

The European Union's Tacis programme
for Ukraine

CAPACITY BUILDING IN DONETSK OBLAST FOR WASTE MANAGEMENT - UKRAINE

Guideline

Westernization of the collection



This project is funded by the
European Union

A project implemented by



Sogreah



PÖYRY



ADEME

Documents management

Title	Guideline: Westernization of the collection		
Code	070226 Guideline Western Collection E.doc	Date Redaction	26/02/07
Index of Revision		Emitter	Philippe FICHAUX

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1. Context and purpose

The Tacis Programme: "Capacity Building in Donetsk Oblast for Waste Management" is a cooperation and assistance programme associating the authorities of the Donetsk Oblast and the consultants of the consortium Sogreah – Pöyry – Ademe. This programme is funded by EU. The authorities defined as the beneficiary are the State Department of Environment Protection and Natural Resources and the Department of Housing and Public Utilities. The Programme is scheduled from May 2005 to October 2007.

The overall objective is the improvement of the Solid Household Waste Management. The first Tacis Programme (2003-2004) has been concluded by a Regional Strategic Plan that has been adopted by the Regional Council on 25 February 2005. The implementation of the Regional Strategic Plan lies on 2 main tools: a Regional Sanitary Landfills Programme for the disposal of the waste; Local Action Plans for the collection of the waste.

The SHW must be managed by the local self-government bodies: municipalities and rayons. The previous situation is so that it's generally considered that 5 years of continuous efforts are necessary to get a real improvement. These efforts are programmed and coordinated within a Local Action Plan.

As old solutions have not solved all the problems, new solutions have been studied and tested as New Schemes for the SHWM. These New Schemes are described in the present Guidelines.

1.1. Situation

A collection truck shares its working time between the collection by itself (to empty the containers) and the transportation of the waste to the landfill. It fulfils these two different tasks. The necessary time for the trip between the populated areas and the landfill is the same whatever is the load of the truck. The usual trucks in Ukraine have a low load capacity: 2 tonnes for the KO-413 and 7 tonnes for the KO-435-01. It's currently 11 tonnes and more for EU collection trucks.

The collection trucks are associated to specific containers. The EU trucks use the more often roll-containers with a lid. The lid offers the advantage of hiding the waste, limiting the smell, forbidding cats and other animals to sort the waste.



Picture 1: Cat in a container

1.2. Characteristics

1.2.1. From cradle to burial

In waste management it's often said that the fundamental problem is that any object will become sooner or later a waste. So any object must be designed taking into account its life "from cradle to burial".

For the waste management, the question must be considered from the birth of a waste (the decision of the housemaid to put something into the bin) until it's burial into the landfill, or "from kitchen to landfill".

The inhabitants store temporarily their waste at home. The storable quantity is limited. Periodically (if there's no refuse-chute) they have to bring it to the containers. The efficiency is that these containers are easy to access and not too far from home.

The containers are disposed on a platform in a yard (the most common scheme). The platform must be also easy to access for the collection trucks. A platform must be easy to clean. A platform for non-movable containers is not implemented like a platform for roll-containers. The roll containers have a weak point: the rolls. They break often and they must be repaired. The Picture 2 was taken on 13/04/06 and the containers are still in the same state today (25/02/07).



Picture 2 Roll containers

The truck collects the waste: it empties the containers. It carries the waste to the landfill. For the non-movable containers, the truck comes close and the handling arm goes to the container and takes it. For roll containers, workers push the containers to the truck at the handling equipment and then push them back to the platform. The more often, the truck enters in the yards and has to drive on the yard's lanes.

The transportation time depends on the average distance between the collection routes and the landfill, the power of the truck, the state of the roads.

On the landfill, the truck must go until the downloading point, the more often it is on already disposed waste.

So the key parameters for the organisation of a waste collection are:

- Place of the containers according to the path from the entrance doors of the inhabitants;
- Type and maintenance of the containers;
- Design and maintenance of the platforms;

- Capacity of the yards lanes: bearing capacity of the asphalt, radius of the corners, size of the portals
- Type of truck:
 - Load capacity;
 - System of handling;
 - Number of people of the crew;
 - Average speed for transportation;
 - Driving capacity on un-compacted soils.

1.2.2. EU experience

The EU tradition is a door-to-door collection with a crew including a driver and 1, 2 or 3 loaders. People put their personal bin (or bag) at the kerbside the day of the collection. Exceptionally, downtown, there are collective containers in the yards of the buildings (or at the base of the refuse chutes) and it is the job of the janitor to bring them at the kerbside.



