The European Union's Tacis programme for Ukraine

# CAPACITY BUILDING IN DONETSK OBLAST FOR WASTE MANAGEMENT - UKRAINE

*Guideline*

*Fighting against wild burning*

This project is funded by the European Union

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**Warning**

This programme is implemented by the Consortium Sogreah – PÖYRY - ADEME. The views expressed in this report do not necessarily reflect the views of the European Commission.

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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

The problem is typical of three situations.

For a long time the SHW collection is not operated in the private sector. The reasons are numerous but the main ones are that it's the most difficult part of the territory for the SHW collection (bad state of the roads, long trip to access to the area, …) and the law has let to the inhabitants the freedom to contract or not for the waste collection. The result is that only a few % of inhabitants of the private sector are collected and the others found other solutions. Among these solutions, the most common is to burn the waste, inside home in the stove or outside in the garden.

Downtown, the usual collection is done help to unmovable steel containers disposed on platforms. The volume of the containers should correspond to the number of deserved inhabitants and the frequency of the collection. By lack of means, containers were not replaced during years. Shops appeared, the population of the flats changed, and the containers are too often full. A common practice is to reduced the volume of waste by burning regularly the content of the containers.

On fall, the autumn leaves are swiped in the yards by the ZHEK's employees. They make big heaps and as there's no specific collection, the usual way is to burn these leaves.

## 1.2. Impact on environment and health

### 1.2.1. Pollutants

Household waste is a mix of a lot of materials and these materials are made of a lot of molecules and atoms. About wild burning, attention must be paid to the following groups.

#### 1.2.1.1. Dioxins

Dioxins and furans are highly toxic molecules. It's a chemical family of 235 different molecules. Their structure is made of two C6 radicals and from 1 to 8 Chlorine atoms. They appear during the combustion between 235°C and 450°C when there are benzoic radicals and chlorine.

The chlorine is present in domestic waste mainly under the forms of kitchen salt and PVC. Benzoic radicals form during the combustion of a lot of plastics and organic compounds.

The effects of dioxins are long-term effects:

- Lethal effects: animals die from a wasting disease in two to six weeks at levels ranging from 1 µg/kg bodyweight to 5000 µg/kg bodyweight;
- Immune system damage at similar levels in all animals examined, because of damage to the thymus gland causing changes in cell immunity: especially likely in children;
- Damage to other organs such as liver, kidney and digestive tract;
- Reproductive effects: miscarriage, sterility;
- Birth defects, including neurological effects;
- Cancer: most potent cancer promoter known, also evidence of some tumour initiation; animal carcinogen;
- Chloracne - persistent skin eruptions in humans and some animals. Chloracne is a skin disease, often accompanied by severe disfiguration, severe joint pain, headaches, fatigue, irritability and chronic weakness; and it can persist in the body for at least 30 years after exposure. No-one disputes that it is caused by dioxin-like compounds, but it is not an infallible marker of dioxin exposure.

Dioxins are liposoluble. They fix in fat and accumulate all along the food chain.

#### 1.2.1.2. Heavy metals

Heavy metals are metals whose the atomic mass is high. Some of them are volatile and are peculiarly hazardous for health. These are mainly lead, mercury, and cadmium.

Heavy metals are (or were) often used in batteries and cells but they are also used in plastics, metal coating, paints. They vaporized during the combustion and they may appear under organic molecules.

The most known affects of heavy metals are:

- Hydrargy (mercury): nervous lesions manifested by trembling, speech impediment, psychical troubles, …
- Neurotoxicity: lead: specifically for children (saturnism)
- Anemia (lead)
- Irritation of breath tract (cadmium), digestive tract (cadmium)
- Cancer: kidneys (lead, cadmium), lungs (cadmium)

Heavy metals are liposoluble. They fix in fat and accumulate all along the food chain.

#### 1.2.1.3. Cyanides

Cyanides are present in the polyurethane family (polyurethanes are made by chemical reaction between isocyanate and resin). Polyurethanes are used for a lot of plastic articles, shoe soles, insulation foam, etc. During the combustion, these polymers are broken and the more often there's an emission of cyanide hydrogen.

