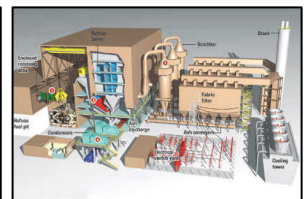


***"Romania – Identification of future waste management projects (2014 – 2020)"***



**FINAL BASELINE REPORT**

**28<sup>th</sup> FEBRUARY 2012**

ENVIROPLAN S.A.

40 Ag. Konstantinou str

15124 Maroussi/Athens - Greece

Tel: +30 210 6105127 / 8

Fax: +30 210 6105138

Email: fl@enviroplan.gr

Assignment: JASPERS Support – Technical Assistance to Beneficiary  
Countries- Romania  
LOT 2: Solid Waste (2014 – 2020)  
Reference No: 2010/ S85-126779

Document title: **Final Baseline Report**

Status: Final

Date: 28/02/2012

Client: **EUROPEAN INVESTMENT BANK – JASPERS Unit**

Drafted by: Mr. George TAVOULARIS –MSW-CBA-Expert  
Mrs. Marinela Manea – Institutional Expert  
Mr. Adrian Gibbs – SWM / Environmental Expert  
Mr. Mike Brown – SWM / Environmental Expert  
Mr. Dominic Hoggs – SWM / Environmental Expert  
Mr. Chris Sherrington – Financial Expert  
Mr. Adam Baddeley – SWM / Environmental Expert

Checked – Approved by: Theofanis Lolos – Team Leader

Date/Initials check: 28/02/2012

# Contents

<b>Contents</b> .....	<b>b</b>
<b>Annexes</b> .....	<b>d</b>
<b>Annexes</b> .....	<b>d</b>
<b>Tables</b> .....	<b>d</b>
<b>Figures</b> .....	<b>d</b>
<b>Abbreviations</b> .....	<b>e</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>i</b>
<b>1. Introduction and Scope of Assignment</b> .....	<b>1</b>
1.1. Introduction and Objectives .....	1
1.2. Scope of Study .....	2
<b>2. Waste Management and Institutional Arrangements in Romania – Key findings</b> .....	<b>3</b>
<b>3. EUROPEAN POLICY AND ROMANIA WASTE MANAGEMENT STRATEGY</b> .....	<b>6</b>
3.1. European Policy and Implications for Romania – Key findings.....	6
3.2. Review of Romanian National Waste Strategy and Plans .....	9
<b>4. County Overviews</b> .....	<b>14</b>
4.1. Introduction - Methodology .....	14
4.2. COUNTIES NOT PREVIOUSLY INCLUDED IN THE 2007-2013 SOP (CATEGORY I).....	16
4.2.1. <i>Counties presentation</i> .....	16
4.2.2. <i>Waste statistics</i> .....	16
4.2.3. <i>Existing infrastructure</i> .....	16
4.2.4. <i>Planned infrastructure</i> .....	17
4.2.5. <i>Critical remarks for category I counties</i> .....	17
4.3. COUNTIES PREVIOUSLY INCLUDED IN THE 2007-2013 SOP, BUT UNABLE TO COMPLETE AN APPLICATION (CATEGORY II).....	17
4.3.1. <i>Counties presentation</i> .....	17
4.3.2. <i>Waste statistics</i> .....	18
4.3.3. <i>Closure of non-compliant landfills in the current and next programming period</i> ....	18
4.3.4. <i>Current and planned waste disposal facilities</i> .....	18
4.3.5. <i>Provisions in terms of reaching the packaging waste targets</i> .....	18
4.3.6. <i>Provisions in terms of reaching the diversion targets</i> .....	21
4.3.7. <i>Possibility that the projects be included within SOP 2014-2020</i> .....	23
4.4. COUNTIES THAT HAD AN APPLICATION APPROVED AND WILL COMPLETE THE PROJECT BY 2015 THE LATEST (CATEGORY III) .....	24
4.4.1. <i>Counties presentation</i> .....	24
4.4.2. <i>Category III - Waste statistics</i> .....	24

4.4.3.	<i>Closure of non-compliant landfills in the current and next programming period ....</i>	25
4.4.4.	<i>Current and planned waste disposal facilities .....</i>	26
4.4.5.	<i>Provisions in terms of reaching the packaging waste targets.....</i>	28
4.4.6.	<i>Provisions in terms of reaching the diversion targets .....</i>	31
4.4.7.	<i>Overview of investment costs and unit capital costs.....</i>	35
4.4.8.	<i>Capacity for co-incineration in cement kilns.....</i>	35
4.5.	<b>CONCLUSIONS – RECOMMENDATIONS .....</b>	<b>38</b>

## Annexes

**ANNEX I: WASTE MANAGEMENT AND INSTITUTIONAL ARRANGEMENTS IN ROMANIA**

**ANNEX II: REVIEW OF EUROPEAN POLICY AND IMPLICATIONS FOR ROMANIA**

**ANNEX III: NATIONAL WASTE STRATEGY AND PLANS**

**ANNEX IV: ASSESSMENT OF SITUATION IN EACH CATEGORY III-COUNTY**

**ANNEX V: MAPS FOR CURRENT AND PLANNED CAPACITIES OF SWM INFRASTRUCTURE**

**ANNEX VI: DESIGNED CAPACITIES AND COST FOR TECHNICAL MEASURES**

**ANNEX VII: DETAILED PROJECT FICHES FOR EVERY COUNTY**

## Tables

<b>TABLE 1: WASTE MANAGEMENT IN ROMANIA - KEY FINDINGS.....</b>	<b>3</b>
<b>TABLE 2: EUROPEAN POLICY AND IMPLICATIONS FOR ROMANIA.....</b>	<b>6</b>
<b>TABLE 3: KEY FEATURES OF NATIONAL WASTE MANAGEMENT STRATEGY.....</b>	<b>9</b>
<b>TABLE 4: KEY COMMENTS ON NATIONAL ACTION PLAN FOR MUNICIPAL WASTE MANAGEMENT FROM THE 2004 NATIONAL WASTE PLAN (PART II CHAPTER II.4).....</b>	<b>10</b>
<b>TABLE 5: THE (CURRENT) DRAFT WASTE MANAGEMENT STRATEGY – KEY FEATURES.....</b>	<b>12</b>
<b>TABLE 6: LIST OF DOCUMENTS PROVIDED TO THE CONSULTANT PER COUNTY.....</b>	<b>15</b>
<b>TABLE 7: BIODEGRADABLE WASTE DATA.....</b>	<b>16</b>
<b>TABLE 8: WASTE DISPOSAL FACILITIES IN CATEGORY II COUNTIES.....</b>	<b>18</b>
<b>TABLE 9: SORTING FACILITIES IN CATEGORY II COUNTIES.....</b>	<b>20</b>
<b>TABLE 10: WASTE DIVERSION FACILITIES IN CATEGORY II COUNTIES.....</b>	<b>22</b>
<b>TABLE 11: WASTE DISPOSAL FACILITIES IN CATEGORY III COUNTIES.....</b>	<b>26</b>
<b>TABLE 12: SORTING FACILITIES IN CATEGORY III COUNTIES.....</b>	<b>29</b>
<b>TABLE 13: WASTE DIVERSION FACILITIES IN CATEGORY III COUNTIES.....</b>	<b>32</b>
<b>TABLE 14: SUMMARY OF SOP1 FINANCIAL COSTS.....</b>	<b>35</b>
<b>TABLE 15: MEETING THE EU DIRECTIVE TARGETS.....</b>	<b>41</b>

## Figures

<b>FIGURE 1: COMPOSITION OF SEPARATELY COLLECTED WASTE (SOURCE: REPORT ON THE STATE OF ENVIRONMENT IN ROMANIA, NEPA 2010, DATA OF 2009).....</b>	<b>3</b>
<b>FIGURE 2: EU WASTE HIERARCHY.....</b>	<b>6</b>
<b>FIGURE 3: PACKAGING WASTE GENERATION IN CATEGORY I COUNTIES.....</b>	<b>16</b>
<b>FIGURE 4: CAPACITIES OF WASTE TREATMENT TECHNOLOGIES IN CATEGORY II COUNTIES.....</b>	<b>23</b>
<b>FIGURE 5: BIODEGRADABLE AND PACKAGING WASTE FORECAST FOR 2013 (CATEGORY III COUNTIES) ....</b>	<b>23</b>
<b>FIGURE 6: CAPACITIES OF WASTE TREATMENT TECHNOLOGIES IN CATEGORY III COUNTIES.....</b>	<b>29</b>

