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# Environment and Climate Regional Accession Network (ECRAN)

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## Workshop Report on Regional Workshop on Remediation of Landfills in the Context of Regional Waste Management

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30 September – 01 October 2015,  
Podgorica, Montenegro

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**ENVIRONMENTAL AND CLIMA REGIONAL NETWORK FOR ACCESSION - ECRAN**

**WORKSHOP REPORT**

**Activity 2.6**

**REGIONAL WORKSHOP ON REMEDIATION OF LANDFILLS IN THE CONTEXT OF  
REGIONAL WASTE MANAGEMENT**

**30 September – 01 October 2015, Podgorica, Montenegro**



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LIST OF ABBREVIATIONS	
ABS	Acrylonitrile Butadiene Styrene
COD	Chemical Oxygen Demand
DOC	Dissolved Organic Carbon
EC	European Commission
EU	European Union
EWC	European Waste Catalogue
GIS	Geographic Information System
HC	Hydrocarbons
HDPE	High-density Polyethylene
HDPE	High-density polyethylene
IPPC	Integrated Pollution Prevention and Control
ISPRA	Istituto Superiore per la Protezione e la Ricerca Ambientale
LDPE	Low-density Polyethylene
PET	Polyethylene Terephthalate
POPs	Persistent Organic Pollutants
PP	Polypropylene
PS	Polystyrene
RA	Risk Assessment
RRCP	Residential Recycling Credit Program
SIN	Sites of National Interest
TOC	Total Organic Carbon
WFD	Waste Framework Directive
WG	Working Group



## I. Background/Rationale

ECRAN countries are in intensive planning and implementation period of the EU waste management requirements. Landfill of Waste Directive (Council Directive 1999/31/EC) is one of the heavy cost Directives and it requires substantial planning, preparation and investment activities. Land filling is still preferred option for many countries in the ECRAN region, while source separation and recycling activities remain in the initial stage. Regional waste management strategies and systems are being planned and implemented in all ECRAN beneficiary countries with landfill as a key element of the system.

Landfill is however, one of the oldest form of waste treatment and one of the least desired options because of the many potentially adverse impacts it might have. Waste framework directive puts very strong requirements for source separation and recycling, establishing clear targets and implementation deadlines. Also it is likely, that the EU funds allocations during new financial perspective 2014 – 2020 will be tightly related with the updated National Waste Management Plans incorporating source separation and recycling targets.

In order to reflect the European Union (EU) requirements on waste management, countries shall gradually move from dependence on landfilling of waste to extensive systems for source separation, secondary separation, revised waste collection schemes, extended recycling capacities, treatment of biodegradable waste and, where economically feasible, mechanical and Landfill Directive requires that Member States shall take the necessary measures to close down sites which have not been granted a permit to continue operations. Also, after a landfill has been definitely closed, the operator shall be responsible for its maintenance, monitoring and control in the after-care phase for as long as may be required by the competent authority, taking into account the time during which the landfill could present hazards. General requirements including protection of soil and water are foreseen for all classes of landfills. Requirements also arise from implementation of the Water Framework Directive, so the assessment of “risk to the water environment” is required. These requirements can be reduced in case an assessment of environmental risks has shown it justified.

The Directive’s demanding requirements for closure of landfills are related with high cost investment needs. Therefore reduction of standard requirements where according to the risk assessment is possible provides less costly though sufficient protection for environment. Application of such approach requires establishment of methodology for risk assessment and evaluation of sites for potential threats to environment. Based on such evaluation different technical parameters for closure may be applied

Countries in the region still lack well established methodologies for risk assessment and evaluation of landfill sites for potential threats to environment. National regulation on technical solutions and documentation for remediation projects are not well defined. Also, there is not many implemented landfill remediation projects so far, so practical experience in that regard is not sufficient. Considering situation in the region, Waste Management Working Group (WG) convenes a workshop to better assess the situation regarding the landfills closure and aftercare within the regional waste management systems and propose ways for developing methodologies for assessment of environmental risks and provides wide range of EU best practices and practical experiences in that regard biological treatment systems.



## II. Objectives of the training

### *Objectives of the Workshop*

The objective of this workshop is to provide the participants with experience of Member States in implementation of Landfill of Waste Directive (Council Directive 1999/31/EC); with focus on requirements of the Directive related to closure of landfills and dump sites. Through site visit, participants will be informed, how capital of Montenegro, Podgorica, develop their waste management system, from remediation of old landfill, establishing new one, source and secondary separation, recycling yards, management of special waste streams.

### *Results/outputs*

The following results were expected:

- Improved skills on implementation of Landfill of Waste Directive (Council Directive 1999/31/EC);
- Improved understanding of the better assess the situation regarding the landfills closure;
- Participants are familiarized on how Member States implement Landfill of Waste Directive (Council Directive 1999/31/EC);
- Better planning process in the field of Waste Management.



### III. EU policy and legislation covered by the training

#### **Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives**

The first Waste Framework Directive dates back to 1975 and was substantially amended in 1991. The aim of the WFD was to lay the basis to turn the EU into a recycling society. Until its revision in 2008, the codified Waste Framework Directive (Directive 2006/12/EC) was the only legally valid version of the Waste Framework Directive.

Proper implementation, application and enforcement of EU waste legislation are among the key priorities of EU environmental policy. The Directive introduces new provisions in order to boost waste prevention and recycling as part of the waste hierarchy and clarifies key concepts namely, the definitions of waste, recovery and disposal and lays down the appropriate procedures applicable to by-products and to waste that ceases to be waste. Since the date of application of the Waste Framework Directive (WFD), many questions regarding its interpretation and application have been raised by national authorities and stakeholders.

Thematic issues that WFD cover are bio-waste, by-products, end of waste criteria, energy recovery, targets and reporting, European list of waste and waste prevention. It explains when waste ceases to be waste and becomes a secondary raw material (so called end-of-waste criteria), and how to distinguish between waste and by-products. The Directive lays down some basic waste management principles: it requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest. Waste legislation and policy of the EU Member States shall apply as a priority order the following waste management hierarchy:

- Prevention;
- Reuse and preparation for reuse;
- Recycle;
- Recover;
- Disposal.