In large amounts, cyanide is very harmful to people. Exposure to high levels of cyanide in the air for a short time harms the brain and heart, and may cause coma and death. Cyanide compounds to potentially cause the following health effects from acute exposures at levels above the MCL: rapid breathing, tremors and other neurological effects.

Exposure to lower levels of cyanide for a long time may result in breathing difficulties, heart pains, vomiting, blood changes, headaches, and enlargement of the thyroid gland. People who eat large amounts of cyanide may have symptoms including deep breathing and shortness of breath, convulsions, and loss of consciousness, and may die.

Cyanide compounds have the potential to cause the following chronic health effects from long-term exposures at levels above the MCL: weight loss, thyroid effects, nerve damage.

People with high blood cyanide levels have also shown harmful effects such as weakness of the fingers and toes, difficulty walking, dimness of vision, deafness, and decreased thyroid gland function, but chemicals other than cyanide may have contributed to these effects. Skin contact with cyanide can produce irritation and sores.

It is not known whether cyanide can directly cause birth defects in people. Birth defects were seen in rats. Effects on the reproductive system were seen in rats and mice that drank water containing sodium cyanide.

The harmful exposition way is breath. Cyanide hydrogen stays 3 years in atmosphere before degradation. It dissolves in water and can contaminate it.

#### 1.2.1.4. Others

The burning generates also a lot of particles that are taken off in the smoke. It's known that these particles include heavy organic compounds. A lot of them are known as cancerigenous but there's no particular study of this problem.

### 1.2.2. Direct exposure

People burning waste in open air are directly exposed. Even if they pay attention to avoid the smoke, if there's no wind, the pollutants are remaining for some time in the area. If everybody does the same in the district, there will be an average permanent concentration of these pollutants in the area.

### 1.2.3. Transfer to air

The question has been deeply studied for the neighbourhood of incineration plants. Even if these facilities are quipped with a smoke treatment and if the operating conditions are optimised for a reduction of the emissions of dioxins and heavy metals, it contributes to a permanent rate of these contaminants in the atmosphere. It has been also established that it exists atmospheric corridors and sometimes a pollution can be found 200 km far from its origin.

Globally, it may be considered that for Donetsk Oblast, the wild burning of household waste (at home and on the landfills) for >50% to the general pollution of atmosphere by dioxins and heavy metals. The rest is generated by the steel and coke industries.

### 1.2.4. Transfer to water

The transfer to water concerns mainly cyanides. The dioxins and heavy metals are lowly soluble. The molecules emitted to atmosphere will finally deposit or will be brought by rain. The concentrations will stay very low.

The ashes resulting of the home burning (in garden as in stove) are usually disposed in the garden, or in dumpsites. They will be washed by the rain. During the burning the conditions of combustion are not optimal and the temperatures stay relatively low. So a lot of metallic objects will be oxidised but will stay as they are. It's common to find batteries and cells in the ashes. As they are only oxidised, some heavy metals will be more or less soluble in an acid middle as it's often the case in the nature. The leachates of these ashes contain high rates of heavy metals and they will contaminate the water resource.

### 1.2.5. Transfer to plants and cattle

It has been noticed in studies that plants at the neighbourhood of incineration facilities have high rates of heavy metals and dioxins, comparing to "normal" plants. The pollutants deposit directly on the leaves or are absorbed from the soil. These studies focused on the vegetables cultivated around the facility (within a radius of 2 km) but it was also demonstrated in Vancouver (Canada) that after 10 years, even the lawn cuts contained mercury and lead.

The worst is that these pollutants accumulate in the food chain and the cattle fed with the plants so grown present higher concentrations: chicken, eggs, rabbits, etc. The worst is the milk. In France some incineration plants have been stopped because too high rates of dioxins and heavy metals were found in the milk of the cows grazing around.

## 1.3. EU experience

The wild burning is strictly forbidden. Usually, it lies on two chapters of regulation.

First, it's a trouble regarding good neighbourhood relationships. Since the mid-age, this question arose a lot of cases and it's highly consolidated in the law and the jurisprudence.

Recently, the impact on environment and health has been discovered and new enforcements have been written in regulations.