## Abbreviations

Abbreviation	Definition
ACIS	Association for Computer and Information Science
AD	Anaerobic Digestion
AF	Application Forms
B2B	Business to Business
B2C	Business to Consumer
BAT	Best Available Techniques
BATNEEC	Best Available Technology Not Entailing Excessive Cost
BDW	Biodegradable Waste
BMW	Biodegradable Municipal Waste
CBA	Cost Benefit Analysis
CLRTAP	Convention on Long range Trans-boundary Air Pollution
CN	Completion Note
CP	County Plan
CSG	Community Strategic Guidelines
DDT	Dichlorodiphenyltrichloroethane
EGO	Emergency Government Ordinance
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EN	English
EPA	Environmental Protection Agency
EWC	European Waste Catalogue
FS	Feasibility Study
GNP	Gross National Product
HCB	Hexachlorobenzene
IPA	Instrument for Pre-Accession Assistance
ISPA	Instrument for Structural Policies for Pre-Accession
ISWM	Integrated Solid Waste Management
IT	Information Technology
J/V	Joint Venture
JASPERS	Joint Assistance to Support Projects in European Regions
JRC	Joint Research Center
MA	Managing Authority
MAI or MIA	Ministry of Administration and Interior
MBT	Mechanical and Biological Treatment
MEC	Ministry of Economy and Trade (for the other references)
MERYS	Ministry of Education, Research, Youth and Sport
MEWM	Ministry of Environment and Water Management
MFP	Ministry of Public Finance
MoEF or MEF	Ministry of Environment and Forests
MoEF -DPE	Ministry of Environment and Forests -Directorate for Programs and Evaluation
MoEF- DWMHS	Ministry of Environment and Forests-Directorate of Waste Management and Hazardous Substances

Abbreviation	Definition
MP	Master Plan
MTCT	Ministry of Transport and Infrastructure
n.a/ N.A.	Not applicable
n.s	Not specified
NEPA	National Environmental Protection Agency
NGOs	Non-Governmental Organizations
NIMBY	Not In My BackYard
NIS	National Institute of Statistics
NSRF	National Strategic Reference Framework
NSWM	National Waste Management Strategy
NWMP	National Waste Management Plan
Octa BDE	Octa Brominated Diphenyl Ether
OP	Operational Programme
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychloinated Biphenyls
Penta BDE	Penta Brominated Diphenyl Ether
POPs	Persistent Organic Pollutant
RDF	Refuse Derived Fuel
REPAs	Regional Environmental Policy Agency
RO	Romanian
RoHS	Reduction Of Hazardous Substances
ROP	Regional Operational Programme
SOP	Sectoral Operational Programme
SOP ENV	Sectoral Operational Programme for Environment
SRF	Solid Recovered Fuels
SWM	Solid Waste Management
tn	Tone
tn/y	Tone per year
ToR	Terms of Reference
TS	Transfer Station
UNECE	United Nations Economic Commission for Europe Convention
WEEE	Waste Electrical and Electronic Equipment
WFD	Waste Framework Directive
WID	Waste Incineration Directive
WM	Waste Management
WtE	Waste To Energy

## EXECUTIVE SUMMARY

The Consortium: **ENVIROPLAN S.A. – LOUIS BERGER France S.A.S – KOCKS Consult GmbH – ICP mbH – C&E Consulting und Engineering GmbH**, is providing services in the assignment: **“Romania – Identification of future waste management projects (2014 – 2020)”**. The overall objective of the current assignment is to assist JASPERS staff in identifying a pipeline of waste management projects in Romania that could be co-funded by the EU in the next programming period (2014-2020).

The present document constitutes the first deliverable, *the Baseline Report*. It includes a detailed recording of the current waste management situation in Romania’s 42 counties. More specifically, the report presents the baseline for further research and analysis for JASPERS in order to be identified beneficial waste management projects in Romania that could be co-funded by the EU within the 2014-2020 Sectoral Operational Programme for Environment (referred to in this work as SOP2). The project’s objective is to estimate the waste management situation in Romania’s 42 counties at the end of the current 2007-2013 programming period (as a result of current planned waste management developments) and to identify a pipeline of new projects required within SOP2. These projects should meet the 50% recycling target for 2020 in the revised Waste Framework Directive (WFD), as well as other core pieces of European legislation, and comply with Romania’s waste management strategy.

### **EU and Romania Policy Background**

**EU Waste Policy** (which Romania is bound to comply with) is detailed in a number of directives, namely the Waste Framework Directive, the Landfill Directive, the Waste Incineration Directive and the Packaging Waste Directive, as well as target specific waste streams (such as electric and electronic equipment, end-of-life vehicles, batteries etc.). Overall EU policy sets ambitious targets that provide strong drivers for large scale developments and investments in the Solid Waste Management sector during the coming years.

The **Landfill Directive** set specific targets (e.g. reduction of biodegradable waste disposed to landfill) as well as technical measures (for example, the requirement to pre-treat waste prior to landfilling). **In Romania**, measures currently in place or even programmed for the period are not fully dealing with the responsibility for meeting future targets of 2013 and 2016, while it is also unknown whether the planned facilities will be fully operational so as to meet the requirements of the Directive and the existing Romanian waste policy.

The **Waste Framework Directive**, as the main driver for future project development, gives greater emphasis to the waste hierarchy and waste prevention, sets specific requirements including: 1) recycling of at least 50% and 70% (household and construction / demolition waste respectively); 2) ensuring mechanisms are in place for the separate collection of glass, metals, paper and plastic; 3) implementing measures designed to lead to separate collection of bio-waste; 4) implementing policies or mechanisms that encourage the use of products of bio-waste management; and 5) promoting the concept of resource efficiency. **In Romania**, the National Waste Management Strategy (NWMS) provides the framework that sets Romania’s policy and strategic objectives concerning waste management. The NWMS is currently undergoing revision (as NWMS2), to incorporate recent EU policy. Evidently, if Romanian policy and strategy development is to be future-proofed, the issue of waste prevention and decoupling waste generation from economic growth needs to be carefully considered.

### **The Current Situation in Romania**



Key observations include:

- ▶ Approximately 63% of the population is connected to sanitation services at national level, out of which 84% in urban area and 38% in rural area.
- ▶ The national practice is mixed waste collection (approximately 96% of the household and similar wastes are collected in a mixed bin), without separation at source.
- ▶ Waste treatment is done in small extent and only for certain waste streams.
- ▶ In 2009 more than 95% of the collected waste has been disposed on landfills.
- ▶ In 2010, there were 29 EU compliant landfills, in the following counties: Neamt, Iasi, Braila, Buzau, Constanta (3 landfills), Tulcea, Ialomita, Prahova (2 landfills), Dambovitza (2 landfills), Dolj, Gorj, Valcea, Mehedinti, Arad, Arges, Bacau, Bihor, Brasov, Galati, Mures, Sibiu, Ilfov (3 landfills) and Harghita.

The EU legislation and standards for waste management were transposed into national legislation, with some transition periods for full compliance. According to GD 349/2005, all rural dumpsites have been closed and rehabilitated by 16/07/2009 (art. 3, paragraph (7)). Regarding the closure of urban non-compliant landfills, a total number of 208 were officially closed or are expected to be closed until the end of 2015. The remaining existing non-compliant landfills have received a transition period from EU and will cease their activity until 2017 (the latest).

Further, Romania has to establish by end of 2015, 30 national integrated solid waste management (SWM) systems. According to SOP ENV, the total funding (EU and national) for Priority Axis 2, Key Area of Intervention is € 991.051.090. By the time being, eighteen projects have been approved and another thirteen are expected to be approved in due time and thus enter to the tendering phase which will be the next challenge, in order to complete the projects within the timeframe of current programming period (latest on 2015). Pre-accession program experience revealed that available funding exceeds local-level absorption capacity, and raising counterpart contributions is difficult.

