibilities, that have not been sufficiently used, especially in the relations of primary and secondary market entities, firms of the sector under review and “re-life/re-use” points/trade.

Index Terms—Waste management sector, re-cycle, re-value, re-use.

I. INTRODUCTION

The concept of creation of municipal waste re-value fits well with the idea of sustainable development which is also referred to with the notion of green development or eco-development. It is the concept of economics that assumes the level and quality of life on the level guaranteed by civilizational development in a given time. The concept of sustainable development is summarised in the first sentence of WCED (The World Commission on Environment and Development also known as “Brundtland Commission”) report of 1987 - “Our Common Future”: “*On current level of civilization, sustainable development is possible. It is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*”. The definition is based on two key notions: **the notion of “needs”**, in particular the essential needs of the world's poor, to which overriding priority should be given; and the **idea of limitations** imposed by the state of technology and social organization on the environment's ability to meet present and future needs. The content of the

report suggests that achieved level of civilisation can be maintained on condition of appropriate management in the sphere of economics, environment and social well-being. According to the opinion of the Club of Rome included in “The Limits to Growth”, taking care of sustainable development in all spheres of life and human activity is necessary to secure further existence of life on Earth and the possibility to meet the essential needs of all the people and future generations. It arises from the definition included in the norms and documents of the United Nations that: *sustainable development of the Earth is the development that meets the basic needs of all the people and conserves, protects and restores the health and integrity of the Earth's ecosystem without compromising the ability of future generations to meet their own needs, without going over the limits of long-term capacity of the Earth's ecosystem* [1]. Thus, sustainable development represents such economic growth that leads to social cohesion and improvement of the quality of natural environment [2][3]. In Poland the principle of sustainable development is included in art. 5 of the Constitution of the Republic of Poland [4], and the definition of sustainable development is comprised in Environmental Protection Law in the following wording: *[it is] such socio-economic development in which the process of integration of political, economic and social actions occurs at conservation of natural balance and persistence of elementary natural processes in order to guarantee the possibility of meeting basic needs of specific communities or citizens of both contemporary generation and future generations* [5].

Therefore, implementation of 5R concept (Table I) (*Refuse, Reduce, Reuse, Repurpose, Recycle*) [6] that corresponds to approaching municipal waste in a qualitatively new way is a desirable and reasonable activity sustainable development.

This new waste quality and thus strategic value, first of all represents reduced amount of waste, but also the value satisfying the needs of aware eco-consumers and unsatisfied demand of customers of price (low) segment.

II. RECYCLING IN THE LIFE OF MUNICIPAL WASTE AS A WAY OF CREATION OF ITS RE-VALUE ON MARKET. RE-VALUE STRATEGIES

Under the European Union directive on waste, (Directive 2008/98/EC of the European Parliament and of the Council of 19th November 2008 on waste repealing certain Directives OJ 2008 L 312, of 22nd November 2008) concerning European Union-wide targets in the sphere of prevention, processing and disposal of waste until 2020, “**reuse of the waste**”, means any operation by which products or components that are not waste are used again

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for the same purpose for which they were conceived. On the other hand, preparing municipal waste for reuse means checking, cleaning or repairing recovery operations, by which waste, products or components of products that became waste before, are prepared so that they can be re-used without any other pre-processing operation. In art. 17 of the law on waste of 2012 preparing for re-use was given a preferred status, i.e. an operation that in the waste hierarchy appears before recycling and other forms of waste recovery. Types of products collected in waste collection points include furniture (sofas, chairs, wardrobes, poufs and tables, bookcases and desks), electrical and electronic equipment (TV sets, printers, lamps, coffee machines, small household equipment, i.e. blenders, food processors, waffle-iron, irons, vacuum cleaners, juicers, computer monitors),

toys (puzzles, stuffed toys, board games), carpets, rugs, lining, utensils, pottery and glass products, pots, sport equipment (bicycles, small bicycles, skis, rollerblades, skates), books, comic books, CDs, as well as various things collected as part of the action for people in need in social welfare centres. Larger amounts of ceramic tiles, wallpapers, veneer, etc. that have not been used during renovation works, doors, bathroom fittings (washbasins, toilets, bathroom tap fixtures, shower-baths, baths), etc. that were removed but their condition allows for their further use can also be collected. Re-use of waste allows to “extend product life-cycle” – i.e. its **recycling in market life-cycle** through its re-use by the same user or another user for the same or other purposes that are result of waste compilation (value assembly) by the very customer.