But the main question is how to impose the respect of the regulation. By history, it's a trouble of neighbouring and any constable can report and put a fine. Often there's a municipal decree remaining that this practice is forbidden on the territory of the municipality and the municipal peacekeepers are in charge to enforce this regulation.

Since the environment and health considerations appeared, the municipalities use to arise public awareness about that. It's included into the general communication about waste management and environment protection.

## 1.4. Legal framework

### 1.4.1. Stockholm Convention[1]

The Convention was adopted on 22 May 2001 at the Conference of Plenipotentiaries on the Stockholm Convention on Persistent Organic Pollutants, Stockholm, 22-23 May 2001, and signed by Ukraine.

Among the substances, the convention targets specifically dioxins and furans (Annex C substances). The convention quotes as a main source the wild burning of waste.

**Article 5: Measures to reduce or eliminate releases from unintentional production**

*Each Party shall at a minimum take the following measures to reduce the total releases derived from anthropogenic sources of each of the chemicals listed in Annex C, with the goal of their continuing minimization and, where feasible, ultimate elimination*:

*(a) Develop an action plan or, where appropriate, a regional or subregional action plan within two years of the date of entry into force of this Convention for it, and subsequently implement it as part of its implementation plan specified in Article 7, designed to identify, characterize and address the release of the chemicals listed in Annex C and to facilitate implementation of subparagraphs (b) to (e). The action plan shall include the following elements:*

*(i) An evaluation of current and projected releases, including the development and maintenance of source inventories and release estimates, taking into consideration the source categories identified in Annex C;*

*(ii) An evaluation of the efficacy of the laws and policies of the Party relating to the management of such releases;*

*(iii) Strategies to meet the obligations of this paragraph, taking into account the evaluations in (i) and (ii);*

*(iv) Steps to promote education and training with regard to, and awareness of, those strategies;*

*(v) A review every five years of those strategies and of their success in meeting the obligations of this paragraph; such reviews shall be included in reports submitted pursuant to Article 15;*

*(vi) A schedule for implementation of the action plan, including for the strategies and measures identified therein;*

### 1.4.2. Law on waste 1998-0187

The only allusion can be found in:

[1] Mrs. Olena LIGOSTAYEVA, National Project Coordinator, Head Division of Programs and Standards, Department of Ecological Safety, Ministry of the Environment and Natural Resources, 5, Khreshchatyk St. 01601 Kyiv, +380 44 228 0606/228 2652, +380 44 229 8383228 0543/228 0606, ENVSAF@menr.gov.ua inventor@i.kiev.ua

***CHAPTER VIII. LEGAL OFFENCES AND RESPONSIBILITY IN THE WASTE MANAGEMENT SPHERE***

***Article 42. Legal Offences in the Waste Management Sphere***

*Persons transgressing the laws on wastes shall bear disciplinary, administrative, civil, and criminal responsibility, namely when:*

*(a) breaching set waste management procedures causing or capable of causing pollution, negatively effecting, directly or otherwise, people's health, and incurring economic losses;*

But the following article enforces the application of the Stockholm Convention:

***CHAPTER IX. INTERNATIONAL CO-OPERATION IN THE WASTE MANAGEMENT SPHERE***

***Article 45. Ukraine's Participation in International Co-operation in the Waste Management Sphere***

*Ukraine shall participate in international co-operation in the waste management sphere, in keeping with the rules of international law.*

*Should an international treaty signed by Ukraine and confirmed by the Supreme Council of Ukraine set forth rules other than those envisaged by this Law, the rules of this international treaty shall have precedence.*

The Ukrainian key-problem is in the following article:

***Article 14. Rights of Citizens of Ukraine, Foreign Subjects, and Stateless Persons in the Sphere of Waste Management***

*In the sphere of waste management, citizens of Ukraine, foreign subjects, and stateless persons shall have the right to:*

*(a) manage waste in conditions safe to their life and health;*

A lot of inhabitants of the private sector argue that they manage their waste by themselves so they disagree to pass a contract with the SHWM companies, and of course, to pay for that.

### 1.4.3. Other texts

The resolution of Cabinet of Ministers of Ukraine, N° 554 dated 27 July 1995, "On the list of activities and objects which constitute an increased ecological hazard" specifies:

*3. Collecting, processing, storage, burial, neutralization, or utilization of industrial and municipal wastes of all kinds.*

It could mean that anybody burning waste should be submitted to the regulations about permitted activities and to burn waste should constitute an infringement to these regulations.