#### **Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste**

According to the waste management hierarchy, landfilling is the least preferable option and should be limited to the necessary minimum. Where waste needs to be landfilled, it must be sent to landfills which comply with the requirements of Directive 1999/31/EC on the landfill of waste. The objective of the Directive is to prevent or reduce as far as possible negative effects on the environment, in particular on surface water, groundwater, soil, air, and on human health from the landfilling of waste by introducing stringent technical requirements for waste and landfills.

The Landfill Directive defines the different categories of waste (municipal waste, hazardous waste, non-hazardous waste and inert waste) and applies to all landfills, defined as waste disposal sites for the deposit of waste onto or into land. Landfills are divided into three classes:



- landfills for hazardous waste;
- landfills for non-hazardous waste;
- landfills for inert waste.

The Directive does not apply to:

- the spreading on the soil of sludges (including sewage sludges and sludges resulting from dredging operations);
- the use in landfills of inert waste for redevelopment or restoration work;
- the deposit of unpolluted soil or of non-hazardous inert waste resulting from prospecting and extraction, treatment and storage of mineral resources as well as from the operation of quarries;
- the deposit of non-hazardous dredging sludges alongside small waterways from which they have been dredged and of non-hazardous sludges in surface water, including the bed and its subsoil.

On 2 July 2014, the European Commission adopted a legislative proposal to review waste-related targets in the Landfill Directive as well as recycling and other waste-related targets in Directive 2008/98/EC on waste and Directive 94/62/EC on Packaging and Packaging Waste. The proposal aims at phasing out landfilling by 2025 for recyclable waste (including plastics, paper, metals, glass and bio-waste) in non-hazardous waste landfills, corresponding to a maximum landfilling rate of 25%.



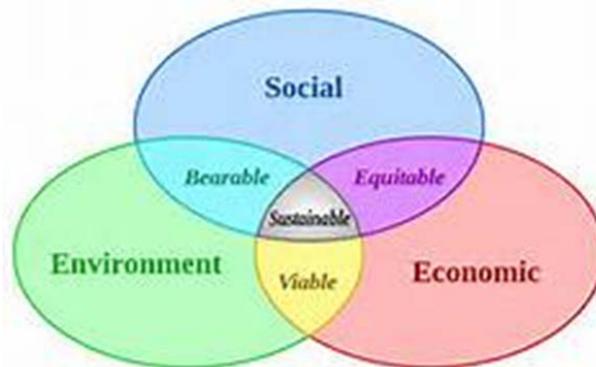
#### IV. Highlights from the training workshop

##### Waste Acceptance Criteria and Risk Assessment Analysis – Francesco Loro

Mr. Loro's presentation covered four major issues:

- The role of landfill
- The waste acceptance criteria;
- The use of Risk Assessment for Landfill;
- The use of Informatics tools.

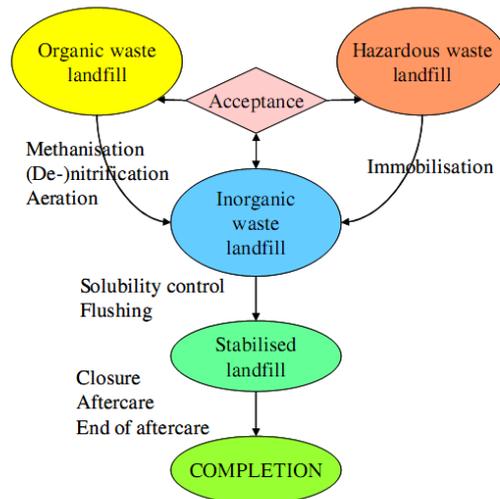
According to the waste hierarchy by the EU Directive, waste disposal is the last possible option for waste treatments, the worst option as well. So if it cannot be prevented, reused, recycled or composed, it has to be located on a landfill. Optimistic target is having zero waste dumped in landfills. However, it is still not sure whether this could be achieved, and if it could, when that would be. Waste in landfill has been decreased in the last few decades. An example of landfill in Veneto was given, where in 2014 when 477,000 tonnes of waste was landfilled, in accordance to 2004, where it was approximately 900,000 tonnes.



According to the research conducted by Dutch Foundation for Sustainable landfilling, is a realistic and highly promising technique for the future. Sustainable landfilling covers all social, economic and environmental issues. What sustainable landfill is hoping to achieve in the beginning is the following:

- Separate collection;
- Reduction of organic waste (35% by 2016);
- Ban for specific kinds of waste;
- Collection of biogas and leachate
- Minimum technical requirements;
- 30 years of aftercare.

Process of obtaining a sustainable landfill was shown on the scheme below.



Sustainable landfill can be landfill for biodegradable waste, hazardous waste, inorganic waste or inert waste. Three pilot scale test landfills were designed in Netherlands, for bio-waste, inorganic waste and stabilised hazardous waste.

Some attention was put on leachate composition. The composition can be determined by the evaluation of waste composition, evaluation of critical parameters and control degree of landfill site parameters. Conditions in landfill are controlled by creating stable mixture, meaning favourable pH, Eh etc., with acceptable soil load and dissolved organic carbon (DOC). Processes that can modify the leachate composition include:

- Mixing of different kind of waste;
- Pre-treatment can reduce the leaching process;
- Biodegradation of organic waste;
- Solubilisation;
- Hydrogeology and percolation of water.

As stated in the Directive, not all waste is acceptable on a landfill. These include:

- liquid waste;
- explosive, corrosive, oxidising, highly flammable or flammable;
- hospital and other clinical wastes;
- whole used tyres;
- other type of waste which does not fulfil the acceptance criteria determined in accordance with Annex II.

Only waste that has been treated can be landfilled. In 2013, Italy was subjected to court due to inadequate treatment of waste landfill in Lazio.

However in 2008, Italian Institute for Environmental protection and research (ISPRA – Istituto Superiore per la Protezione e la Ricerca Ambientale) developed a specific manual for Risk Assessment (RA) of landfills.

