



## Introduction

Due to its complexity, environmental protection has been recognized as one of the most demanding areas in the process of approximation to the EU *acquis communautaire*.<sup>1</sup> The Republic of Croatia (RC) was granted the status of a candidate country for EU membership on 18 June 2004. Accession negotiations with the EU were launched in 2005 and Croatia is looking forward to becoming a member as early as 2010.

### 1. Waste Management – Current State

Waste management is the biggest problem in the environment sector in Croatia. Key issues are: increase in solid waste, very limited recycling, unreliable data concerning waste flows and quantities, and lack of organized disposal sites. Concerning the complexity of the sector, administrative capacity is weak and strategies for financing the significant investments necessary are lacking. The division of responsibilities for operational aspects of environmental protection and lack of coordination between ministries continues to hamper progress. This sector presents a major challenge for Croatia and will require significant efforts during the process of harmonization with the EU *acquis*.

The total amount of produced waste in Croatia is estimated at approximately 13.2 mil. t/year or approximately 2.97 t of waste annually per capita (Table 1). In the next ten years, one of the

<sup>1</sup> Environmental *acquis communautaire* is a collective term for all the policies, laws, directives and goals in the area of environment agreed with the EU

greatest national problems, waste management problem and especially hazardous waste management problem should be solved. Croatia primarily depends on communal waste disposal sites (some 90 % of waste is disposed of in this manner) and only 1% is composted. There are only two compost plants for organic waste, both located in Zagreb. Waste separated for recycling amounts to about 27.000 t, of which about 48% is paper, 42% glass, and approximately 10% other waste.

| <b>Waste</b>                | <b>Amount<br/>(million tons/year)</b> |
|-----------------------------|---------------------------------------|
| Municipal                   | 1.2                                   |
| Construction and demolition | 2.6                                   |
| Industrial and mining       | 1.6                                   |
| Agricultural and forestry   | 7.1                                   |
| Hazardous                   | 0.1                                   |
| Collected separately        | 0.2                                   |
| Other                       | 0.4                                   |
| <b>Total</b>                | <b>13.2</b>                           |

*Table 1. Estimate of annual amount of waste*

### **1.1. Municipal waste**

By definition, municipal waste is waste from households, waste from production activities and/or services. An average of 92.8% of the population of Croatia is covered by organized municipal waste collection, varying from 50% in some counties up to almost 100% in Zagreb.

Disposal of municipal waste in Croatia is carried out by 199 utility companies and concession holders registered for the collection and landfill of municipal waste.

### **Municipal Waste Treatment Technology**

The selection of a waste treatment technology is based on the cost-effectiveness analysis, taking into account the choice of the best available technology (BAT) not involving excessive costs. The applied municipal waste treatment technology will be mechanical biological treatment (MBT) of waste. Given the large number of MBT variants, the term covers plants differing considerably with respect to the level of equipment and operating conditions.

Given the difference in the quality of specific waste treatment procedures, a strict waste disposal hierarchy has been defined by European directives and the Waste Act.

**WASTE GENERATION PREVENTION ► REUSE ► MATERIAL RECOVERY ►  
ENERGETIC RECOVERY OR OTHER TYPES OF TREATMENT PRIOR TO FINAL  
DISPOSAL OF RESIDUAL WASTE**

## 1.2. Landfills

The largest quantities of generated waste still end up on landfills. The country has 252 registered waste landfills, which are used by public utility companies or waste disposal concessionaires. It is estimated that a further 3.000 uncontrolled dump sites exist in Croatia. The country has no official landfill for the disposal of hazardous waste. The small number of organized official, and the great number of uncontrolled dump sites have a detrimental effect on the environment, the quality of life and the development of tourism. Inspection is not sufficient, penalties inadequate, education insufficient.

## 2. Legislation and Related Documents

The new, general **Law on Environmental Protection** came into effect on November 2, 2007. It includes all the environmental sectors: water, air, waste, chemicals etc. and it is fully harmonized with the EU *acquis*. Since 2005, in accordance with Article 104 of Waste Act (OG 178/04, OG 111/06), new legislation for the management of specific waste categories has been established (packaging and packaging waste, waste tires, end-of-life vehicles, waste oils, waste batteries and accumulators).