### **County overviews and Project Evaluation**

*The Baseline Report* provides an overview of the current situation in Romania. This has been based on a review of all county master plans, feasibility studies and application forms of waste management projects financed in the 2007-2013 programming period that identify compliance with EU Acquis Communautaire. All key project parameters (e.g. municipal waste generation, other waste streams, projections, targets to be achieved, existing infrastructure etc) available from county master plans, feasibility studies and application forms has been analysed and codified into 42 **project fiches** (available in the Annex VII).

As commonly seen in the waste management sector, the material provided contained errors and inconsistencies; examples include:

- ▶ Missing data (for example data about non packaging waste recycling);
- ▶ Obvious data inconsistencies within the same report, especially for Category I projects; one example is the mismatch between the packaging waste generated and the 60/55% recovery-recycling to be achieved; wherever an error was discovered, this was marked in red and a comment was added (examples: Tulcea, Prahova, Dambovitza)

General Comments / Observations about the Data Reviewed

- ▶ Where possible, efforts were made to confirm data using common assumptions and rules of thumb;

- ▶ In most of the cases, achievement of targets after 2013 has not been analysed in detail and the set of measures for year 2016 (reduction of biodegradable waste landfilled to 35% of the quantity generated in 1995) are vague;
- ▶ As at the time of elaboration of the Master Plans, the new Waste Framework Directive was still under discussion, the relative provisions of 50% recycling has not been examined;
- ▶ Figures given at the MPs level could be changed in the application form due to different approach in the calculation methodology;

Based on the above analysis, all county solid waste management projects have been allocated in three categories:

- ▶ Projects / Counties not previously included in the 2007-2013 Sectoral Operational Programme Environment (CATEGORY I): Dambovită, Teleorman, and Satu Mare.
- ▶ Projects / Counties previously included in the 2007-2013 Sectoral Operational Programme Environment, but will have difficulties to complete their projects within the current Programming Period, (CATEGORY II). Eight counties fall under this category.
- ▶ Projects / Counties that had an application approved and will complete their project at the latest by 2015 (CATEGORY III). Thirty one counties fall under this category: eighteen counties with already approved application and other thirteen counties that approval process is expected to be finished successfully within 2012.

Although there are currently several projects under implementation (mainly for landfill capacity but also related waste management infrastructure) work is progressing slowly. The performance of the solid waste management sector is weak; key challenges include:

- ▶ Institutional arrangements suffer gaps and inconsistencies
- ▶ Crucial supervision and enforcement capacities remain weak – monitoring and data collection are limited
- ▶ Lack of coherent planning and weak consultation procedures; county planning is still weak.
- ▶ Focus on investment has obscured cost recovery needs – most local tariffs are insufficient, even to cover recurring costs.

### **Optimising the Sector**

Three key areas were identified, in order to contribute to optimizing the sector:

- ▶ **Improving institutional arrangements:** establishing incentives for authorities to plan, implement, and maintain an integrated solid waste management system and increasing local ownership through incentives for good performers / sanctions for non-compliance and worse performers, and improved public communication and outreach campaigns to engage the local population;
- ▶ **Operationalising national waste management plans:** increasing central-level implementation capacity, setting monitorable targets, and intermediate deadlines; providing support / resources to commission feasibility studies and technical designs, prepare bidding documents, and contract for goods, works, and services
- ▶ **Progressing towards medium-term economic and financial sustainability:** increasing the share of private sector participation; where possible, link service level improvements to tariffs increase; define clear affordability limits but improve access to services.

### **Conclusions, Critical Remarks & Priorities for 2014-2020 SOP**

The main conclusions of the baseline report analysis and certain critical remarks in the waste management sector in Romania are presented below:

- ▶ **Waste generation and composition:** To tackle inconsistencies, and given that a number of projects in Romania have already been implemented, waste generation and composition data should be re-established with greater detail taking data from existing facilities in the various counties.
- ▶ **Collection Systems:** In most of the counties according to existing Master plans and strategies, a “dual” system was adopted to promote separate collection, namely a dry bin for recyclables and a wet bin for the residuals. However, since 2011, the Romanian Regulation GD 247/2011 requires selective collection in three fractions: paper and cardboard, plastic and metal, and glass. So, the system will be promoted with additional bins or bell containers for paper, plastics, metals and glass. Since separate collection is still poorly developed, public participation of public is expected to be low and the contamination level is expected to be significant.
- ▶ **Home composting:** In the Master Plans reviewed, provision of home composting bins up to a certain percentage of the rural households was adopted. Home composting is a solid technology that can contribute not only to the diversion target but to environmental awareness as well. However, authorities should be cautious about a large scale use of home composting as it is unknown how the composting bins will be distributed and the public should be clearly informed how to use the bins, what material to avoid and how to apply the product in their gardens/ fields.
- ▶ **Sorting plants:** The sorting plants that are promoted in the counties operate manually. Some of them have capacities 4.000 – 5.000 t/y or even lower - such low capacities are not financially viable. Upgrade of the larger ones with more automatic separation systems, like optical sorting for the plastic fractions which have higher value can be implemented in the new SOP.
- ▶ **Biowaste collection:** apart from some limited sources (garden and market waste in selected areas), in general separate collection of organic waste has not been adopted in the counties. Issues such as purity of input, willingness to participate, product marketability and quality were also not investigated. Source separation of the organic waste stream is a critical sector that EU is currently emphasising (see comments in Section 3 and in the SOP2 report). Separate collection of biowaste coupled with suitable management systems to produce clean and safe compost should be a priority in the new SOP 2014-2020.
- ▶ **Biowaste treatment (recycling):** By the end of the SOP1 programming period, around 740Ktpa of organic waste treatment is expected to be in place across Romania. There are not full details on all systems used, but it is expected that the majority of these are simple aerobic facilities. In recent years, it has become clear that Anaerobic Digestion (AD) plants are environmentally more favourable compared to aerobic composting particularly from the carbon emission saving and energy perspectives. Many Life Cycle Assessment studies have concluded that treatment of separately collected food waste by AD is the most environmentally sound option for this material stream. This technology ought thus to feature in the next programming period. Since AD is an effective process for dealing with food waste (with aerobic composting better at handling plants and garden waste), and considering that food waste (which is the main target material of the WFD) is understood to constitute the large proportion of “organic waste” within the waste composition, this also makes AD the most appropriate technology to build in the next programming period to complement the pre-existing aerobic composting facilities, in order to fulfil the until now legislative requirements for 50% recycling.
- ▶ **Residual waste treatment – biostabilisation / biodrying MBT:** Romania has followed a “low cost” approach for residual waste treatment whereby treatment typically takes place in a so called “simple MBT”: waste is divided into a light fraction that goes directly to landfill and a heavy (or fine) fraction that is first directed to a simple biostabilisation (composting) stage prior to landfill. More sophisticated MBT configurations that are now

state of the art in Europe use significantly more advanced material processing and separation technologies (like optical sorting), and have sophisticated process control systems which (as well as achieving better material recycling from the mixed residual waste) ensure effective stabilisation of the active waste prior to landfill. In addition, these more advanced processes can be readily modified into the biodyring mode of operation where (instead of producing stabilised output for landfill) a solid recovered fuel (SRF) is produced which is suitable to be utilised in cement industries or other co-combustion applications. These more advanced systems are therefore more appropriate for effective integrated waste management for the next programming period.

- ▶ **Residual waste treatment – Waste to Energy:** In Brasov and Bucharest counties, two WtE plants will be constructed under combined funding (private and public funds), however the planning procedure of the facilities has not yet been finalised and therefore these are not expected to be implemented within the current period, and it is more likely to be in operation by the end of the next programming period (2020). Subject to measures higher up the waste hierarchy, there may remain scope for further thermal facilities in the coming programming period – in particular where district heating networks are already installed in some of the larger cities in Romania.