TABLE I: 5R CONCEPT – PRACTICAL APPROACH

Refuse	Reduce	Reuse	Repurpose	Recycle
- say no - refuse - do not buy	- reduce shopping to meeting necessary needs	- use again	- use in a creative way - look for a new application of the product	- segregate and recycle
"Say no to plastic grocery bags", "Refuse to buy harmful products, like cleaners", "Refuse to buy GMOs", "Say no to single use plastic"	"Do you really need the latest smart phone?", "Reduce the amount of energy you use to heat your home by getting an energy audit"	"Replace any single use items with reusable ones – like reusable grocery and produce bags, reusable water bottles, travel mugs",	"Pretty up a regular old cardboard box to use as storage"	„Recycle all the basics you can – paper, plastic, metal, and glass“, “Recycle ALL fabric – even stained or ripped clothing“, "Recycle all electronics"

Source: Own case study

TABLE II: STRATEGIES OF MUNICIPAL WASTE RE-VALUE IN PURPOSE-USER DIMENSIONS

		intended use	
		previous	new
user	previous	strategy of renovated waste	strategy of building awareness in the process of knowledge diffusion and / or strategy of waste modification
	new	Strategy of exchange of used product and / or the strategy of an active approach to unsatisfied demand (active analysis of market absorption)	strategy of building awareness and / or modification of waste for implementation of active approach to unsatisfied demand

Source: own case study

III. STRATEGIES OF MUNICIPAL WASTE RE-VALUE

Re-value strategies resulting from combination of dimensions of intended use and user category have at least fourfold nature (Table II). They all correspond to the 5R concept (Refuse, Reduce, Reuse, Repurpose, Recycle).

Strategy of renovated waste mainly includes promotion of repair, servicing and renewal of products by their owners before their final disposal. These actions can be taken by the very product owner or they can be referred to service centres established for this purpose. **Strategy of waste exchange and/or strategy of active approach to unsatisfied demand** is noticed especially on the market of household appliances, radio and television equipment, computers, furniture and bicycles. “Give or take” days, “Second hand banks”, street markets, exchange on Websites are only few forms of implementation of the strategy. Its

realisation also takes the form of the networks of furniture renovation, repair of electronic equipment, refrigerators and bicycles, that within the active approach to unsatisfied demand, are given to families with little income, or are sold after being renovated, to customers with low income. Such re-sale can be organised on an inter-municipal scale in the form of “exchange and re-sale centres”. To make the projects self-sufficient, re-sale of majority of recovered equipment is recommended, but at relatively low, attractive price. Furthermore, in this way customer’s discomfort associated with being a beneficiary and the situation in which donated equipment soon proves to be under-valued waste are avoided. Food banks also perform a role in implementation of this strategy as they prevent waste and the phenomena of hunger in some social groups. **Strategy of building awareness in the process of knowledge diffusion and/or strategy of waste modification** is largely

based on pro-ecological initiatives aiming at shaping social attitudes and behaviours that are compatible with the assumptions of the policy of waste amount reduction. Customers' attitudes of "zero waste" character, expressed by highly creative way of giving a second life to products perceived as waste through combining, assembly, reduction, etc. support implementation of this strategy option. The strategy of building awareness and/or modification of waste for realisation of active approach to unsatisfied demand comprises actions referring to customers who intentionally provide themselves in second-hand centres regardless of their financial status. Eco-convictions of customers determine their buying behaviours. The so-called Banks of wood established for recovery of wood from construction sites for the purpose of re-use for the needs of household woodwork, sculpture or as fuel, also programs of "rests of paint recovery" that appropriately mixed can offer a new quality are examples of forms of the strategy implementation.