Milestones of the RA of a landfill cover:

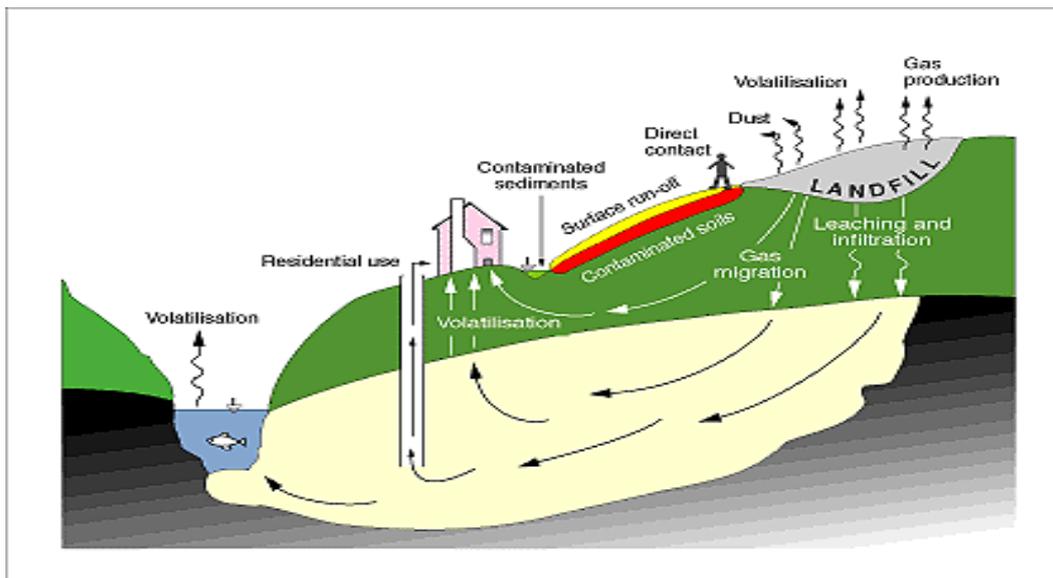
1. Definition of risks: probabilities, impact factors;
2. Acceptance criteria;
3. Pollutants;
4. Level of analysis : level 1 to 3;
5. Model design (Source, pathway, targets);
6. Approach (forward mode vs backward mode).

Mr. Loro presented the simplified approach, as done in the landfill in Veneto. It covers also six milestones, but in a practical easier way:

1. Use of defined limit values (water);
2. Specific limits for each kind of waste;
3. Specific limits for each pollutants;
4. Level of analysis: 2;
5. Model design (Source, pathway, targets);
6. Approach (forward mode vs backward mode).

Levels of risk assessment, that is, tiers are divided into three levels, depending on their complexity, cost, information and reliability. Tier is recommended according to landfill phase and need of information.

Conceptual model of landfilling was presented, as on the picture below.



Risk Assessment of landfills has been driven by the concern over the possible human health effects, resulting from exposure to hazardous substances disposed to landfill sites. Thus, RA is carried out on a site-specific basis with the objective of determining the risks to which the human population and the environment are exposed.

According to the deterministic model, leaching test must be equal to leachate concentration, that is, the real leachate. There is an entire mathematical background of calculating leachate concentration. The main factors included in the formula are:

- Hydraulic conductivity of clay layers (without HDPE) ( $K_i$ );

- Height of leachate ( $h_{LEACH}$ );
- Thickness of waterproof layer ( $d_i$ );
- Landfill surface ( $A_f$ ).

The formula is then as follows:

$$L_f = K_i * [(h_{leach} + d_i) / d_i] * A_f$$

In Italy, a software for calculations of leachate is being used, called Leach 8. It has been developed by University of Rome in cooperation with RECONnet, a network of firms and Environmental protection Agency on RA. The software is based on ISPRA manual and equations. It is free for use, after registration, and can be downloaded from [www.reconnet.net](http://www.reconnet.net).

### Landfill mining: The remediation of Villorba Landfill – Francesco Loro

The old landfill of Villorba was located in the Municipality of Villorba, in Treviso Province. It was a landfill for urban and industrial waste, and it was open in 1970s, even before the first environmental legislation. However, it was closed in 1985. The new highway is planned to go through the landfill, and it will be built as a trench to reduce environmental impact related to noise.

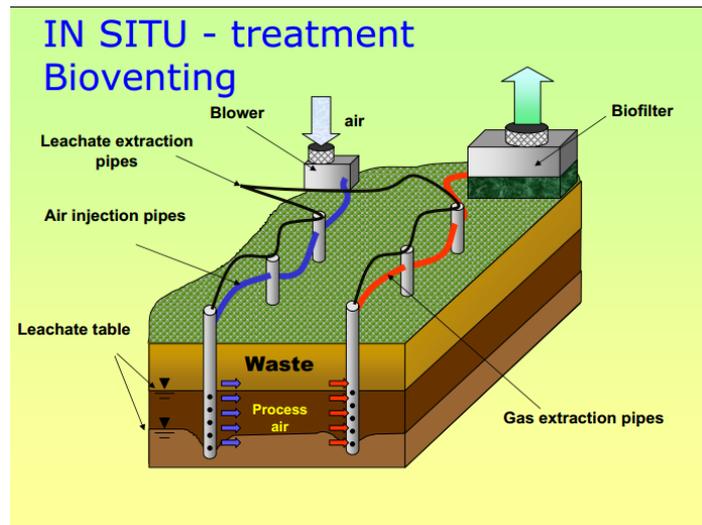
Evaluation of waste composition has been done, using 39 inspection wells, 95 waste samples and other analysis. The results showed that there is a high concentration of HC, absence of persistent Organic pollutants (POPs), a small amount of asbestos in one sample, and a high level of total organic carbon (TOC), more than 5%. However in general, the waste dump was considered as non-hazardous. The proposed solution included:

- Excavation of:
  - 46.000 m<sup>3</sup> of waste;
  - Soil used as daily coverage of waste: 11.000 m<sup>3</sup>;
  - Polluted soil: 4.000 m<sup>3</sup>;
  - Non-polluted soil: 30.000 mc;
- Air venting treatment before the excavation;
- Creation of a physical barrier.