### General commenting on targets fulfilment

The expected targets fulfilment (according to current situation and projects included in SOP1) is shown in detail in Table A:

**Table A: Meeting the EU Directive Targets**

County	Category	Packaging Directive Recycling Targets	Landfill Directive Biodegradable Tonnage Targets**		Landfill Directive Compliant Sites Obligation**	Waste Framework Directive	
			2013 (or latest 2015)	2013		2016	End of 2015
Alba	III	YES	YES	YES	YES	YES	NO
Arad	III	YES	YES (Marginally)	NO	YES, Closure not part of SOP1	YES	NO
Argeş	III	YES	YES (Marginally)	NO	YES	YES	NO
Bacău	III	YES	YES (Marginally)	NO	YES	YES	NO
Bihor	II	YES	YES	YES	YES	YES	NO
Bistrița-Năsăud	III	YES (Partially)*	YES (Marginally)	NO	YES, Closure not part of SOP1	YES	NO
Botoșani	III	YES	YES (Marginally)	NO	YES, Closure not part of SOP1	YES	NO
Brașov	II	YES	YES	YES	YES	YES	NO
Brăila	II	YES	YES	NO	YES	YES	NO
București	II	NOT CLEAR****	YES	NO	YES	YES	NO
Buzău	II	YES	YES	NO	YES, Closure not part of SOP1	YES	YES

County	Category	Packaging Directive Recycling Targets	Landfill Directive Biodegradable Tonnage Targets**		Landfill Directive Compliant Sites Obligation**	Waste Framework Directive	
			2013	2016		End of 2015	2015 (materials)
Caraș-Severin	II	YES	YES	YES	YES	YES	NO
Călărași	III	YES (Partially)*	YES	NO	YES	YES	NO
Cluj	III	YES	YES	YES	YES	YES	NO
Constanța	II	YES	YES	NO	YES	YES	YES
Covasna	III	YES (Partially)*	YES (Marginally)	NO	YES, Closure not part of SOP1	YES	NO
Dâmbovița	I	NO	NO	NO	NO	NO	NO
Dolj	II	YES	YES	YES	YES	YES	NO
Galați	II	YES	YES	NO	YES	YES	NO
Giurgiu	III	YES (Partially)*	YES	NO	YES, Closure not part of SOP1	YES	NO
Gorj	II	YES	YES	YES	YES	YES	NO
Harghita	II	YES	YES	unknown	YES	YES	YES
Hunedoara	II	YES	YES	YES	YES	YES	NO
Ialomița	II	YES	YES	NO	YES	YES	NO
Iași	II	YES	YES	YES	YES	YES	NO
Ilfov	II	YES	YES	NO	YES	YES	NO
Maramureș	II	YES	YES	NO	YES	YES	NO
Mehedinți	II	YES	YES	YES	YES	YES	NO
Mureș	III	YES	YES	YES	YES	YES	NO
Neamț	III	YES	YES	YES	YES	YES	NO
Olt	III	YES	YES	NO	YES	YES	NO
Prahova	II	YES	YES	YES	YES	YES	NO
Satu Mare	I	NO	NO	NO	NO	NO	NO
Sălaj	III	YES	YES	YES	YES	YES	NO
Sibiu	III	YES	YES (Marginally)	NO	YES	YES	NO
Suceava	III	YES	YES	NO	YES	YES	NO
Teleorman	I	NO	NO	NO	YES	NO	NO
Timiș	III	YES	YES	NO	YES	YES	NO
Tulcea	II	YES	YES	NO	YES	YES	NO
Vaslui	III	YES	YES	NO	YES	YES	NO
Vâlcea	II	YES	YES	YES	YES, Closure not part of SOP1	YES	YES
Vrancea	III	YES (Partially)*	YES***	NO	YES	YES	NO

\* Additional capacity or shifts needed

\*\* For Category II counties, under the condition of project implementation within the current period

\*\*\* Under the condition of sufficient home composting

\*\*\*\* please see page 20 footnote

The following general comments can be made on the basis of the overall current situation:

- The counties in the Category I will not meet the European Directives (due to absence of compliant landfills and the necessary infrastructure).
- The projects in counties under Category II will be implemented either as bridge projects between current and next period or in the next programming period 2014 – 2020. Although not very likely, some of them may also be implemented in the current period in case they proceed quickly to the approval of the AF.
- The projects in counties under Category III will be implemented in the current period. The counties that will achieve both Packaging and 2016 Landfill Directive targets are Alba, Caras Severin, Dolj, Gorj, Iasi, Mehedinti, Prahova, Valcea, Cluj, Mures, Neamt and Salaj, provided that effective collection systems are in place. The gaps in the remaining counties are identified in the main text of this report.

# 1. Introduction and Scope of Assignment

## 1.1. Introduction and Objectives

Following the Framework Agreement dated on 03/01/2011, between EIB/JASPERS and ENVIROPLAN S.A. as a leader of the Consortium: **ENVIROPLAN S.A. – LOUIS BERGER France S.A.S – KOCKS Consult GmbH – ICP mbH – C&E Consulting und Engineering GmbH**, a Request for Proposal was sent on 08/07/2011 for providing the services defined in the assignment's Terms of Reference, under the title: **“Romania – Identification of future waste management projects (2014 – 2020)”**.

The project was awarded to the Consortium **ENVIROPLAN S.A. – LOUIS BERGER France S.A.S – KOCKS Consult GmbH – ICP mbH – C&E Consulting und Engineering GmbH** and the relative contract, was signed on the 26<sup>th</sup> of August 2011.

The overall objective of the current assignment is to assist JASPERS staff in identifying a pipeline of waste management projects in Romania that could be co-funded by the EU in the next programming period (2014-2020). For the successful achievement of the objectives, six Tasks have to be completed with the current assignment.

The present document constitutes the Baseline report of the project “Romania – Identification of future waste management projects (2014 – 2020). It includes a detailed recording of the current waste management situation in Romania's 42 counties. This has been based on a review of the counties' master plans, feasibility studies and application forms of waste management projects financed in the 2007-2013 programming period that identify compliance with EU Acquis Communautaire. Given that two additional years after 2013 are allowed to complete planned implementation, “current” refers to what the situation will be in 2015.

In particular, in order to identify the current status of ISWM projects in Romania, the Consultant has examined and assessed the following set of documents:

### For Romania:

- National Waste Management Strategy – approved version 2004,
- National Waste Management Strategy – working document 2011,
- National Waste Management Plan – approved version 2004,
- National Sustainable Development Strategy 2008,
- National Action Plan for Environmental Protection – elaborated in 2008

### For the 42 counties:

- Regional Waste Management Plans
- Waste Management Master Plans including the Annexes
- County Waste Management Plans, where relevant
- Feasibility Study including the Annexes, where relevant
- Application Forms, where relevant
- Project's Completion Notes, where relevant and
- The status of implementation of the co-financed projects

The above documents have been provided by i) the MA for SOP Environment –Programming and Evaluation Directorate, MoEF ii) the Waste Management and Hazardous Substances Directorate,

MoEF and iii) Jaspers. Also, meetings among the stakeholders have taken technical place in order to discuss technical issues.

There are a number of key European policies which Romania is bound to comply with, and thus must be considered to guide the projects which may be funded are. Key policies are:

- The Waste Framework Directive 50% municipal recycling target;
- Landfill directive targets;
- Packaging directive (producer responsibility) targets and obligations.

The projects have been grouped into three categories:

- Counties not previously included in the 2007-2013 SOP, where the county waste management plans and corresponding regional waste management plans must be evaluated to establish how far these counties are from meeting targets and provide a rough estimate of the infrastructure needed in the 2014-2020 period.
- Counties previously included in the 2007-2013 SOP, but will have difficulties to complete their projects within the current Programming Period. For these, the infrastructure to be built must be identified so as to establish whether projects should be included in the 2014-2020 period as bridge projects.
- Counties that had an application approved and will complete their project at the latest by 2015. For this category, the work remaining for each waste management component must be established and if the project is designed in phases (e.g. to meet the 2013 target for the diversion of biodegradable waste from landfills, but not the 2016 target) to identify the needs for additional capacity.