Picture 3 Roll containers used in EU

An additional key-factor is the high cost of the labour, so the systems of handling-downloading of the containers in the truck have been developed in aim to reduce at the minimum the work time for these operations. It's why the individual bins (or containers) have been often standardised in a city, the municipality providing (or selling) standard containers to the inhabitants. In some areas, the waste are put in plastic bags (50 to 100 litres) marked and provided by the municipality.

The latest developments are focused on the integration of selective collection with the rough collection. A way is to use bags of different colours according to the material, or plastic caches for paper, plastic packages, etc., in aim to collect simultaneously the rough waste and the sorted waste (Picture 4).



Picture 4 Separate collection of rough waste and sorted waste in plastic bags

In EU, the key parameter is the labour cost: for the waste management in the City of Paris, it's around 25€/hour (wages + social charges). So the goal is the efficiency of the people and the technical progress aims to improve this efficiency. It can be expected that in a next future the energy efficiency will become a second key parameter.

1.2.3. Technical comparison

1.2.3.1. Trucks

Parameter	KO-413	KO-435-01	EU truck	Comments
Load capacity	2 t	7 t	12 t	
Load capacity	7.5 m ³	16.5 m ³	25 m ³	
Load density	267 kg/m ³	424 kg/m ³	480 kg/m ³	
Full weight	4.6 t	18 t	26 t	Bearing ratio of the yard lanes? Bearing ratio on the landfill?
Length	6.08	7.90	11.52	
Width	2.45	2.50	2.50	
Height	3.11	3.47	3.49	
Steering diameter (wall to wall)	18.0	18.4	18.3	Corner radius of the yard lanes?
Speed for transportation at full charge km/h	60	70	85	
Price VATi UAH	105 000	156 000	1 042 000	
			160 321 €	
Power hp	119	230	390	
Fuel consumption Empty l/100	20 (A-76)	28 (Diesel)	29 (Diesel)	
Fuel consumption Full load l/100	26 (A-76)	34 (Diesel)	43 (Diesel)	
Liability & maintenance	?	?	Very good	

Table 1 Comparison of trucks

1.2.3.2. Platforms

Parameter	750 l containers	1100 l roll containers	Comments
Distance to housings			
Distance between container and truck	short	Not determining	
Height of step	Not determining	No step smooth slopes	
State of the ground	Not determining	Smooth	No holes for the rolls
Cost of construction	?	?	Who is the owner of the platforms?
Maintenance	Not determining	Important	Who is in charge of the maintenance?

Table 2 Comparison of platforms

1.2.3.3. Containers

Parameter	750 l containers	1100 l roll containers	Comments
Crew	1 driver + 0 or 1 loader	1 driver + 2 or 3 loaders	
Overload	Can break the arm of the truck	Not determining	
Corrosion resistance	Weak	Good (galvanized)	
Unit cost UAH	250	2 000	
Maintenance	Not determining	Very important	

Table 3 Comparison of containers

1.3. Impact on economy of SHWM

1.3.1. Scenario

In aim to compare the economical cost of the different solutions, it is considered that:

- The collection is done 365/365.
- The truck downloads full containers, filled with a density of 150 kg/m³.
- The platforms have 3 750 l containers or 2 1100 l roll containers.
- The duration of the downloading is 2 minutes for 1 non-movable container and 1 minute for a roll container.
- The trip between two platforms is 200 m. For the fuel consumption, the truck is assessed half-loaded, so it is calculated as ½ empty and ½ full load.
- The distance from the base to the collection area is 3 km.
- The distance from the collection area to the landfill is 10 km.
- The local trucks are stopped 15 days/year for maintenance and the EU truck is stopped 5 days/year for maintenance.

1.3.2. Comparison of costs

On the base of the previous scenario and the following data, the real cost may be composed as Table 4:

Data	Unit cost	Unit	KO-413 + 750 l containers		KO-435-01 + 750 l containers		EU truck + 1100 l roll containers	
			Qty	Cost	Qty	Cost	Qty	Cost
Base to collection		km	3		3		3	
Duration of the trip base-collection		minute	4,5		4,5		3	