**2.1. Waste Management Strategy of the Republic of Croatia** (hereinafter the Strategy; OG 130/05) - adopted in 2005 pursuant to Article 8 of the Waste Act. This strategy is based on general EU waste management principles and represents a real framework for the implementation of the sustainable waste management in Croatia by the year 2025. It seeks to provide a realistic concept for the effective reduction of national waste load. Gradual organization of regional and county waste management centers with treatment plants and landfills has commenced in 2006. According to an estimate, the implementation of the Strategy will cost over USD 5 billion.

**2.2. Plan of Waste Management in the Republic of Croatia (RC) 2007 – 2015** (hereinafter the Plan, OG 85/2007). On the basis of the Strategy, the Waste Management Act (OG 178/2004 and 111/2006), other relevant regulations and the practice and guidelines of the EU, the Plan was adopted by the Government of the RC in July 2007 as an implementation document.

Through the implementation of the Plan the following shall be accomplished:

- a) establishment of an integrated waste management system in each county;
- b) increase of the share of separately collected waste;
- c) recycling and re-use of waste;
- d) pre-treatment of waste before final disposal;
- e) reduction of biodegradable waste in municipal waste;
- f) reduction of quantities of waste deposited on landfills;
- g) self-sustainable financing of the municipal WM system.

The Plan includes:

- Waste types, quantities and origin;
- Procedures for management of special waste categories;

- Network/locations of plants and facilities for the waste recycling and management, and deadlines for their construction;
- General technical requirements for the waste management plants and facilities;
- Assessment and sources of funds necessary for realization of the waste managements goals.

Realization of the Plan is supervised by the [Ministry of Environmental Protection, Physical Planning and Construction](#) .

Adoption of the Waste Management Strategy and Plan is of a particular importance for the RC, because they are initiating changes that will gradually solve the existing problems, improve the system and direct the RC toward the sustainable waste management and accession to the EU. A major problem is planning (or lack of it) of sites for waste storage and treatment/disposal facilities in the planning documents.

#### 4. Integrated Waste Management System (WMS)

Based on the 3R (Reduce, Recycle, Recover/Reuse) Waste Management Concept (Fig. 1),

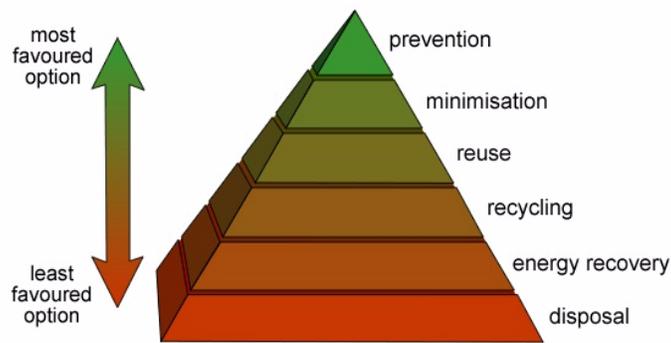


Fig. 1

the Integrated WMS will be developed in Croatia according to the following timetable (Table 1):

| Period   | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|--|------|------|------|------|------|------|------|------|------|
| 1. Adoption of waste management plans (counties, The City of Zagreb) |      |      |      |      |      |      |      |      |      |
| 2. Establishment of county and regional WM Centres                   |      |      |      |      |      |      |      |      |      |
| 3. Supervision of the Plan's implementation                          |      |      |      |      |      |      |      |      |      |

Table 1: Timetable for the establishment of an integrated WM system in Croatia

**The integrated WMS consists of: separate waste collection, mechanical-biological and thermal treatments and disposal in newly established regional or county waste disposal centers organized according to the EU directives.** At present, Croatian cities and counties organize the collection and land filling of waste in a way which cannot be called an integrated WMS. Separate waste collection is carried out through integrated expert planning and competition in which the private and public sectors take part.

Waste management and the improvement of existing effects arising from the inadequate management of waste are of particular importance in the achievement of sustainable development. It is therefore necessary to establish an **integral information system** for waste management, to rehabilitate the existing and close “wild” landfills, and establish the WM centers.

#### **4.1. Institutional Framework**

The framework of the envisaged WMS is determined by law, governing bodies and institutions. The WMS includes the following stakeholders:

##### **- Stakeholders**

###### **National level:**

- [Ministry of Environmental Protection, Physical Planning and Construction](#)
- [Croatian Environment Agency \(CEA\)](#)
- [Fund for Environmental Protection and Energy Efficiency](#)
- [Croatian Bureau of Statistics](#)
- Other state administration bodies competent for e. g. agriculture, health, forestry, etc.