## 1.2. Scope of Study

The material streams included in this study align with those of the previous programming period so as to further progress developments for municipal waste. The streams included are:

- Waste from households;
- Waste from businesses which is similar in composition to household waste;
- Other minor waste streams falling under this banner such as schools, parks waste etc.

The material streams which do not come within scope of this work are:

- Industrial waste;
- Construction and demolition waste;
- Hazardous wastes;
- Mining waste.



## 2. Waste Management and Institutional Arrangements in Romania – Key findings

The key findings of the waste sector overview are summarized below. Detailed information is provided in [Annex I](#).

**Table 1: Waste Management in Romania - Key findings**

Issue	Key findings														
<b>Coverage</b>	Approximately 63% of the population in connected to sanitation services at national level, out of which 84% in urban area and 38% in rural area.														
<b>National practice</b>	<p>✓ The national practice is collection in the mixture (approximately 96% of the household and similar wastes are collected in a mixed bin), without separation at source.</p> <p>✓ Nevertheless, the institutional framework has yet to mature sufficiently to fully implement the National Waste Management Strategy, in particular, finding solutions for economies-of-scale among small scattered rural settlements.</p> <div data-bbox="614 828 1225 1153" style="text-align: center;"> <table border="1" style="margin: 0 auto;"> <caption>Data for Figure 1: Composition of separately collected waste (2009)</caption> <thead> <tr> <th>Material</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>PET</td> <td>23%</td> </tr> <tr> <td>Plastic</td> <td>13%</td> </tr> <tr> <td>Paper/ cardboard</td> <td>46%</td> </tr> <tr> <td>Glass</td> <td>13%</td> </tr> <tr> <td>Metal</td> <td>2%</td> </tr> <tr> <td>Wood</td> <td>3%</td> </tr> </tbody> </table> </div> <p><b>Figure 1: Composition of separately collected waste (source: Report on the state of environment in Romania, NEPA 2010, data of 2009)</b></p>	Material	Percentage	PET	23%	Plastic	13%	Paper/ cardboard	46%	Glass	13%	Metal	2%	Wood	3%
Material	Percentage														
PET	23%														
Plastic	13%														
Paper/ cardboard	46%														
Glass	13%														
Metal	2%														
Wood	3%														
<b>National awareness campaign</b>	<p>Starting from 2007, a national awareness campaign for separate collection has been launched at national level. One foresees a 3-steps implementation process of the separate collections, as follows:</p> <ul style="list-style-type: none"> <li>• 2004-2006: experiencing (pilot projects)</li> <li>• 2007-2017: extension of the separate collection at national level</li> <li>• 2017-2022: implementation of the separate collection in critical areas (collective houses, isolated rural settlements, mountain areas)</li> </ul>														
<b>Authorized Economic Operators</b>	<p>✓ Currently, there are 6 economic operators authorized according to MO 1229/2005 approving the procedure and authorization criteria of the economic operators for undertaking the responsibility regarding the annual targets for packaging waste recycling and recovery.</p> <p>✓ In 2011, there were 1238 economic operators at national level authorised for packaging waste collection, recycling, energy recovery.</p> <p>✓ In 2011, there are 8 compliance schemes authorised to achieve WEEE targets and a number of private economic operators for ELVs, Batteries and waste oil collection and treatment.</p>														
<b>Waste Treatment</b>	<p>✓ Waste treatment is done in small extent and only for certain waste streams.</p> <p>✓ Out of the total quantity of municipal waste collected in 2009, 100.560 t were recovered, out of which 93.620 t through recycling and 6.940 t through co-incineration in cement factories (although the existing co-incineration capacity is much higher). This low rate is caused also by the parallel collection and sorting circuits (authorised collection points, ad-hoc sorting on the landfills) which are not counted.</p>														

Issue	Key findings
	<p>Also, for certain waste materials there are no real recycling options at national level (e.g. there is a low technical capacity of the glass factories for glass waste and also a lack of interest due to the poor quality of the glass, respectively to the additional costs needed in order to get a proper quality of glass waste) and other waste (as paper, plastic and metal) are separated and exported for recovery (in 2009 approximately 380.000 t were exported). Overall, both the markets for extraction and sales of recyclables and compost need further development.</p> <ul style="list-style-type: none"> <li>✓ Having regard on the fact that in 1995 the whole quantity of municipal waste has been disposed on landfills, Romania has enforced the provisions of the waste directive regarding the possibility of postponing the attainment of the targets set out in the paragraphs (a) and (b) by 4 years, until 16/07/2010 and 16/07/2013 respectively.</li> <li>✓ Because of the features of the municipal waste and of the high investment and operations costs, no facility for the municipal waste incineration exists currently in Romania.</li> </ul>
<b>Landfilling</b>	<ul style="list-style-type: none"> <li>✓ In 2009 more than 95% of the collected waste has been disposed on landfills.</li> <li>✓ There are no organized waste management services in most of the rural areas, this has led to a high number of unauthorized landfills (approx. 2,700 small dumping sites).</li> <li>✓ According to EU and national legislation requirements, all rural dumpsites were closed in 2009.</li> <li>✓ In 2010, there were 29 compliant landfills, in the following counties: Neamt, Iasi, Braila, Buzau, Constanta (3 landfills), Tulcea, Ialomita, Prahova (2 landfills), Dambovitza (2 landfills), Dolj, Gorj, Valcea, Mehedinti, Arad, Arges, Bacau, Bihor, Brasov, Galati, Mures, Sibiu, Ilfov (3 landfills) and Harghita.</li> <li>✓ By the end of 2010 there were 80 non-compliant landfills operating, which are to cease their activity and to be closed in steps, until 16/07/2017, in accordance with GD 349/2005.</li> </ul>
<b>Legal Requirements</b>	<ul style="list-style-type: none"> <li>✓ By 16/7/2011, Romania has closed 170 old municipal landfills and about 1.500 illegal rural dumpsites. Further, Romania has to establish 30 national integrated solid waste management (SWM) systems by end of 2015 and close certain number of non compliant municipal landfills. The EU legislation and standards for waste management were transposed into national legislation, with some transition periods for full compliance: 2017 for municipal landfills; 2009 for temporary storage of hazardous industrial waste; and 2013 for non-hazardous industrial waste. Around 90 percent of urban residents, but only 6,5 percent of the rural population have access to organized solid waste management services.</li> <li>✓ Transition periods were given for certain types of landfills of waste: municipal landfills – transition periods by 2017; temporary storage of industrial hazardous waste – 2009; industrial non-hazardous waste landfills – transition periods by 2013. For closure of non-compliant waste landfills type b in urban areas, gradual transition periods were granted during 16 July 2009 – 16 July 2017.</li> <li>✓ Other transitions were agreed for certain targets in the field of packaging waste by 2013, aiming to considerably reduce the quantity of waste to be landfilled.</li> <li>✓ The biodegradable municipal waste going to landfills must be reduced to 50% of the total amount (by weight) of biodegradable municipal waste produced in 1995, by 2013.</li> <li>✓ According to SOP ENV, the total funding (EU and national) for priority axis 2 is 1,167 billion € or investments of about €25-50 million per county.</li> <li>✓ By the time being, eighteen projects have been approved and another thirteen are expected to be approved in due time and thus enter to the tendering phase which will</li> </ul>

Issue	Key findings
	<p>be the next challenge, in order to complete the projects within the timeframe of current programming period (latest on 2015). Pre-accession program experience revealed that available funding exceeds local-level absorption capacity, and raising counterpart contributions is difficult.</p>
<b>Institutions</b>	<p>The main institutions with roles and responsibilities in the field of waste management, according to SOP ENV, are:</p> <ul style="list-style-type: none"> <li>✓ the Managing Authority,</li> <li>✓ the Intermediate Bodies and</li> <li>✓ the Beneficiaries.</li> </ul>

### 3. EUROPEAN POLICY AND ROMANIA WASTE MANAGEMENT STRATEGY

#### 3.1. European Policy and Implications for Romania – Key findings

The key findings of the review of EU policy and implications for Romania are summarized below. Detailed information is provided in Annex II.