Load of 1 container	150	kg	112,5		112,5		165
Load capacity		t	2		7		12
Number of containers per round			18		63		73
Duration of the downloading		minute	36		126		73
Number of platforms			6		21		37
Trip of collection		km	1,2		4,2		7,4
Duration of the trip of collection		minute	3,6		12,6		14,8
Collection to landfill		km	10		10		10
Duration of the trip collection-landfill		minute	15		15		10
Downloading on the landfill		minute	10		10		10
Landfill to collection		km	10		10		10
Duration of the trip landfill-collection		minute	15		15		10
Total time for 1 round			79,6		178,6		117,8
Distance empty per round			10,6		12,1		13,7
Distance full load per round			10,6		12,1		13,7
Number of rounds per day			6		2		4
Number of containers per day			108		126		292
Tonnage collected per day		t	12,15		14,175		48,18
Distance empty per day			66,6		27,2		57,8
Distance full load per day			63,6		24,2		54,8
Cost of the collection							
Truck							
Investment			105 000		156 000		1 042 000
Amortization /year	7	y	15 000		22 286		148 857
Working days of the truck		d/y	350		350		360
Daily amortization		UAH/d		42,86		63,67	413,49
Maintenance							
Per year	8	%	8 400		12 480		
Per day	20	€/d		24,00		35,66	130,00
Assurance							
		/y	10 000		15 000		40 000
		UAH/d		28,57		42,86	111,11
Personnel							
Driver	1000	UAH/m		45,45		45,45	45,45
Loader 1	800	UAH/m				36,36	36,36
Loader 2	800	UAH/m					36,36
Loader 3	800	UAH/m					36,36
Social charges		UAH/d		44,54		80,17	151,44
Fuel							
	3,65	UAH/l					
Fuel consumption empty		l/100 km	20	48,62	28	27,80	29 61,18
Fuel consumption full load		l/100 km	26	60,36	34	30,03	43 86,01
TOTAL FOR THE TRUCK					294,40		362,00 1107,76
Containers							
Investment			27 000		31 500		584 000
Amortization /year	7	y	3 857		4 500		83 429
Daily amortization		UAH/d		10,57		12,33	228,57
Maintenance							
Per year	2	%	540		630		35 040
Per day		UAH/d		1,48		1,73	96,00
Platforms							
Maintenance							
Per year		UAH	1 800		2 100		29 200
Per day		UAH/d		4,93		5,75	80,00
TOTAL CHARGES							
		/d		311,38		381,81	1512,33
		/t		25,63		26,94	31,39

Table 4 Comparison of operation costs

1.3.3. Comments

The comparison is only a spreadsheet of simulation. All will depend on the input figures for the input variables. This example is only one possible case among a lot. Nevertheless, all the simulations we already made conclude that the western collection is more expensive than the usual one.

So, anyway, the western collection will not solve the true problem of the usual collection that is the poor state of the trucks, the platforms and the containers.

The western collection is almost competitive: +20% in UAH/tonne and it can solve some particular problems (mainly if the landfill is very far and if there's no transfer station). But in such a case, the greatest attention must be paid to the state of the yards where are implemented the containers.

2. Description of the New Scheme

2.1. Principle

Within a defined area, the usual system of waste collection is replaced by a western type scheme including roll containers, specific platforms, and a western truck.

2.2. Western type collection

2.2.1. Roll containers

2.2.1.1. Choice of the containers

The use of the inhabitants is to bring their waste to a disposal point in collective containers. It cannot be seriously envisaged for the moment to offer individual roll containers.

The standards of the market are from 800 l to 1100 l. Big slopes can be a problem when a full container weighs 200 kg or more. So generally the 1100 l is more convenient, excepted when there are important slopes: then the weight should be limited with 800 l containers.

The standards of the market are metallic and plastic containers. The plastics containers are less heavy and easier to manoeuvre. But in case of big shock, they will break when metallic ones will only deform. And here it still happens too often that waste burn in the container. For the moment, the metallic containers seem to be a better choice.

There are two main systems of lids: articulated or sliding. Articulated lid is easy to manoeuvre when it's made of plastic but very heavy when it's made of iron. The sliding lid is a little bit delicate and requires some maintenance.

At least, a particular attention must be paid to the quality of the rolls. It is the weak point.

The CEN norms package proposes standards for the roll containers that can help for the choice:

EN840-1:2004	Mobile waste containers. Containers with 2 wheels with a capacity up to 400 l for comb lifting devices, dimensions and design
EN840-2:2004	Mobile waste containers. Containers with 4 wheels with capacity up to 1 300 l with flat lid(s), for trunnion and/or comb lifting devices. Dimensions and design
EN840-3:2004	Mobile waste containers. Containers with 4 wheels with capacity up to 1 300 l with dome lid(s), for trunnion and/or comb lifting devices. Dimensions and design
EN840-4:2004	Mobile waste containers. Containers with 4 wheels with capacity up to 1 700 l with flat lid(s), for wide trunnion or BG- and/or wide comb lifting devices. Dimensions and design.
EN840-5:2004	Mobile waste containers. Performance requirements and test methods
EN840-6:2004	Mobile waste containers. Safety and health requirements

2.2.1.2. Maintenance of the containers

The drivers have to check the state and the containers and to report as soon they notice a problem.