###### **Regional Level**

- State Administration Offices in counties / City of Zagreb Office

###### **Local Level**

- City / Municipality Office / City of Zagreb Office

###### **Other Stakeholders:**

- Companies producing / collecting / treating waste
- Legal persons having preliminary clearance (issued by the Ministry)
- Laboratories
- Non-governmental organizations

## **5. Major Projects**

### **► Remediation of landfills**

[Fund for Environmental Protection and Energy Efficiency](#) and local self-government units have already been engaged in the process of remediation of the existing landfills according to the EU Instruction 1999/3/EC on waste disposal. Remediation of 292 official non-sanitary landfills started in 2004. The total value of the investment is estimated to be USD 570 million. After remediation, the majority of the former landfills will be turned into transshipment stations and recycling yards and the remainder will be closed within a five-year period.

### ► New regional and county WM centers

Gradual organization of 4 regional and 21 county waste management centers with treatment plants and landfills has commenced in 2006. According to [Ministry of Environmental Protection, Physical Planning and Construction](#) the establishment of these centers should be completed in five years time. Construction of centers is financed from the state budget, local self-government units and EU pre-accession funds (80%), and the remainder through the public-private partnership.

### ► Zagreb city incinerator for municipal waste

The major landfill in Croatia Prudinec-Jakusevac where waste from the capital Zagreb and surrounding area is disposed, is expected to be closed in 2012. Instead, the Zagreb City Council ([www.zagreb.hr](http://www.zagreb.hr)) and [Ministry of Environmental Protection, Physical Planning and Construction](#) have approached the EBRD (European Bank for Reconstruction and Development) to fund a 385,000 tones-per-year waste-to-energy plant for which the official cost estimate is USD 255 million. The incinerator will be constructed next to the central wastewater treatment plant and the sewage sludge, together with the municipal waste, will be used for energy generation.

*The counties and the City of Zagreb are bound to define WMC locations by the end of 2007.*

### ► Center for the hazardous waste management with a collection network

About 213,000 tons of hazardous waste is generated in Croatia per year. For carrying out activities of collection and temporary storage of hazardous waste, as well as disposal and recovery, it is necessary to obtain a permit in accordance with Article 41 of the Waste Act. At present in Croatia there are no controlled locations for land filling hazardous waste (waste which cannot be recycled, recovered, etc.) and it is mostly exported for land filling abroad.

Projects, especially those to be funded or co-funded from EU funds and international banks and institutions, must be of sufficient scale to have a significant impact in the field of environmental protection. Maximum opportunity should be given to the involvement of the private sector in particular with relation to waste segregation, recycling and waste treatment activities.

## 6. Sources of Financing

The assessment of the investments necessary for the implementation of the Strategy during next 20 years amounts to approximately USD 4,65 billion. Of that USD 4,65 billion, more than USD 3,3 billion is necessary for the communal waste disposal. Anticipated sources of financing are from:

### 6.1. Public sources:

- *State Budget;*
- *Environmental Protection and Energy Efficiency Fund (The Fund)*
- *County budgets and City of Zagreb Budget;*
- *Municipality / city budgets.*

## 6.2. Other sources

- *Commercial capital* – leasing market and proprietary shares;
- *Concessions and other public/private partnerships*;
- *IPA (Instrument for Pre-Accession Assistance)*, the new single EU pre-accession assistance for the period 2007 – 2013 has replaced CARDS and pre-accession programs PHARE, ISPA and SAPARD. Its objective is to assist candidate countries in the process of gradual harmonization with the EU *acquis communautaire*. Pursuant to the Croatian Government Regulation of 28 September 2006, the [Central Office for Development Strategy and Coordination of EU funds](#) is the body competent for an overall coordination and preparation for the use of the IPA program in the Republic of Croatia. IPA program is available to Croatia from 2007 until Croatia's accession to the EU. In the period until 2010, the amount allocated to Croatia is USD 885 million, starting with USD 92.3 million in 2007 with a foreseen permanent increase of the annual amount of funds which in 2010 should amount to USD 231.3 million.
- *International financial institutions*.

According to plans, half of necessary resources should be provided from public resources and the remaining part from other sources.