**Table 2: European Policy and Implications for Romania**

Issue	Key findings
<p><b>Priority Status of Waste Prevention</b></p>	<p>➤ Waste prevention lies at the top of the waste management hierarchy. The status of waste prevention in this respect has been reinforced by the revised Waste Framework Directive (WFD) under Article 4:<sup>1</sup></p> <div style="text-align: center;"> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>➤ The WFD sets out a requirement for Member States to develop Waste Prevention Programmes under Articles 29 to 31.</p> <p>➤ The WFD includes provision, under Article 9, for decoupling objectives to be set</p> </div> <p><b>Figure 2: EU Waste hierarchy</b></p> <ul style="list-style-type: none"> <li>✓ Evidently, if Romanian policy and strategy development is to be future-proofed, the issue of waste prevention and decoupling waste generation from economic growth needs to be considered.</li> <li>✓ Recognising the relatively low level of GDP per capita in Romania, this might not imply ‘absolute de-coupling’ (i.e. where waste generation declines as the economy grows), but ‘relative decoupling’ (i.e. the rate of waste growth becomes progressively lower than the rate of growth in the economy).</li> <li>✓ <u>It should be noted that Romania may have some ‘late mover advantages’ in that it may be better placed to formulate patterns of consumption and growth which are less wasteful than that which has existed in other countries.</u></li> </ul>
<p><b>Definitions</b></p>	<ul style="list-style-type: none"> <li>✓ Given that Romania will have to align its legislation, it seems only logical to use the definitions set out in the revised WFD.</li> <li>✓ It is, of course, important to note that a reduction in waste <b>collected</b> by a local authority does not necessarily imply that ‘waste prevention’ has occurred to an equivalent degree (for example, where waste is dumped or burnt illegally).</li> </ul>
<p><b>Preparation for re-use</b></p>	<p>The key distinction between re-use and preparation for re-use is that the latter is an activity which is applied to material which has already become waste.</p> <p>The option of preparation for re-use is a particularly interesting approach where wastes</p>

<sup>1</sup> Directive 2008/98/EC of the European Parliament and the Council of 19 November 2008 on Waste and Repealing Certain Directives.

Issue	Key findings
	such as WEEE and furniture are concerned, but other waste streams may also be suitable for such an approach (such as paint, and wood). For Romania, as for other countries, it might be interesting to note that schemes which involve preparation for re-use can be sources of employment and can provide re-training opportunities.
<b>Packaging and Packaging Waste</b>	<ul style="list-style-type: none"> <li>✓ Directive 94/62/EC of 20 December 1994 on packaging and packaging waste<sup>2</sup> and its amendments suggests that Member States must introduce systems for the return and/or collection of used packaging to attain specific targets.</li> <li>✓ The Directive also lays down essential requirements with which countries should comply regarding the composition and the reusable and recoverable nature of packaging and packaging waste.</li> <li>✓ It has made clear its determination is to promote the development of European standards relating to these essential requirements and has suggested that provisions concerning proof of conformity with national standards should be applied immediately. The Commission is also known to be considering revising targets under the Packaging Directive.</li> </ul>
<b>Other relevant strategies</b>	<ol style="list-style-type: none"> <li>1. The Thematic Strategy on the prevention and recycling of waste.</li> <li>2. The Thematic Strategy on the sustainable use of natural resources, whose main objective is to reduce the negative impact on the environment generated by the use of natural resources in the EU.</li> <li>3. The 6th Environment Action Program of the European Community 2002 – 2012, which promotes integration of environmental perspectives within all policy and actions, and represents the environmental component of the Sustainable Development Strategy. It identifies four priority areas for the EU, these being climate change, nature and biodiversity, environment and health, and natural resources and waste.</li> <li>4. The Sustainable Development Strategy of the European Union.</li> </ol>
<b>The Landfill Directive</b>	<p>Article 5(2) sets targets for reducing the quantity of biodegradable waste sent to landfill as follows. The target years for Romania :<sup>2</sup></p> <p>Romania has taken up the option to postpone the first two target years, thus the targets for Romania are:</p> <ul style="list-style-type: none"> <li>➤ 75% of 1995 landfilled BMW by 2010;</li> <li>➤ 50% by 2013;</li> <li>➤ 35% by 2016.</li> </ul> <p>As it is shown in this report, current and planned infrastructure are not sufficient, so as to fully meet the requirements of the Directive and the existing Romanian waste policy, so additional facilities and capacities are required for the new programming period.</p> <p>The Directive also, points out various important issues in respect to the operation of landfills, and the recovery of costs, including those for aftercare.</p>
<b>Waste recycling - composting</b>	<ul style="list-style-type: none"> <li>✓ Article 11 of the WFD, on Re-use and Recycling, sets specific targets.</li> <li>✓ The WFD also highlights the significance of the biowaste stream in Article 22.</li> <li>✓ In respect of the Commission's above commitment, the Commission has already issued a Green Paper on the Management of Biowaste in the European Union.</li> <li>✓ Article 8 of the WFD, on Extended Producer Responsibility, allows Member States considerable freedom to develop measures to encourage producers to take</li> </ul>

<sup>2</sup> Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste *Official Journal L 182* , 16/07/1999.

Issue	Key findings
	<p>responsibility for their products.</p> <p>✓ One might reasonably interpret the logic to be that where extended producer responsibility systems are implemented, producers / distributors should bear all costs related to extended producer responsibility, ensuring that as far as possible, consumers of products – the ultimate causes of the pollution – pay.</p>
<p><b>Summary</b></p>	<p>In respect of waste management, there are some increasingly strong markers provided in respect of policy development. The revised Waste Framework Directive gives greater emphasis than has been present hitherto to the priority position accorded to waste prevention. Also, the revised Directive suggests that policy would do well to take heed of the requirement to:</p> <ul style="list-style-type: none"> <li>➤ Develop waste management policy and law in such a way as to enshrine the hierarchy outlined in Article 4 of the WFD, though with departures from this ranking made clear where the case, based on life-cycle thinking, justifies this;</li> <li>➤ Include a specific programme for waste prevention. A forward looking strategy would pre-empt the decoupling objective foreseen by the WFD;</li> <li>➤ Put in place means to ensure that targets for recycling of at least 50% from household waste and 70% from construction and demolition waste are met in the spirit of pre-empting the WFD objectives;<sup>3</sup></li> <li>➤ Ensure that mechanisms are in place which lead to the separate collection of glass, metals, paper and plastic;</li> <li>➤ Implement measures designed to lead to separate collection of bio-waste;</li> <li>➤ Implement policies or mechanisms that encourage the use of products of bio-waste management;</li> <li>➤ Ensure that where incineration or co-incineration are employed, permits should not be issued unless the recovery of energy takes place <i>‘with a high level of energy efficiency’</i>;</li> <li>➤ Apply the polluter pays principle; and</li> <li>➤ Give substance to the concept of resource efficiency.</li> </ul> <p>The Landfill Directive targets, and in particular some of the technical measures (for example, the requirement to pre-treat waste prior to landfilling) need to be addressed. With respect to the Landfill Directive targets (as for the WFD recycling targets also), no measure is yet in place which cascades responsibility for meeting these targets down to the actors capable of delivering them.</p>

<sup>3</sup> European Commission (2011) Commission Decision establishing rules and calculation methods for verifying compliance with the targets set in Article 11 (2) of Directive 2008/98/EC of the European Parliament and of the Council, July 2011.

### 3.2. Review of Romanian National Waste Strategy and Plans

The key findings of the review of Romanian Waste Strategy and Plans are summarized below. Detailed information is provided in Annex III. The National Waste Management Strategy (NWMS) provides the framework that sets Romania’s policy and strategic objectives concerning waste management. The key features of NWMS are presented in the following table.