IV. REUSE POINTS AS ENTITIES ON MUNICIPAL WASTE MARKET

Strategies described before, implemented by **reuse points**, and organised as a separate strategic business unit at PSZOKs (Points of Selective Collection of Municipal Waste) comprise specific activities forming the **process of reuse of products** recognised as waste. They include:

- waste collection;
- waste storage;
- checking whether collected waste is suitable for reuse without the need of service or repair;
- isolation, from the stream of waste, of products that are suitable for re-use (without the need to service them or repair);
- execution of necessary actions within the process of preparation for re-use in the case of waste that needs service or repair. These activities include product servicing through actions such as corrosion protection, waxing, repair of damaged products through exchange of damaged elements, puttying, riveting, drilling, welding and grinding,
- storage of products intended for re-use;
- selective way of storage of waste produced as a result of processing.

Preparation for re-use can take place outside installations and appliances. Such form of waste recovery is permitted under art. 30 section 3 and 5 of the act on waste of 2012 as well as regulation on waste recovery outside installations and appliances (amendment to regulation, section 2) [7]-[10].

Due to realisation of the elements of the process described before, organisational structure of re-use plant can take functional-market form (Table III).

TABLE III: RE-USE PLANT (RPU) ORGANISATIONAL MATRIX

Functional-market, organisational matrix of RPU			
point of access to products segregated from waste stream			
points of renovation of deposited product/waste (service, repair, renovation) for economical customers of low and medium price market	points of collection and exchange of potential waste for economical customer segment	after renovations products are made commercially available on low-price markets or in segments of eco-customers	products directly gained from stream
		for use in unchanged form for customers who are not well-off, or for eco-customers	as components and units of a product for the segment of "assembler"/prosumers

Source: own case study

Obviously, re-cycling in the market product life-cycle by its re-use delays and reduces the cost borne by the environment at production of a given new product purchased to satisfy replacement demand, offers the opportunity to employ people socially excluded or people unemployed for a long time, supports activation of older people, as well as it helps people in need. Thereby it supports implementation of image strategies of a committed entity and municipality.

V. POINTS OF RE-USE AS A FORM OF SUSTAINABLE TRADE. DOMESTIC AND INTERNATIONAL EXAMPLES

Analysis of operating WPGO (Regional Waste Management Plan) for the years 2016-2022 showed that in Poland there are 35 repair points and 74 re-use points functioning at PSZOKs (Point of Municipal Waste Selective Collection) (Fig. 1). However, actually a lot of repair points exist only theoretically (Table IV)

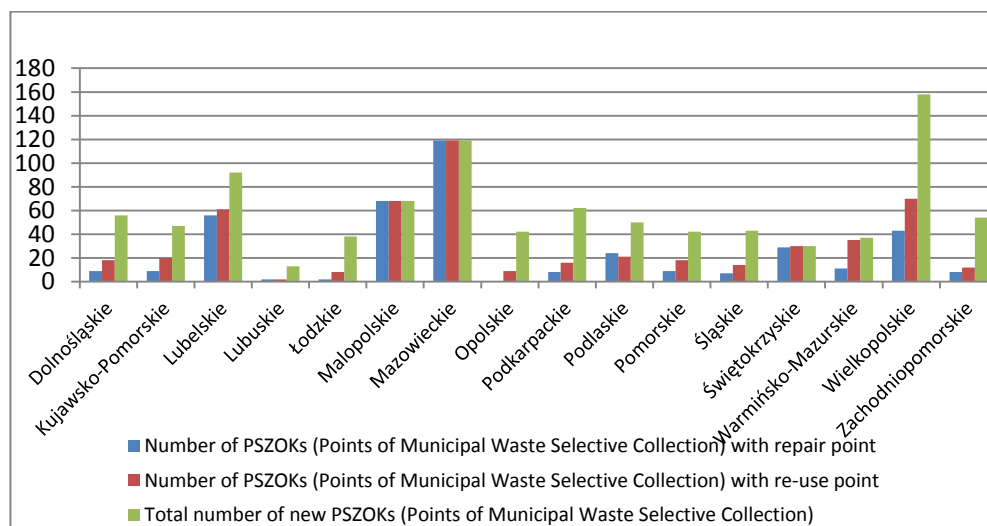


Fig. 1. Planned repair points and reuse points at PSZOKs (Point of Municipal Waste Selective Collection) according to investment plan 2016-2020 in Poland, by voivodeships. Source: [11].