Air venting is a well-known technique of reducing the impact of landfill mining. Air venting is releasing air from water pipes. Air vents are installed in places where air accumulates, usually at the highest points in the pipeline. The aims of air venting in landfills are reducing of biodegradable components and reducing biogas. Air venting solution proposed in Villorba landfill includes:

- 2 extraction line composed by 4 inflation wells and 1 pump (11 kw – 800 m<sup>3</sup>/h, prevalence 1500 mm H<sub>2</sub>O column);
- Creation of 4 sub-areas and the use of a step by step process;
- Bio filter able to treat 1200 mc/h and retention time of 46 sec.





The air venting is a kind of “reverse” biogas collection. It is necessary to create a net of wells to inflate and extract the exhausted air. In order to avoid the risks of fire related to biogas the inflate phase should start before the extraction (dilution of biogas below the explosion range). Also applicable is automatic system for the evaluation of biogas composition. Influence ray is 25 mt, based on the guideline developed by Milano Province. There are several factors that can influence the dimension of the ray, but the main factors include distribution of waste, their composition and distance from the pump.

Regarding the treatment of exhausted, the use of bio filter is the most common practice. Also, it is possible to use wood from composting process to inoculate microbes. Humidity and temperature must be regularly controlled due to spread of bacteria.

For this specific case, the treatment of waste would include removing one third of the total surface of the landfill. Maximum depth of the landfill has not been known, thus it has to be measured. Also, the excavation of waste will be carried out using a perpendicular front all along the landfill using two excavators. Additionally, the barrier will be constructed by using pre-created panels of concrete and through the creation of a system of concrete pole.

#### Landfilling Intervention Techniques – Marco Ostoich

Environmental issues regarding waste management require a broad knowledge of legal framework in different fields. Three main fields that are inevitably connected in this case are waste management at both European (EU) and national levels, soil protection and remediation, and IPPC for waste management plans.

Old deposits of wastes and pollutants ‘spills are a threat to environment if not correctly managed and left with effective security interventions/measures. It is crucial to identify the sites, along with the degree of contamination and the type of waste dumped. Remediation project serves to achieve specific sanitary and environmental objective, once it is approved and implemented.

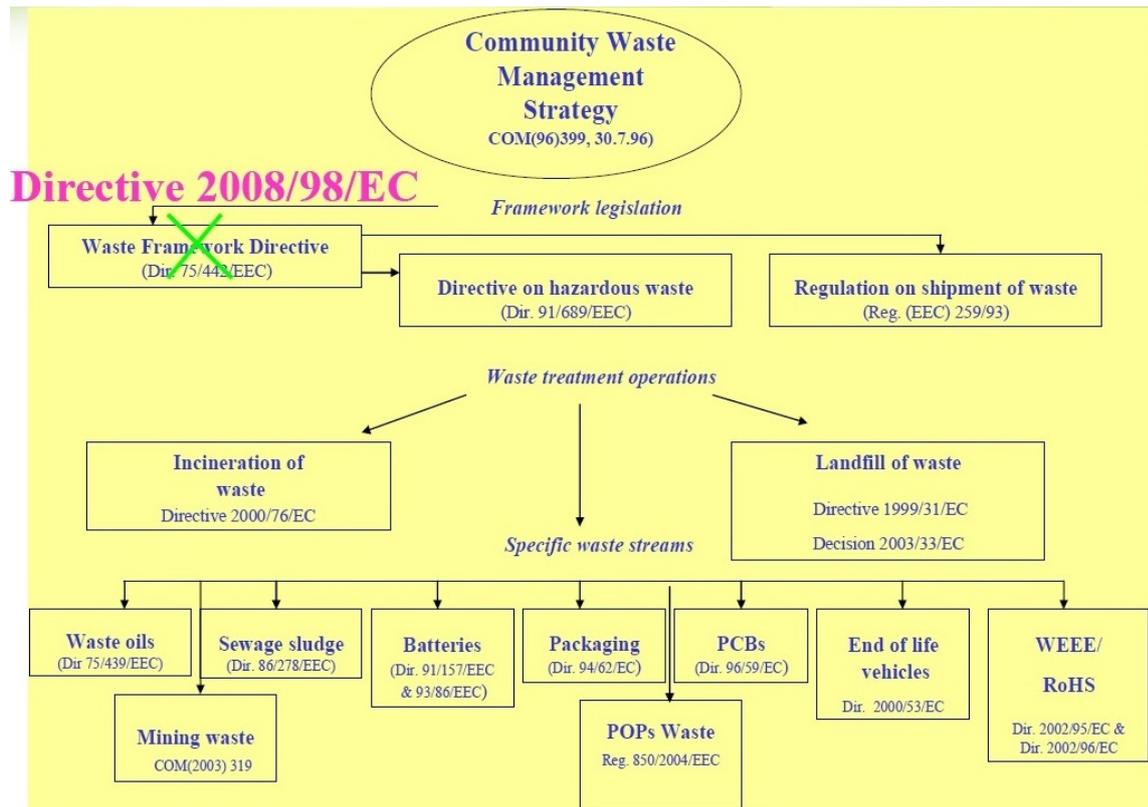
European Waste Policy was schematically presented and briefly described, as shown in the picture below.



This Project is funded by the European Union



A project implemented by Human Dynamics Consortium



European Framework legislation on waste management and waste treatment operations was as well, including Waste Framework Directive, Hazardous Waste Directive, and Regulation on Shipment of Waste, Incineration of Waste, and Landfill of Waste. Specific waste streams included subjects as sewage sludge, POPs, waste oils, end of life vehicles, packaging, and other. Mr. Ostoich presented the Italian legislation of waste and EU regulations transposed in the framework.

Directive 2008/98/EC on waste has been revised in order to modernise and streamline its provisions. The revised Directive sets the basic concepts and definitions related to waste management and lays down waste management principles such as the "polluter pays principle" or the "waste hierarchy". This Directive lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use. As well-known, the waste hierarchy applies in waste prevention and waste legislation and policy:

- Prevention;
- Preparing for re-use;
- Recycling;
- Recovery;
- Disposal.