**Table 3: Key features of National Waste Management Strategy**

<b>Authority</b>	The National Waste Management Strategy (NWMS) is promoted by the Ministry of Environment and Forests, according to the prerogatives and duties deriving from EGO 78/2000 on waste regime, with subsequent amendments and completions.
<b>Purpose</b>	✓ To create the necessary framework for the development and implementation of an integrated waste management system at national level, efficient from an environmental and economic perspective.
<b>NWMS1</b>	<ul style="list-style-type: none"> <li>✓ The first National Waste Management Strategy (NWMS1) was approved in 2004 and covered the period 2003 – 2013.</li> <li>✓ It was intended that it should be revised periodically to ensure it remained aligned with technical progress and any new environmental requirements.</li> </ul>
<b>NWMS2</b>	<p><u>The NWMS is currently undergoing revision (as NWMS2), due mainly to the following:</u></p> <ul style="list-style-type: none"> <li>• The establishment of new European concepts regarding waste management (mainly the need to approach the waste as resource, the principle of the producer’s extended liability);</li> <li>• The appearance of the new Waste Framework Directive (2008/98/CE) and the need to transpose it in the national law, as well as the need to integrate its principles and provisions in the national programming documents;</li> <li>• The need to include legal provisions and requirements that appeared between 2004 and 2010;</li> <li>• The development of projects regarding implementation of integrated waste management, in different implementation stages, and projects that propose the implementation of waste treatment technologies that are new for Romania; and</li> <li>• The institutional and organizational changes which have occurred in the period 2004 – 2010.</li> </ul> <p><u>NWMS2 is intended to cover both actions for the short-term (until 2015) and for the medium-term (until 2020).</u></p>
<b>The 2004 Strategy and Plan</b>	<p><u>The strategy includes short-term objectives to be achieved by 2005, medium-term objectives to be achieved by 2010, and long-term objectives to be achieved by 2013.</u></p> <p>NWMS1 was supported by a National Waste Management Plan (NWMP1) which included further detail on the initiatives to be used to deliver the strategy, as well as key targets. <b>It is intended that NWMS2 will also be supported by such a Plan, though we have not seen this document and have not been able to include it within this review.</b></p> <p>The Plan sets deadlines for achieving objectives, and also includes some quantitative targets. As regards municipal waste, these are set out in Section 4 of Part II.</p>

<p><b>The Not-Adopted 2009 Review of the Strategy and Plan</b></p>	<p>In 2009, there was a Review of NWMS1 and NWMP1, though these were never adopted.</p> <p><u>It has not been possible to precisely interrogate these documents due to the absence of quality translation from the Romanian. However, it is worth mentioning that these documents are quite lengthy occasionally cumbersome. There is also a very limited options appraisal which supposedly seeks to understand the relative merits of three different options for dealing with municipal waste in future. The appraisal appears to be weighted towards arriving at a conclusion that:</u></p> <ol style="list-style-type: none"> <li>1. 50% recycling is better than 60% recycling (which effectively contradicts the hierarchy); and</li> <li>2. incineration should be the method of choice for treating residual waste.</li> </ol> <p>For more detailed information, please refer to Annex III.</p> <ul style="list-style-type: none"> <li>✓ The basis for the analysis appears undefined, and includes costing of the options based upon UK figures (there is no information, though, as to what these are).</li> <li>✓ The revision also recommends a range of policies and interventions. The list is not fully coherent, with insufficient justification given for the wide number and variety of policies being proposed.</li> <li>✓ In general, it is not clear how the policies work together as a package, and the absence of clear priorities for the numerous proposals may reduce their usefulness to Romania. <u>It would be advisable for Romania to consider much more carefully – with the intention of economising on the number of measures required – the responsibilities and incentives which the different actors require to ensure waste management moves to a more sustainable path.</u></li> </ul>
<p><b>Concluding remarks</b></p>	<ul style="list-style-type: none"> <li>✓ In summary, NWMS2 sets out some interesting actions, though with targets driven principally by the EU acquis. Romania could adopt an approach of more than ‘just complying’ with the terms of the EU acquis and could consider developing its own indigenous path for the development of waste management. There are opportunities to be seized, and in what has been a quickly changing area (in terms of technological possibilities), there may be major benefits for the country in using its late-mover position to its considerable advantage.</li> <li>✓ The big question remaining behind the NWMS2 is the same one as has preoccupied the European Commission over recent years, and is one of the <u>quality of implementation</u>. The targets and actions set out in NWMS2 are a leap forward from those in NWMS1, but they do still need further work to ensure that the different measures are coherent across the piece.</li> </ul>

The National Action Plan from the 2004 NWMP is presented in Annex III, Table 1. In relation to the aforementioned National Action Plan, the following comments are worth making (for more detailed information, please refer to Annex III).

**Table 4: Key comments on National Action Plan for Municipal Waste Management from the 2004 National Waste Plan (Part II chapter II.4)**

<p><b>Definition</b></p>	<p>It is not clear what is really meant by ‘integrated waste management’ as opposed to ‘waste management’</p>
<p><b>Actions regarding landfill</b></p>	<p>Various actions regarding landfill are envisaged to be achieved by 2017. This appears to be a lengthy period of time</p>
<p><b>Fees/tax system</b></p>	<p>The Plan states it will “<i>Exactly establish the tax system for the municipal waste</i>” and that it will “<i>Calculate the fees in order to cover all the costs of the municipal waste management operations (collection, including</i></p>



	<p><i>separate collection, transport, treatment, final disposal, closure, monitor after closure)</i>". In addition, it stated that by 2007, there would be established:</p> <p><i>"an additional fee for landfilling in order to stimulate the mitigation of landfilled waste quantity, to reduce the quantity of biodegradable and hazardous waste that is landfilled"</i></p> <p>It is not clear that this has happened. <u>The last extract seems to imply that there was an intention to introduce a landfill levy of some form. Yet, this has not happened.</u></p>
<b>Funding</b>	<p>On improving enforcement, the funding mechanisms for the procedures are not clear. Improved enforcement will have budgetary impacts. The source of revenues is frequently a difficult matter to deal with.</p>
<b>Implementation of WEEE directive</b>	<p>The implementation of the WEEE Directive is clearly envisaged as being on an 'old for new' return basis (i.e. retailers' take-back of WEEE is only necessary where a similar product is being purchased). This tends to have the effect of depressing collection rates, and might mean the system needs to be revised to meet the targets envisaged under the recast WEEE Directive.</p>
<b>Incineration</b>	<p>There is some contradiction within the Plan in that it states that by 2017, all the necessary facilities for municipal waste treatment will have been built, but it also states that after 2017, the building of incinerators with energy recovery for the treatment of municipal waste will take place.;</p>
<b>Institutional/Organizational arrangements</b>	<p>On the institutional side, the suggestion is that the subsidiarity principle will be taken into account. At the same time, it is not apparent that there have been mechanisms instigated that truly 'devolve' responsibility for meeting the various targets in the strategy down to those best placed to meet them; Similarly, under its "Institutional / organizational arrangements", the Plan suggests it will:</p> <p><i>"Develop mechanisms in order to ensure that the organizations / economical agents operate in view of achieving the targets stipulated in the EU Directives."</i></p> <p>This was set a deadline of 2007. It is not clear that this has happened to a significant degree.</p>
<b>Packaging</b>	<p>For packaging, the Plan states the intention to extend, between 2007-2017, separate collection to be applied across the country. This appears to be a restatement of the previous target regarding separate collection. Again, this is a lengthy period of time over which to do</p>

**Conclusion:**

- ✓ The NWMP will need to be **updated** to meet various targets which it needs to achieve.
- ✓ Some implementing measures which could have been important **have not yet been introduced (notably, a landfill tax).**
- ✓ The **rate of change** that was envisaged in some areas seems to be **quite slow.**

	this. Arguably, producers should be made – in line with the principles in the strategy – financially responsible for a swift roll-out of quality separate collection systems for packaging across the country;
<b>Separate collection</b>	The Plan seeks, by 2017, to extend the separate collection of the municipal waste nationwide. <u>This is a long period over which to achieve this objective.</u> It is especially long if what is implied by this is a basic ‘bring’ system for dry recyclables;
<b>Targets</b>	It was intended that by 2005, a system would have been developed “capable to reach the targets for recovery and recycle of packaging waste from the municipal waste.” Whether or not the system is capable of doing this, the targets seem unlikely to have been met. In negotiations on the environment chapter at Accession, a 3 year derogation period was requested, implying that the targets should have been met in 2010;

Based on the NWMS1 and NWMP1, Regional Waste Management Plans (RWMP) were prepared between 2005 and 2006, and County Waste Management Plans (CWMP) between 2007 and 2009. Master Plans and Feasibility Studies for implementing integrated waste management systems, to be financed by SOP Environment, were also developed.