### 1.4.4. Sanitary Epidemiological Service

# 2. Description of the New Scheme

## 2.1. Principle

It should be illusory to forbid this practice without to offer any alternative. So the New Scheme must be articulated with:

- Organisation of a good level service of waste collection; this service may be:
  - Regular collection of the rough waste;
  - Combination of home sorting, home composting, selective collection, remaining waste collection;
- Organisation of enforcement by the constabulary;
- Public awareness actions.

The situations to be avoided are the wild burning in the private sector as a current way to manage waste, and the burning in the containers.

## 2.2. Private sector

### 2.2.1. Organisation of the waste collection

#### 2.2.1.1. Standard collection

The usual ways are the unmovable container and the bucket or "bell collection".

A usual characteristic of the private sector is the very poor state of the roads and streets. It's really not easy to deserve these sectors with a truck, moreover in winter conditions. So the number of rounds must be reduced and a collection once a week is better. It means that the system must store 1 week of waste production.

There are 4 ways to store the waste before collection:

- In the street in standard containers 0,75 $m^3$ (exclusively unmovable containers for the moment because there would be too many works for the implementation of roll containers):

  The containers should be disposed on a concrete platform. For 1-week storage of rough waste, the number may be assessed as 1 container for 20 inhabitants (1 kg/inh/d at 0.15 density). It's easy to use for the inhabitants. The collection takes some time, the truck stopping at each container. The collection can be done any day of the week.

- In the street in 10 $m^3$ tips at the end of the street;

  The area for the tip must be done with concrete or asphalt with enough space for 2 tips (the truck disposes an empty one and takes the full one). For 1-week storage of rough waste, the number may be assessed as 1 container for 250 inhabitants (1 kg/inh/d at 0.15 density). It's less easy to use for the inhabitants. The collection is relatively fast. The collection can be done any day of the week.

- At home in a bin (or bucket);

  The constraint for the inhabitants is to be at home the day of the collection. It's not so convenient for the inhabitants working all week long. The collection takes time, the truck stopping at each door. The collection should be done on Saturday.

- At home in plastic bags.

  It's a typical European way. The bags are put on the kerbside the day of the collection. The crew of the truck includes 1 or 2 workers picking up the bags and throwing them into the hopper. The collection is fast. The truck must be the model with rear hopper. The collection can be done any day of the week.

  This way offers in addition the possibility to use pre-paid bags, solving the question of the fees.

#### 2.2.1.2. Home composting

It's another scheme but it is assessed that it can manage 50% SHW of a family. It means that the standard collection should divide by 2 the quantities to collect.

#### 2.2.1.3. Selective collection

But home composting is a component of home sorting: the inhabitant has to separate the organic waste from the other waste. If he (she) becomes used to do that, he (she) can easily sort the recyclables in the meantime. The stake is that 20% waste should be selectively collected and only 30% would remain for the standard collection.

### 2.2.2. Enforcement

#### 2.2.2.1. Contracts

It must be explained to the inhabitants that they cannot manage their waste by themselves and the contract must be imposed.

The contract must be fair. It means that the inhabitant of the private sector and the one of collective residences should pay the same (principle of equality).

#### 2.2.2.2. Constabulary

There's no efficient regulation without police. The key-point is to demonstrate that there's a police. So this question will be developed within the next as a tool of public awareness.

The police must be shown in the private sectors where the reform is engaged. The constables must know the regulation about that infringement. The constables must have clear instructions about their role of "motivation factor". Perhaps some examples will be necessary to demonstrate it's a serious topic.

### 2.2.3. Public awareness

#### 2.2.3.1. Sensitisation

The objective is to inform of the hazard of the waste burning. The difficulty is that the matter is very technical and scientific.

#### 2.2.3.2. Cooperation

The problem and the solution proposed by the municipality should be debated with the involved inhabitants.

#### 2.2.3.3. Materials

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

## 2.3. Public sector

### 2.3.1. Organisation of the waste collection

#### 2.3.1.1. Standard collection

The usual ways are the unmovable container and the roll container.