However according to Zero Waste philosophy, that encourages the redesign of resource life cycles so that all products are reused, aiming to have no trash sent to landfills, the waste hierarchy is a bit different:

- Avoidance;
- Reuse;



- Material Recovery;
- Energy recovery;
- Landfilling.

European Waste Catalogue (EWC) was presented, which is a classification system for waste materials. It categorises waste based on a combination of what they are in the process or activity which produced them. EWC is divided into 20 chapters, covering waste from different industry sectors, processes or waste types. Within each chapter there is a list of generic waste types that are classified under the industry sector, process or waste type. The wastes have a detailed description. Each waste has a six-digit code, constructed as below:

- First pair of digits – correspond to the chapter number;
- Second pair of digits - correspond to the subheading number;
- Third pair of digits - correspond to the code number of the specific waste type in the subheading.

The EWC includes some code numbers followed by an asterisk “\*”. This signifies that any waste classified under that EWC number is considered to be Hazardous. Even though that Mr. Ostoich briefly went through the EU legislation regarding waste, more time was dedicated for the EU Directive of Waste and also for Directive on the landfill of Waste. According to the directive, landfill is a waste disposal site for the deposit of the waste onto or into land, including internal waste disposal sites and a permanent site, but excluding unloading waste facilities, storage of waste prior to treatment, and storage of waste prior to disposal. Article 4 defines classification of landfills. Each landfill shall be classified in one of the following classes:

- Landfill for hazardous waste;
- Landfill for non-hazardous waste;
- Landfill for inert waste.

Italian decree on waste was also presented. Top covers for landfills were presented. Waste is landfilled under biogas drain layer and compensation layer. Drainage layer however, is much longer in Italy, according to their law, than it is in the legislation. By the EU legislation, it should be 30 cm, but in Italy is 50 cm. The top layer for non-hazardous waste in Italy is shown on the following picture.



Integrated pollution and prevention (IPPC) Directive is dealing with control of polluted and contaminated air. On the other hand, there is not directive on an EU level on contaminated land. In EU countries, this is regulated by national laws and legislation. Part IV of the Italian Environmental Code bases the contaminated land regime on the "polluter pays" principle. The relevant local authority (Municipality/Commune) is responsible for the enforcement of the contaminated land regime. However, the Ministry of Environment is the enforcing authority for certain contaminated land identified as "Sites of National Interest - SIN". Venezia- Porto Marghera in one of these sites.

Anyone who becomes aware of a site being contaminated must communicate relevant information to the public authority. If the local authority identifies that a site is or might be contaminated, it must begin an investigation procedure and can order further investigation of a specific site. This will be carried out by a regional environmental protection entity or a suitably qualified commercial company. If the site is found to be contaminated (that is, the site contains substances exceeding certain thresholds provided in Ministerial Decree, or there is a significant threat of contamination, the competent local authority must make an order to require:

- A clean-up of the contaminated site in accordance with the requirements imposed by the competent authorities;
- Adoption of safety measures to avoid the migration of any contamination.

Any failure to comply with these provisions is a criminal offence.

In Veneto Region, with population of approximately five million people, monitoring plan was started in 2003 having the main purposes of:

- the identification through remote sensing of possible illegal dumps recently created or hidden in the past in the Veneto plain;
- the creation of an information system of possible polluting sources that may have an impact on the hydro-geologic system;
- the assignment, through GIS statistical analyses, of priorities for further analyses and field investigations on selected candidate sites.

Identification of illegal dump sites required the development of specific techniques based on the identification of physical anomalies produced by soil contamination. Thus, identification methods were based on the effects that contamination may produce on the radiometric properties of surfaces.

So far, around 51% of the local districts \*41 out of 91 provided feedback for information of potential illegal dump sites. According to the currently available information, the conclusion was that there likely are 130 contaminated sites. The entire Veneto plain cover an area of almost 2000 km<sup>2</sup>, 533 sites were documented, 37 investigated, and 19 confirmed to be contaminated.

There is a special national legislation for Venice lagoon, having a special discharge limit. The definition of limits was based on the basis of experimental monitoring.



## Communal Waste Management – Igor Scepovic

Mr. Scepovic presented how communal waste is managed in Podgorica. Podgorica population is around 200,000 people. The city covers area of 1,440 km<sup>2</sup>, of which 400 km<sup>2</sup> are plains, while the rest is mountainous. Master Plan on Waste Management was passed in 2004, Law on Waste Management in 2008, but before that, in 2002, City Authorities and Public Company “Communal Services” made an agreement for organised waste management and landfilling, as the practice was in EU at the time.

- First phase included a study of choosing a location for a landfill’
- Second phase was urbanistic project of “Sanitary landfill with recycling centre”;
- Third phase was an international tender for main project design;
- Fourth phase was an international tender for main project implementation;
- Fifth phase was projecting and construction of recycling centre for unselected and selected communal waste, which occurred from 2008-2010.

Public Company “Čistoća” is responsible for collecting and transport of waste, while public company “Deponija” is responsible for admitting the waste, recycling, processing and landfilling of waste. “Deponija” (“Landfill”) works 365 days a year with 160 employees and additional 70 contractors. It cover the area of 57 ha, while daily waste acceptance is up to 300 tons in 14 hours a day.

Urban project for recovery and construction of the landfill is planned to have six sanitary tubs, each with capacity of 480,000 m<sup>3</sup>, all six spreading on an area of 2,880,000 m<sup>2</sup>. Construction works of recovery and construction of landfill amounted to 6.5 million euros. With this project, Podgorica solved the question of landfilling until 2055. Some of the images before and after landfill recovery were showed.



The project of landfill rehabilitation was very demanding, both from a standpoint of protection ground water and air, and well as because of a vast amount of waste that had been disposed on the site in the last 40 years. Several illegal dump sites were identified in the city, but are foreseen for a recovery, according to a Waste Management Plan. Other things done and planned include:

- Completed aspiration of biogas on sanitary tubes 1 and 2;
- Eco torch was built in, for burning of landfill biogas with capacity of 800 Nm<sup>3</sup> per hour;
- Completed feasibility study for production of electricity and hot water from landfill biogas (planned for 2014);



Regional recycling centre was built in 2010 by a Spanish company “Leblan”, with the capacity of 90,000 tons per year of selected and non selected waste. The cost of investment was 5,000,000 euros. On the other hand, regional centre for treatment of old vehicles was constructed by the same Spanish company, with a daily capacity of 20 vehicles per day. The cost of this investment was approximately 1,200,000 euros.