Considering present relatively low charge levels for waste in RC, it is necessary to plan constant gradual growth of waste charges. Waste disposal costs - the user charges pay for rendering of the utility services of waste collection, transport and disposal. The tariff is most frequently (in 90% of cases) determined on the basis of an occupied floor area (HRK/m<sup>2</sup>).

Private investment should be stimulated for recycling systems for secondary raw material separated from waste by primary selection. Private investment may be stimulated in waste management centers but in the first place as public private partnerships.

## 7. What American companies need to do to participate in waste management infrastructure/environmental projects in Croatia?

American companies should either establish their daughter-companies in Croatia or find a partner in Croatia.

### 7.1. Croatian companies involved in waste management projects:

- **Produkt d.o.o.** - construction works  
E-mail: [product@zg.t-com.hr](mailto:product@zg.t-com.hr)
- **Viadukt d.d.** - construction works  
[www.viadukt.com](http://www.viadukt.com)
- **IGH-Institut gradjevinarstva Hrvatske d.d.** – consultancy, design, supervision  
[www.igh.hr](http://www.igh.hr)
- **Elektroprojekt d.d.** – consultancy  
[www.elektroprojekt.hr](http://www.elektroprojekt.hr)

- **Ekonerg d.o.o.** – consultancy, construction, design  
[www.ekonerg.hr](http://www.ekonerg.hr)
- **ECOINA, d.o.o.** – consultancy  
[www.ecoina.hr](http://www.ecoina.hr)
- **Investinzenjering d.o.o.** – consultancy  
[www.gin.hr](http://www.gin.hr)
- **Civil Engineering Faculty, Zagreb** - consultancy  
<http://info.grad.hr/gf/>
- **Civil Engineering Faculty, Split** – consultancy  
[www.gradst.hr](http://www.gradst.hr)
- **IPZ Uniprojekt MCF d.o.o.** – engineering and consultancy  
[www.ipz-uniprojekt.hr](http://www.ipz-uniprojekt.hr)
- **Konstruktor-Inzenjering d.d.**, Zagreb / Split - construction works  
[www.konstruktor-split.hr](http://www.konstruktor-split.hr)
- **Werkos d.o.o.**, Osijek - construction works  
[www.werkos.com](http://www.werkos.com)

**7.2. U.S. firm eligibility to receive EU funding for projects:**  
[http://www.buyusa.gov/europe/environment\\_eu\\_funding.html](http://www.buyusa.gov/europe/environment_eu_funding.html)

**7.3. Tenders are invited on:**

- **state level** by:
  - Ministry of Environmental Protection
  - Fund of Environmental Protection and Energy Efficiency
- **Counties and cities / local management** level for:
  - remediation of existing landfills
  - construction of new waste management centers

**8. Type of Projects**

Waste projects are planned to be on the basis of concessions through the public-private partnership.

Zagreb waste-to-energy plant (incinerator) is planned on a Build Operate Transfer (BOT) basis.

**9. Competition**

Croatian companies involved in waste management projects

**10. Current Waste Management Sector Market Demand**

lining / insulation, impermeable foils for prevention of landfill leachate, bentonit, sludge treatment equipment, conveyors, compactors, facilities/equipment for mechanical biological waste treatment, recycling equipment, equipment for recycling of construction waste

## 11. Useful Contacts

[Ministry of Environmental Protection, Physical Planning and Construction](#) - [www.mzopu.hr](http://www.mzopu.hr)

[Agency for Environmental Protection](#) - [www.azo.hr](http://www.azo.hr)

[Fund for Environmental Protection and Energy Efficiency](#); [www.fzoeu.hr](http://www.fzoeu.hr)

[Central Office for Development Strategy and Coordination of EU funds](#) [www.strategija.hr](http://www.strategija.hr)

[EBRD-European Bank for Reconstruction and Development](#)

[www.ebrd.com/country/country/croatia/index.htm](http://www.ebrd.com/country/country/croatia/index.htm)

### For More Information

The U.S. Commercial Service in Zagreb, Croatia can be contacted via e-mail at:

[dalila.uzelac@mail.doc.gov](mailto:dalila.uzelac@mail.doc.gov) ; Phone: +(385 1) 661-2224; Fax: +(385 1) 661-2446 or visit our website:

<http://www.buyusa.gov/croatia/en/>

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