When the number of containers is not correctly sized (1 kg/inh/d at 0.15 density), or when the routes of collection are not updated, it happens that the containers are regularly overloaded and waste brim over. Spontaneously, somebody thinks that to set fire to the waste will reduce their volume.

It's clearly a question of organisation. The first step is the knowledge of the places where the problem appears. The information can come from the drivers, from the JEK employees, from the inhabitants. But such information must be managed:

- The Municipal Company can name an Inspector checking regularly the platforms;
- The Municipal Company can organise a reporting system for the drivers;
- The Municipal Company can propose a special phone number receiving the complaints.

Then the Municipal Company must do something but it supposes it has means as extra containers and truck capacities.

#### 2.3.1.2. Selective collection

The selective collection can help. The stake is that 20% waste should be selectively collected. It's 20% in weight but it's more in volume.

### 2.3.2. Enforcement

#### 2.3.2.1. Who sets fire?

We have seen 2 groups of people:

- ZHEK employees: they are in charge of the cleansing of the yard and they can take such initiative;
- Employees of commerce: the boss asks to eliminate the packages and the containers of the yards are full.

#### 2.3.2.2. Constabulary

There's no efficient regulation without police. The key-point is to demonstrate that there's a police. So this question will be developed within the next as a tool of public awareness.

The police must be shown in the private sectors where the reform is engaged. The constables must know the regulation about that infringement. The constables must have clear instructions about their role of "motivation factor". Perhaps some examples will be necessary to demonstrate it's a serious topic. If the fire is provoked by a commerce, the fact must be systematically penalized because the commerce should have a contract with the Municipal Company.

### 2.3.3. Public awareness

#### 2.3.3.1. Sensitisation

The objective is to inform of the hazard of the waste burning. The difficulty is that the matter is very technical and scientific.

#### 2.3.3.2. Cooperation

The problem and the solution proposed by the municipality should be debated with the involved people, mainly the ZHEKs and the commercial organisations.

#### 2.3.3.3. Materials

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

# 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
- Sanitary and Epidemiological Service
- Inspection of Environment
- Constabulary
- 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 problem?
- 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. Strategy of implementation

The project will determine the prioritisation of the sectors for the New Scheme. The first one will be the experimentation sector.

For each sector the project will assess the necessary means (containers, trucks, etc.).

#### 3.2.1.3. General public awareness

The problem must exist in the mind of the inhabitants. A first communication campaign exposes the problem, help to mass-media.

#### 3.2.1.4. Preparation of the experimentation

It's mainly a second communication campaign but concrete and focused on the inhabitants of the experimentation sector. The main tool is meetings with the inhabitants, prepared with the local NGOs.

#### 3.2.1.5. Implementation of the solution

The new collection scheme is announced and operated.

#### 3.2.1.6. Enforcement of the solution

The communication continues but the constabulary shows by its presence that it's a serious topic.

### 3.2.2. Overall Planning

| Months | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Assessment of the situation | | | | | | | | | | | | |
| Strategy of implementation | | | | | | | | | | | | |
| General public awareness | | | | | | | | | | | | |
| Preparation of the experimentation | | | | | | | | | | | | |
| Implementation of the solution | | | | | | | | | | | | |
| Enforcement of the solution | | | | | | | | | | | | |
| Monitoring and feedback | | | | | | | | | | | | |

## 3.3. Technique

### 3.3.1. Equipments and materials

There's no particular technical point. It's an extension of the collection so it requires means: containers and trucks.

If the solution of pre-paid plastic bags is chosen, the model and the printing of the bags must be determined (see the relevant Guideline).

### 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 enforcement should be based on communication and information. All depends on who will be in charge of the enforcement. The people in charge of the enforcement must be trained on:

- The hazards of the wild burning;
- The regulation.

## 3.6. Pitfalls

The wild burning is a "no other way" solution for the waste management. It means that people do that because there's no other solution. So it's not realistic to hope they will change their behaviour if there's not a regular and efficient waste collection.

## 3.7. Monitoring and feed-back

### 3.7.1. Private sector

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 waste collection in the private sector 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 sector

The only people who can see if the waste are burnt are the drivers. Any monitoring or feedback lies on a reporting by the drivers.

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