Regional recycling centre was put in operation in 2010, serving apart from the city of Podgorica, also cities of Danilovgrad and Cetinje. From non-selected waste, the following materials are being separated:

- Cardboard and all kinds of paper;
- Plastic materials’
- PET packaging;
- HDPE plastic (in all colours);
- LDPE plastic (transparent in all colours);
- PP packaging;
- PS – polystyrene;
- ABS materials.

Separated paper and plastic material in RRCP are baled, pressed and sold on stock market in EU, according to COD. All EU regulations and standards are applied in RRCP. It has been working on analysis of capabilities for plastics processing on “Livade” landfill as technology continuation in Regional Recycling Centre.

The landfill area has also been horticulturally landscaped and revitalised.



So far, “Deponija” public company has managed to resolve:

- Disposal of municipal waste by 2050;
- Recycling of unselected communal waste for a capacity of 90,000 tons per year;
- Recycling of old, unused vehicles;
- Complete combustion of landfill biogas generated in the tubes, by anaerobic decomposition;
- Quality resolved issue of the office space.

Project that is in the process of realisation is a construction of facility for treatment (purification) for leachate from the landfill. On the other hand, in focus is also project that is in the process of preparation, regarding production of electricity by combusting landfill biogas in cogeneration.

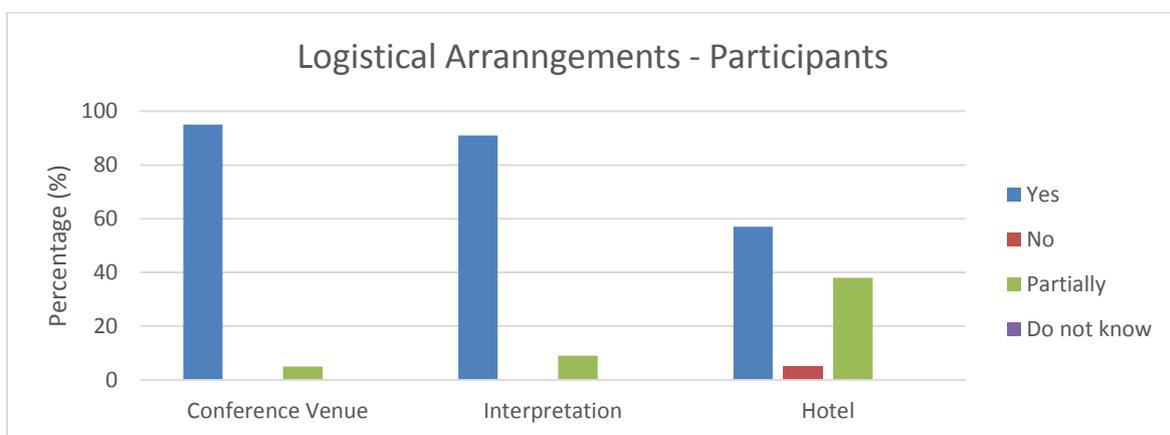
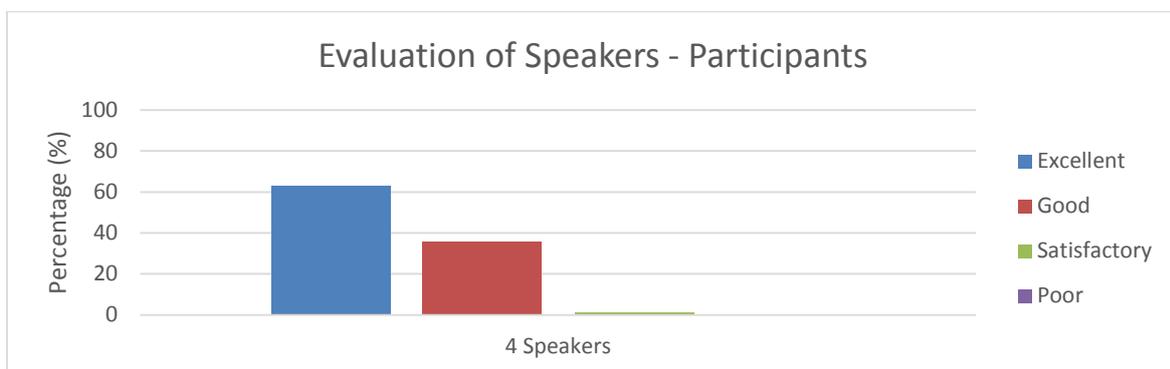
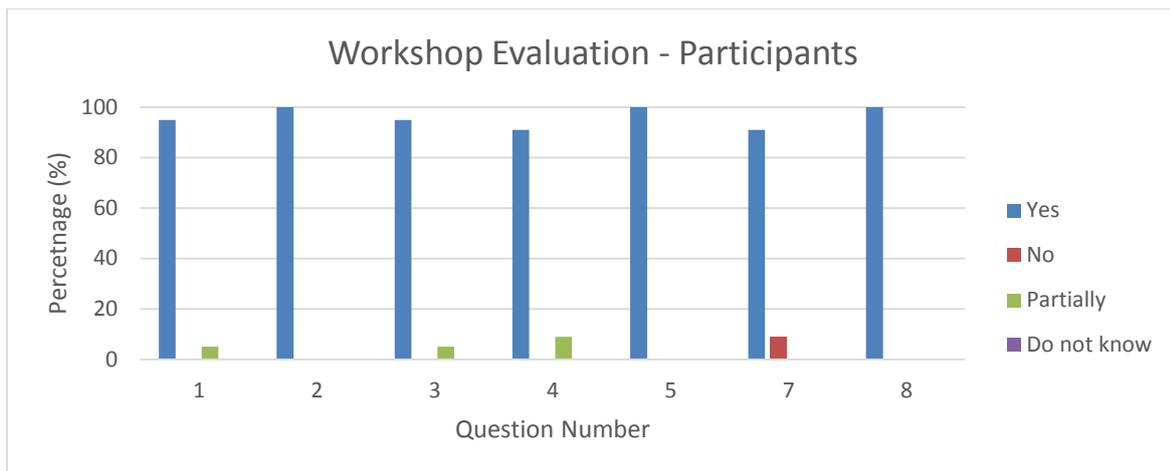