A specialised team must go on place with the truck at the next round in aim to repair or to replace the defective container. (The truck is necessary to empty the container before any repair or exchange).

2.2.2. Yards

It's said "yards" in aim to simplify. In fact it's usually the territory managed by the ZHEKs.

2.2.2.1. Lanes

The lanes, even with asphalt, are made for cars and light trucks. They have never been designed for the load of a heavy truck of 26 tonnes.

So the operator should check that the whole itinerary of the collection truck will be able to resist to the load. He must also check that the corners have width and a radius sufficient for the passage of the truck. He must also check the portals if there are.

2.2.2.2. Platforms

From the platform to the rear of the truck, the loaders will push the container. In that way, the slopes must be only descending (total weight may be 200 kg) and there must not be any step more than 2 cm high. Obviously, holes in the concrete or in the macadam put serious problems.

2.2.3. Collection truck

For the selection of the equipment, it's advisable to check the conformity to the following norms:

EN1501-1:1998	Refuse collection vehicles and their associated lifting devices. General requirements and safety requirements. Rear-end loaded refuse collection vehicles
NF H96-112-2 1999	Lifting devices for refuse collection. Part 2 : technical specifications and safety requirements concerning trunnion lifting devices used for mobile waste containers with capacities from 500 l to 1 300 l.
NF H96-112-4 1999	Lifting devices for refuse collection. Part 4 : requirements for checking the lifting device and test methods.
DIN 30731	Refuse collection vehicles - Interface conditions for rear-end loaded refuse collection vehicles.

2.3. Public awareness

2.3.1.1. Sensitisation

The objective is to inform of the progress brought by the new equipment.

2.3.1.2. Cooperation

The users are asked to pay attention to the lids (they should be closed after use) and to the unauthorized waste (construction waste, hot ashes, etc.).

2.3.1.3. Materials

A document developing "good practices" is prepared and distributed to the inhabitants.

2.4. Economic approach

2.4.1. Parameters

The economic approach is based on a specific guideline "Choice of the collection equipments".

A key parameter is the production of SHW. The park of a SHWM company is an integer number of trucks, more or less loaded depending the production of SHW. But the situation is such that today only a part of the produced SHW is collected, then an improvement of the collection will incite the inhabitants to increase the quantity of waste they put to the bin, and generally the growth of the purchase power will increase the production of SHW. As trucks have a long life length (7 to 10 years) the manager must pay attention to the dynamics of the SHWM.

Different rates represent a scenario of evolution of general inflation, wages, energy, tonnage of SHWM, fees for SHW service as for instance the Table 5:

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Energy	1,0800	1,1664	1,2597	1,3605	1,4693	1,5869	1,6662	1,7495	1,8370	1,9289	2,0253	2,1266	2,2329	2,3445	2,4618
Wages	1,2000	1,3200	1,4520	1,5972	1,7569	1,9326	2,1259	2,3385	2,5723	2,8295	3,1125	3,4237	3,7661	4,1427	4,5570
Fees	1,0300	1,0609	1,0927	1,1255	1,1593	1,1941	1,2299	1,2668	1,3048	1,3439	1,3842	1,4258	1,4685	1,5126	1,5580

Inflation	1,1000	1,1990	1,2949	1,3856	1,4687	1,5421	1,6038	1,6519	1,6850	1,7187	1,7530	1,7881	1,8239	1,8603	1,8976
Tonnage	1,2500	1,5000	2,0000	2,5000	3,0000	3,0600	3,1212	3,1836	3,2473	3,2798	3,3126	3,3457	3,3791	3,4129	3,4471

Table 5 Rates of inflation

According to the nature of the charges and incomes, these coefficients are applied on the 2006 base prices.

Other parameters are determining for the economic approach as they are in the following scenario.

2.4.2. Scenario

The principle is to re-equip the MC with new trucks (KO-413 or KO-435-01) and the standard 750 l containers. The trucks are financed with a credit and amortized on 7 years.