TABLE IV: FORMS AND METHODS OF PRODUCT RECYCLING IN THE SECTOR OF MUNICIPAL WASTE IN POLAND

	barter trade	giving as donation	repair	building ecological awareness	additional services, e.g. café
„Drugie Życie” [“Second life”] Poznań	X				
„Kącik rzeczy używanych” [“Second hand corner”] Słupsk, Stalowa Wola, Gorzów Wlkp.	X				
„Galeria Szpargałek” [“Junk items gallery”] Szczecin	X				
Repair Cafe Piła, Katowice	X	X	X		X
Skład charytatywny Poznań [“Charity storehouse Poznań”], Warszawa, Kraków, Toruń		X			
Internet portals e.g. DIY (do it yourself)				X	

Source: own case study

Within investment plans, municipalities plan organisation of 404 repair points and 531 re-use points for existing WPGOs (District Plan of Waste Management) that will be located next to PSZOKs (Points of Municipal Waste Selective Collection).

Much more intense forms of implementation of the concept of sustainable development by product Recycling,

i.e. not only collection, renovation at PSZOKs (Point of Municipal Waste Selective Collection) and return of products recovered from waste stream to market is presented by the countries of developed economy (Table V). Re-cycling structure is much more complex and diverse which also supports greater market penetration.

TABLE V: FORMS AND METHODS OF PRODUCT RECYCLING IN THE SECTOR OF MUNICIPAL WASTE ON WORLD MARKETS

Austria	Belgium	Sweden	Holland	Great Britain	Hongkong
					Waste Reduction Programs
					Recycling non-profit Organizations
					Community Green Stations
					Community Recycling Network
					E-waste collection Hotline and Collection Service
					Collection Points
					Community Recycling Centres
					NGO Collection Points
Internet forums: WWW.reparaturfeu.ehrer.at, WWW.reparaturnet	Oxfam organisation – network of shops for third world	Avfall Sverige – PR organisation for “zero waste”, Retuna	Government program “Green Deal” for development of	CEX chain – sale of second-hand electronics, Gumtree platforms,	“Hongkong chain Blueprint for Sustainable Use of Resources 2013-

zwerkt.at; Revital Stations, LAVU- organisation working in repair, renovation and sale for non-profit organisations of social character, 48erTandlerWiener markt – market of old items, Tandler-Box	countries; Kringwinkel association, non- profit, 135 stores and 30 repair centres, Foundation for children and homeless people, Vintage Market – 60 markets with second-hand things,	AterbruksGalleria – second life centre and repair centre, Ebbes Horns – church association, Returhset centre with café and eco- food	entrepreneurship in the sphere of “zero waste”, Repair café (800 points in Holland, 1300 in the world)	eBay, 2022” Organisations: Christian Action, Industrial Relations Institute, Salvation Army and others
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Source: own case study based on Internet resources: [12]–[18]

VI. CONCLUSIONS

Certainly, municipal waste as marketing product can be recycled in their market life-cycle. This stage of product life cycle can be realised at involvement of many various entities from the sector of municipal waste, companies, non-profit organisations and governments of states. Strategic value of such product selected from waste stream and returned to market circulation is expressed by profits of Eco-social, business and image dimension of the companies of the sector and their cooperants. However, as suggested by theoretical approach, complexity and systemic character of these actions is difficult, at least in some cases. Re-use points definitely support implementation of 2 among 5 elements of 5R concept, i.e. Reuse, and Repurpose. However, consistent comprehensiveness in this area (5R) of the entities of the sector and their cooperants is not easy. Besides, on this stage of research, the tasks seem to have one-option nature and do not use the whole scope of possibilities. Only some RUPs (Re-use point) establish relationships with the entities in the environment and provide a broader range of services and not only exchange and small repair services, at least in the case of Polish market. It seems, that still poor level of awareness and resulting little commitment to implementation of the concept of sustainable development through Re-cycling in at least some economies and societies make this subject area interesting and worth focussing on in further research.

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