V. Evaluation

Workshop - participant Evaluation

Question	N°. Responses	Yes	No	Partially	Do not know	
1. Was the workshop carried out according to the agenda	22	21 (95)%	0 (0)%	1 (4)%	N/A	
2. Was the programme well structured?	22	22 (100)%	0 (0)%	0 (0)%	N/A	
3. Were the key issues related to the topics addressed?	22	21 (95)%	0 (0)%	1 (4)%	N/A	
4. Did the workshop enable you to improve your knowledge?	22	20 (90)%	0 (0)%	2 (9)%	N/A	
5. Was enough time allowed for questions and discussions?	22	22 (100)%	0 (0)%	0 (0)%	N/A	
6. How do you assess the quality of the speakers?	<b>Speaker/Expert</b>	<b>N°. Responses</b>	<b>Excellent</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Poor</b>
	4	77	48 (62)%	28 (36)%	1 (1)%	0 (0)%
Question	N°. Responses	Yes	No	Partially	Do not know	
7. Do you expect any follow-up based on the results of the workshop (new legislation, new administrative approach, etc.)?	22	20 (90)%	2 (9)%	N/A	N/A	
8. Do you think that further TAIEX assistance is needed (workshop, expert mission, study visit, assessment mission) on the topic of this workshop?	20	20 (100)%	0 (0)%	N/A	N/A	
9. Were you satisfied with the logistical arrangements, if applicable?	Conference venue	22	21 (95)%	0 (0)%	1 (4)%	0 (0)%
	Interpretation	22	20 (90)%	0 (0)%	2 (9)%	0 (0)%
	Hotel	21	12 (57)%	1 (4)%	8 (38)%	0 (0)%
<p>Comments:</p> <ul style="list-style-type: none"> <li>This TAIEX event was a good way for improving skills on implementation of Landfill of Waste Directive, particularly the example of how capital of Montenegro, Podgorica developed its waste management system and the establishment of a sanitary landfill. Workshops like this one are always necessary, especially in terms of presenting the experiences of other countries how they implemented the Landfill Directive.</li> <li>Regional workshop on remediation of landfills in the context of regional waste management was very successfully. Study visit in the landfill of Podgorica was interesting for implementation of this technology and in Albania. The knowledge of this training will be used and interpreted for us for training of inspectors in the regions.</li> <li>Ružica Radovic did not participate in workshop, but prof. Petar Zivkovic did.</li> </ul>						

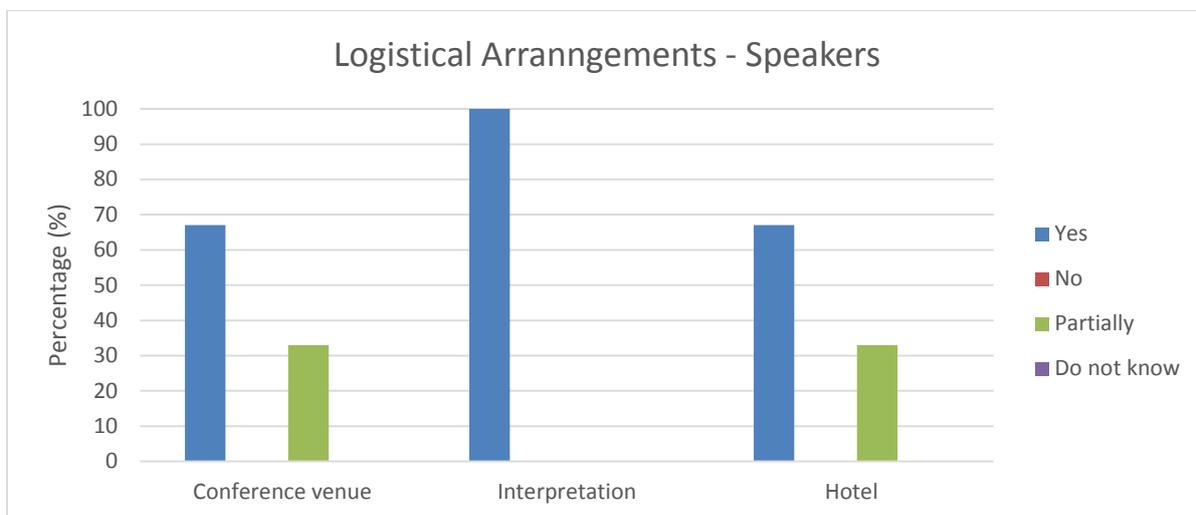
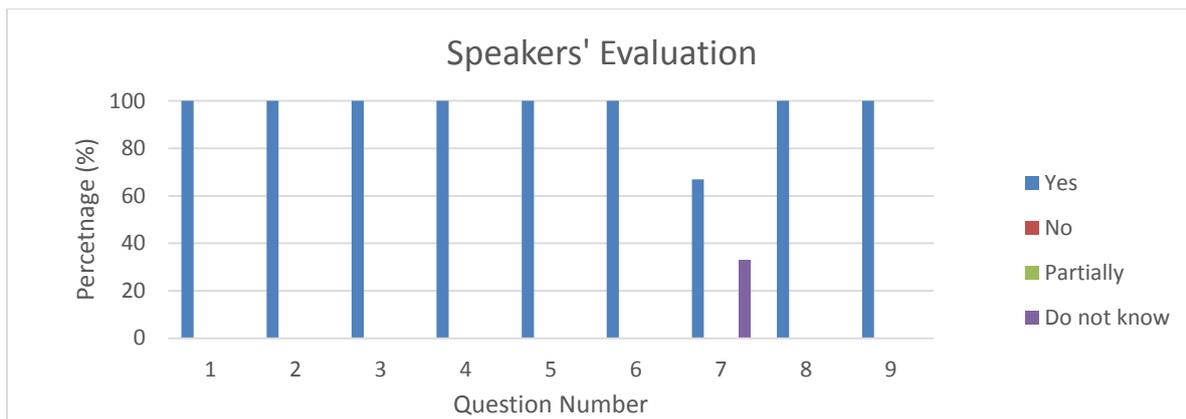