In aim to compare the economical cost of the different solutions, it is considered that:

- The collection is done 365/365.
- The truck downloads full containers, filled with a density of 150 kg/m³.
- The platforms have 3 (750 l) containers or 2 (1100 l) roll containers.
- The duration of the downloading is 2 minutes for 1 non-movable container and 1 minute for a roll container.
- The trip between two platforms is 200 m. For the fuel consumption, the truck is assessed half-loaded, so it is calculated as ½ empty and ½ full load.
- The distance from the base to the collection area is 3 km.
- The distance from the collection area to the landfill is 15 km (3 km downtown and 12 km road).
- The local trucks are stopped 15 days/year for maintenance and the EU truck is stopped 5 days/year for maintenance.

2.4.3. Comparison of costs

On the base of the previous scenario and the following data, the real cost of collection may be composed as Table 4:

Data	Unit cost	Unit	KO-413 + 750 l containers		KO-435-01 + 750 l containers		EU truck + 1100 l roll containers	
			Qty	Cost	Qty	Cost	Qty	Cost
Speed downtown empty		km/h	40		40		50	
Speed downtown full		km/h	35		40		50	
Speed during collection		km/h	20		20		30	
Speed road empty		km/h	60		70		85	
Speed road full		km/h	60		60		85	
Base to collection		km	3		3		3	
Duration of the trip base-collection		minute	4,5		4,5		3,6	
Load of 1 container density 0,15	150	kg	112,5		112,5		165	
Load capacity		t	1,98		7,50		12,29	
Number of containers per round			17		66		74	
Duration of the downloading		minute	34		132		74	
Number of platforms			6		22		37	
Trip of collection		km	1,2		4,4		7,4	
Duration of the trip of collection		minute	3,6		13,2		14,8	
Collection to landfill: downtown		km	3		3		3	
Collection to landfill: road		km	12		12		12	
Duration of the trip collection-landfill		minute	17,1		16,5		12,1	
Downloading on the landfill		minute	10		10		10	

Landfill to collection: downtown		km	3		3		3	
Landfill to collection: road		km	12		12		12	
Duration of the trip landfill-collection		minute	16,5		14,8		12,1	
Total time for 1 round			81,2		186,5		123	
Distance empty per round			15,6		17,2		18,7	
Distance full load per round			15,6		17,2		18,7	
Number of rounds per day			5		2		3	
Number of containers per day			85		132		222	
Tonnage collected per day		t	9,56		14,85		36,63	
Distance empty per day			81		37,4		59,1	
Distance full load per day			78		34,4		56,1	
Rate of time Collection			0,586207		0,832172		0,803252	
Rate of time Transfer			0,413793		0,167828		0,196748	
Cost of the collection								
Truck								
Investment			105 000		156 000		1 042 000	
Amortization /year	7	y	15 000		22 286		148 857	
Working days of the truck		d/y	350		350		360	
Daily amortization				42,86		63,67		413,49
Maintenance								
Per year	8	%	8 400		12 480			
Per day	20	€/d		24,00		35,66		130,00
Assurance		/y	10 000		15 000		40 000	
		/d		28,57		42,86		111,11
Personnel								
Driver	1000	UAH/m		45,45		45,45		45,45
Loader 1	800	UAH/m				36,36		36,36
Loader 2	800	UAH/m						36,36
Social charges				44,54		80,17		115,81
Fuel	3,65	UAH/l						
Fuel consumption empty		l/100 km	20	59,13	28	38,22	29	62,56
Fuel consumption full load		l/100 km	26	74,02	34	42,69	43	88,05
TOTAL FOR THE TRUCK				318,57		385,08		1039,19
Containers								
Investment			21 250		33 000		444 000	
Amortization /year	7	y	3 036		4 714		63 429	
Daily amortization				8,32		12,92		173,78
Maintenance								
Per year	2	%	425		660		26 640	
Per day				1,16		1,81		72,99
Platforms								
Maintenance								
Per year		UAH	1 417		2 200		22 200	
Per day				3,88		6,03		60,82
TOTAL CHARGES		/d		331,93		405,84		1346,78
		/t		34,71		27,33		36,77

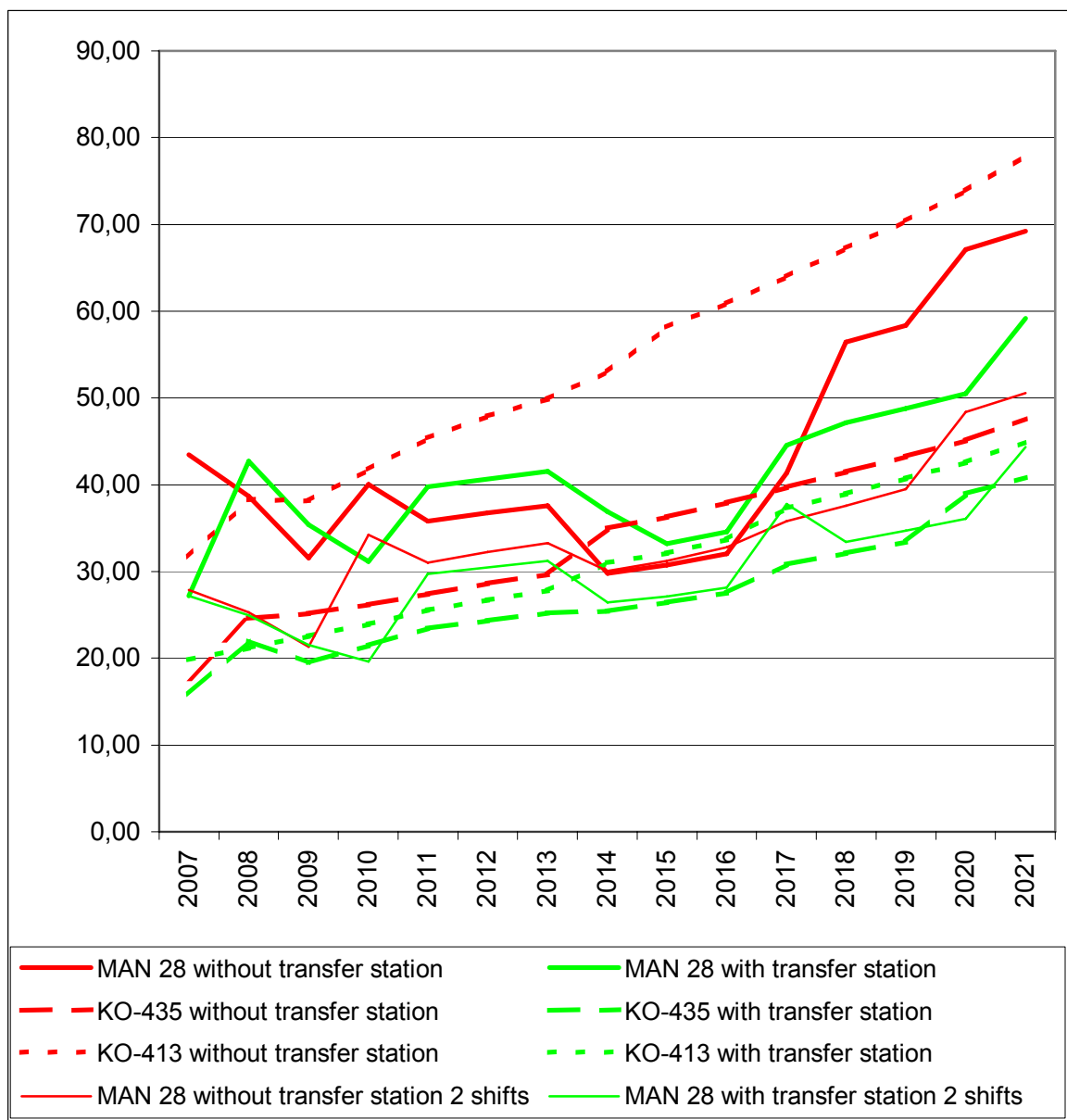
Table 6 Comparison of operation costs

2.5. Simulation of costs

This simulation has been done for a city collecting 12,000 tonnes in 2006. The results are summarized in the following Table 7 and Graph 1:

Cost	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
MAN 28 without transfer station	43,48	38,67	31,60	40,03	35,81	36,79	37,59	29,82	30,78	32,05	41,37	56,48	58,34	67,11	69,23
MAN 28 with transfer station	27,18	42,73	35,41	31,14	39,75	40,64	41,56	36,89	33,19	34,55	44,52	47,14	48,76	50,49	59,21
KO-435 without transfer station	17,73	24,58	25,14	26,14	27,39	28,65	29,67	34,97	36,31	37,96	39,68	41,48	43,22	45,10	47,66
KO-435 with transfer station	15,83	21,99	19,49	21,44	23,43	24,30	25,19	25,43	26,47	27,52	30,79	32,10	33,39	38,97	40,89
KO-413 without transfer station	31,71	38,28	38,13	41,75	45,36	47,91	49,92	53,03	58,14	60,91	63,99	67,21	70,41	73,84	77,96
KO-413 with transfer station	19,80	21,19	22,55	23,93	25,57	26,70	27,80	31,04	32,12	33,70	37,30	38,97	40,72	42,58	44,95
MAN 28 without transfer station 2 shifts	27,86	25,29	21,31	34,24	31,05	32,23	33,27	30,06	31,26	32,79	35,83	37,61	39,53	48,37	50,55
MAN 28 with transfer station 2 shifts	27,18	24,91	21,51	19,59	29,75	30,47	31,23	26,41	27,15	28,19	37,81	33,42	34,70	36,06	44,37