## Workshop - speaker Evaluation

Question	N°. Responses	Yes	No	Partially	Do not know	
1. Did you receive all the information necessary for the preparation of your contribution?	3	3 (100%)	0 (0%)	0 (0%)	N/A	
2. Has the overall aim of the workshop been achieved?	3	3 (100%)	0 (0%)	0 (0%)	N/A	
3. Was the agenda well structured?	3	3 (100%)	0 (0%)	0 (0%)	N/A	
4. Were the participants present throughout the scheduled workshop?	3	3 (100%)	0 (0%)	0 (0%)	N/A	
5. Was the beneficiary represented by the appropriate participants?	3	3 (100%)	0 (0%)	0 (0%)	N/A	
6. Did the participants actively take part in the discussions?	3	3 (100%)	0 (0%)	0 (0%)	N/A	
7. Do you expect that the beneficiary will undertake follow-up based on the results of the workshop (new legislation, new administrative approach etc.)	3	2 (66%)	0 (0%)	N/A	1 (33%)	
8. Do you think that the beneficiary needs further TAIEX assistance (workshop, expert mission, study visit, assessment mission) on the topic of this workshop?	3	3 (100%)	0 (0%)	N/A	N/A	
9. Would you be ready to participate in future TAIEX workshops?	3	3 (100%)	0 (0%)	N/A	N/A	
10. If applicable, were you satisfied with the logistical arrangements?	Conference venue	3	2 (66%)	0 (0%)	1 (33%)	0 (0%)
	Interpretation	3	3 (100%)	0 (0%)	0 (0%)	0 (0%)
	Hotel	3	2 (66%)	0 (0%)	1 (33%)	0 (0%)
<p>Comments:</p> <ul style="list-style-type: none"> <li>to be sure that all the issues faced during the Taiex event it could be necessary to prepare dedicated events for each country in order to discuss about specific problems-cases;</li> <li>Workshop was well prepared with interesting practical topics, related to waste management. Also site visit was organized on very good way. Rooms in hotel was good, but hotel was without internet access during the workshop, and also conference room was changed during the workshop.</li> </ul>						





## ANNEX I – Agenda

### Day 1 : Wednesday 30 September 2015

<b>Topic: Landfill directive</b>				
<b>Chair: Nebojsa Pokimica/Host country representative</b>				
<b>Venue: City Hotel, Crnogorskih Serdara 5, Podgorica, Montenegro</b>				
Start	Finish	Topic	Speaker	Sub topic/Content
08:30	09:00	<b>Registration</b>		
09:00	09:30	Address by the representative of the host country  Address by ECRAN	Dragan Asanovic, Assistant Minister, Ministry of Sustainable Development and Tourism  Nebojsa Pokimica, Waste Management WG Coordinator	Welcome  Objectives and expected results  Introduction and agenda  Adoption of the Agenda
09:30	10:30	Waste acceptance criteria	Francesco Loro, Waste management expert at Environmental Protection Agency of Veneto, Italy	Waste acceptance criteria in landfill and the risk analysis for landfill.
10:30	11:30	Landfill mining	Francesco Loro, Waste management expert at Environmental Protection Agency of Veneto, Italy	Landfill mining of an old urban waste landfill in Treviso province: the Spresiano Landfill
11:30	12:00	<b>Coffee Break</b>		
12:00	13:00	Landfilling intervention techniques	Mr. Marco Ostoich Remediation expert at Environmental Protection Agency of	<b><i>Old industrial dumps/landfills: intervention techniques and case studies presentation.</i></b>



			Veneto, Italy	
13:00	14:00	<b>Lunch Break</b>		
14:00	15:00	ECRAN country experiences	Representatives of ECRAN countries	Status of transposition and implementation of Landfill directive,  Remediation of landfill and dump sites.
15:00	16:30	Development of Waste management system of Podgorica	Prof. Petar Živković, Special adviser to Livade landfill ltd	Preparation for site visit  Remediation of old landfill  Construction of new landfill  Source and secondary separation  Recycling yards  Management of special waste streams
16:30	17:00	Summary conclusions and closure of the first day	Nebojša Pokimica, ECRAN	Wrap up  Preparation for the second day of the workshop



## Day 2: Thursday 1 October 2015

**Topic: Landfill directive**

**Chair: Nebojsa Pokimica/Host country representative**

**Venue: Site visit, Livade, Podgorica, Montenegro, Location Livade is 10 km from Podgorica**

**Venue: City Hotel, Crnogorskih Serdara 5, Podgorica, Montenegro**

Start	Finish	Topic	Speaker	Sub topic/Content
08:30	09:00	Registration		
09:00	09:15	Transport to the site		
09:00	13:45	Site visit, Landfill Livade Podgorica	Dragan Asanovic, Assistant Minister, Ministry of Sustainable Development and Tourism  Prof. Petar Živković, Special adviser to Livade landfill ltd	Remediation of old landfill  Construction of new landfill  Source and secondary separation  Recycling yards  Management of special waste streams
13:45	14:00	Transport back to the hotel		
14:00	15:00	<i>Lunch Break</i>		
15:00	16:30	Site visit discussion, conclusions and wrap up	Dragan Asanovic, Assistant Minister, Ministry of Sustainable Development and Tourism  Nebojsa Pokimica, ECRAN	



## ANNEX II – Participants

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### ANNEX III – Presentations (under separate cover)

Presentations can be downloaded from:

[http://www.ecranetwork.org/Files/Workshop\\_ppt\\_Remediation\\_of\\_Landfills\\_September\\_2015\\_Podgorica.zip](http://www.ecranetwork.org/Files/Workshop_ppt_Remediation_of_Landfills_September_2015_Podgorica.zip)



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