Table 7 Comparison of global costs of collection + transfer

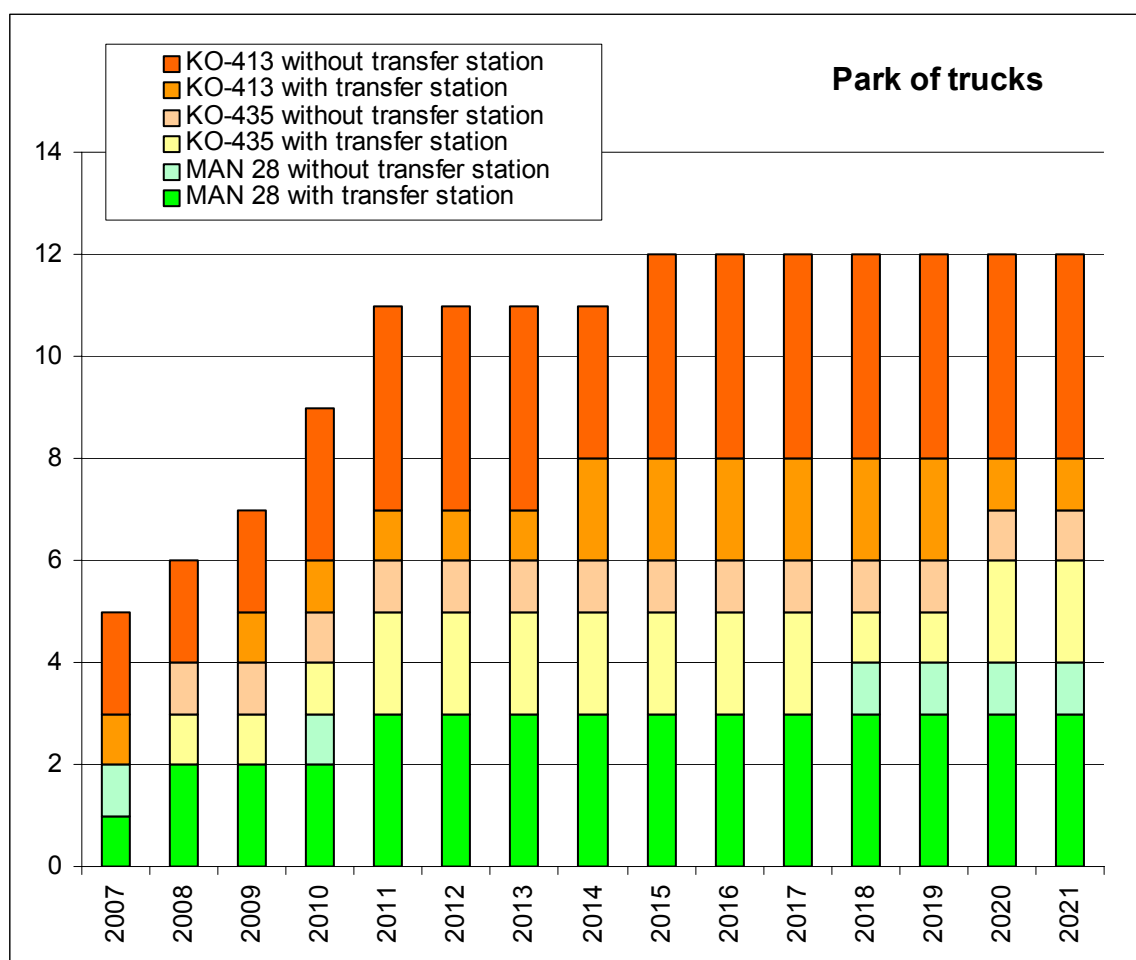


Graph 1 Comparison of global costs of collection + transfer

Another interesting comparison is the number of necessary trucks for the same tasks. It is resumed in Table 8 and Graph 2:

Cost	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
MAN 28 without transfer station	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4
MAN 28 with transfer station	1	2	2	2	3	3	3	3	3	3	3	3	3	3	3
KO-435 without transfer station	3	4	5	6	7	7	7	8	8	8	8	8	8	8	8
KO-435 with transfer station	2	3	3	4	5	5	5	5	5	5	5	5	5	6	6
KO-413 without transfer station	5	6	7	9	11	11	11	11	12	12	12	12	12	12	12
KO-413 with transfer station	3	3	4	5	6	6	6	7	7	7	7	7	7	7	7

Table 8: Number of necessary trucks



Graph 2: Number of necessary trucks

2.6. Comments

The cost with a transfer station is lower than without transfer station excepted for the solution of the MAN 28 working 8 hours a day. It's normal in the way the transfer truck (multipurpose truck) is also a MAN 28 with almost the same costs.

The cheapest is the KO-435-01 but in a lot of cases it cannot fulfil the bearing conditions of the yard lanes and of the landfill as the MAN 28.

The MAN 28 becomes competitive with the KO-435 when it's used 16 hours a day.

This approach can also help to decision. In the case of the MAN 28, in 2018, without transfer station, it's necessary to buy a 4th truck which is the same price than a multipurpose truck: so the decision should be for the same cost either to buy the 4th collection truck or to implement a transfer station.

NOTE: the results depend on parameters as the cost of fuel, the wages, the inflation, the organisation of the company and so. We took as realistic as possible values for these parameters. All other possible values can be input in the computerized model and would give other results.

3. Organisation of the implementation of the New Scheme

3.1. General organisation

3.1.1. Head of project

Such a project requires a full-time Head of Project during six months.

3.1.2. Working Group

The development and the implementation of the project will gather within a working group the main stakeholders who are:

- Municipality
- Municipal Company
- ZHEKs
- Municipal roads department
- Sanitary and Epidemiological Service
- NGOs

3.2. Steps and Planning

3.2.1. Main steps

3.2.1.1. Assessment of the situation

It must be answered to:

- Which housing sectors are involved by the project?
- How many inhabitants are concerned in each one?
- What's the normal production of SHW of these sectors?
- How is today organised the SHW collection in these sectors?

3.2.1.2. Preparation of implementation

The sector is studied in aim to assess the state of the yard lanes and the necessary enhancements of the road surface.

For each potential platform, the question of the slopes and steps is checked and the necessary works are determined.

3.2.1.3. Consultation of providers

A documentation is collected (and eventually a preliminary quotation) on the trucks and containers offered on the Ukrainian market.

3.2.1.4. Budget of the project and decision

With all these elements, are dressed a business plan and a budget of investment of the project.

Then decision to do or not should be taken.

3.2.1.5. Tender for equipments

A call for tender is launched for the trucks and containers.

3.2.1.6. Works on platforms

The platforms are built, rebuilt or renovated, depending the place.

3.2.1.7. Implementation of the western collection

The containers are installed with information of the inhabitants. The collection starts.

3.2.1.8. General public awareness

The inhabitants may wonder why to put so much money in waste collection. A first communication campaign exposes the problem, help to mass-media.

3.2.1.9. Monitoring and feedback

Ideally the truck should be weighted and statistics made about the evolution of the waste collection.

Analytical accounting should allow to check the true cost of the collection.

3.2.2. Overall Planning

Months	1	2	3	4	5	6	7	8	9	10	11	12
Assessment of the situation												
Preparation of implementation												
Consultation of providers												
Budget of the project and decision												
Tender for equipments												
Works on platforms												
Implementation of the western collection												
General public awareness												
Monitoring and feedback												

3.3. Technique

3.3.1. Equipments and materials

The means are: roll containers and trucks.

There are works for the platforms and eventually road enhancement.

3.3.2. Communication

A leaflet should be distributed to the inhabitants. The Tacis Programme made a standard leaflet that is joined in Annex.

3.4. Economy

A business plan of the extension of the SHW collection to these sectors must be done. It includes the necessary investment of trucks, containers, and platforms.

3.5. Training

The people in charge of the new scheme of collection must be trained on:

- The ergonomics of the handling of roll containers;
- The safety rules of the handling of roll containers;
- The procedure of detection and reporting of the breakages of roll containers.

3.6. Pitfalls

The roll containers are not "armour-plated" equipments. They have weak points as the rolls and the lids: when it's broken the time for the downloading in the truck is multiplied by 10!

3.7. Monitoring and feed-back

3.7.1. Cost efficiency

The produced waste can be assessed on the base of the number of inhabitants as 1 kg/inh/d. The efficiency of the system is measured by the collected waste. Ideally the collected waste should be weighted.

A specific business plan of the new scheme of waste collection should be dressed. With analytical accounting, the share of the expenses of the Municipal Company for this sector can be registered. So it would be possible to check the real cost of the service and the relevant incomes.

3.7.2. Public opinion

It's not bad to check if the inhabitants consider it's a progress for their own life conditions.

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