The key findings of the review of the current draft Waste Management Strategy are summarized in the table below. Detailed information is provided in Annex III.

**Table 5: The (Current) Draft Waste Management Strategy – Key features**

<b>Focus</b>	NWMP2 is being prepared with a <b>focus on short-term actions for 2010 – 2015.</b> <u>However, we have not been provided with NWMP2 and the review here is written assuming this has not yet been drafted.</u>
<b>Key features</b>	<ul style="list-style-type: none"> <li>✓ NWMS2 recognises that the hierarchy “<i>must be reflected in the national law and policies</i>”.</li> <li>✓ The new strategy sets out 10 strategic objectives, and each of which has attached to it a package of strategic actions and targets. The associated NWMP (<u>which we have not seen</u>) will add details regarding these.</li> <li>✓ The strategic actions imply a considerable body of work, and it remains to be seen how this would be scoped.</li> <li>✓ At the very least, it might be difficult to monitor progress to targets when so much waste may well be being deposited at illegal sites.</li> <li>✓ Finally, it is not clear that the actions will necessarily deliver on the specified target. The Government will need to develop a coherent policy package to achieve what is desired.</li> </ul> <p>Under the heading “<b><i>Simplifying and modernizing the waste management law in order to increase its enforcement efficiency</i></b>”, the following strategic target has been set:</p> <p style="padding-left: 40px;">a. <i>Implementing by the end of 2015 the legal package needed for implementing the activities proposed in NWMS.</i></p>

This is clearly essential for the success of NWMS2. Indeed, without it, there is little hope of the various targets being met. Even if this target is achieved, however, the fact that the response to some measures may have long lead times may mean that if the package is 'back-end loaded' in time, the targets will not be met. Some measures will clearly need to be enacted sooner than others to drive the response of the market.

Strategic actions include:

- a. Simplifying the national legal framework concerning waste management, based on waste hierarchy and products' life cycle analysis;*
- b. MEF will ensure that the NWMS vision, objectives and actions will be considered and integrated in preparing/revising other national strategies;*
- c. Encouraging private investments in managing and treating resources by implementing a definite and stable legal framework and by sending clear signals that the investments have strategic interest.*

In the case of 'a' above, the hierarchy might simplify matters, but product life cycle analysis might not do so. 'b' and 'c' are, of course, sensible actions to undertake. Crucially, 'c' will require Government to take a long view early on, so that matters such as tax rates will need to be set several years in advance. This will allow the market to respond to signals in a sensible fashion.

## 4. County Overviews

### 4.1. Introduction - Methodology

Material provided for the assessment of the counties has been listed in Chapter 1 and a full list is provided below.

Various diverse data over a time period (municipal waste generation, other waste streams, projections, targets to be achieved, existing infrastructure, collection etc) from the previous sources has been analysed and codified into 42 project fiches and spreadsheets and it will be presented in the following chapters as well as the Annexes. Additionally, the current and planned capacities of SWM infrastructure in each of Romania's 42 counties are presented in a map in Annex V.

As mentioned, the ISWM projects have been grouped into three categories:

- Counties not previously included in the 2007-2013 SOP (CATEGORY I),
- Counties previously included in the 2007-2013 SOP, but will have difficulties to complete their projects within the current Programming Period, (CATEGORY II).
- Counties that had an application approved and will complete their project at the latest by 2015 (CATEGORY III).

Some general comments about the provided material are as follows:

- Projections of municipal waste, other waste streams and composition has not been checked and was adopted as given (see also § 5.4.6);
- There have been obvious data inconsistencies within the same or subsequent reports for the same counties (MPs, feasibility studies); one example is the mismatch between the packaging waste generated and the targets or the quantities of biodegradable waste generated;
- There has been missing data (for example data about non packaging waste recycling);
- In certain cases it was tried to confirm using common assumptions and rules of thumb that the envisaged infrastructure achieves the targets for biodegradable diversion from landfilling and recycling of packaging waste.
- In some cases, achievement of targets after 2013 has not been analysed in detail and the set of measures for year 2016 (reduction of biodegradable waste landfilled to 35% of the quantity generated in 1995) are vague;
- As at the time of elaboration of the Master Plans, the new Waste Framework Directive was still under discussion, the relative provisions of 50% recycling has not been examined;
- Figures given at the MPs level have been changed in the application form due to different approach in the calculation methodology;
- In Galati County, municipalities of Tecuci, Matca, Gohor and Barcea refused to participate in the IWMS project. Furthermore, in Tulcea County, Tulcea Municipality initially (in the Master Plan and application phase) was not part of IDA, but according to our information from MoEF has finally entered the Association; In Harghita county, Odorheiu Secuiesc has decided not to join the county project.

The list of documents provided to the Consultant for each county (as of December 2011) is as follows:

**Table 6: List of documents provided to the Consultant per county**

A/A	COUNTY	DOCUMENTS					Category
		MASTER PLAN (MP)	REGIONAL PLAN (RP)	FEASIBILITY STUDY (FS)	APPLICATION FORM (AF)	COMPLETION NOTES (CN)	
1	ALBA	EN	EN	EN	EN		II
2	ARAD	RO	EN	EN	EN	EN	III
3	ARGES	EN	EN	EN	EN	EN	III
4	BACAU	EN	EN	EN	EN		III
5	BIHOR	EN	EN	EN	EN		II
6	BISTRITA NASAUD	EN	EN	EN	EN	EN	III
7	BOTOSANI	RO	EN	EN	EN	EN	III
8	BRAILA	RO	EN	RO	RO		II
9	BRASOV	EN	EN				II
10	BUCHAREST	EN	EN				II
11	BUZAU	RO	EN	RO	EN		II
12	CALARASI	RO	EN	EN	EN		III
13	CARAS-SEVERIN	EN	EN	EN	EN		II
14	CLUJ	EN	EN	EN	EN	EN	III
15	CONSTANTA	RO	EN	RO	RO		II
16	COVASNA		EN	EN	EN	EN	III
17	DAMBOVITA		EN				I
18	DOLJ	RO	EN	EN	EN		II
19	GALATI	EN	EN	EN			II
20	GIURGIU	EN	EN	EN	EN	EN	III
21	GORJ	EN	EN	EN	EN		II
22	HARGHITA	EN	EN	EN	EN		II
23	HUNEDOARA	EN	EN	EN	EN		II
24	IASI	RO	EN	EN	EN		II
25	IALOMITA	RO	EN				II
26	ILFOV	EN	EN				II
27	MARAMURES	EN	EN	RO	RO		II
28	MEHEDINTI	EN	EN	EN	EN		II
29	MURES	RO	EN	EN	EN	EN	III
30	NEAMT	EN	EN	EN	EN	EN	III
31	OLT	RO	EN	EN	EN		III
32	PRAHOVA	RO	EN	RO	EN		II
33	SALAJ	EN	EN	EN	EN	EN	III
34	SATU MARE	RO	EN	RO			I
35	SIBIU	EN	EN	EN	EN		III
36	SUCEAVA	RO	EN	EN	EN		III
37	TELEORMAN	RO	EN				I
38	TIMIS	RO	EN			EN	III
39	TULCEA	RO	EN	RO	RO		II
40	VALCEA	EN	EN	EN	EN		II
41	VASLUI	RO	EN	EN	EN	EN	III
42	VRANCEA	EN	EN	EN	EN	EN	III

Additionally, for Dambovita and Teleorman we have received the environmental authorisations and the financing memorandum for the subsequent amendments.

## 4.2. COUNTIES NOT PREVIOUSLY INCLUDED IN THE 2007-2013 SOP (CATEGORY I)

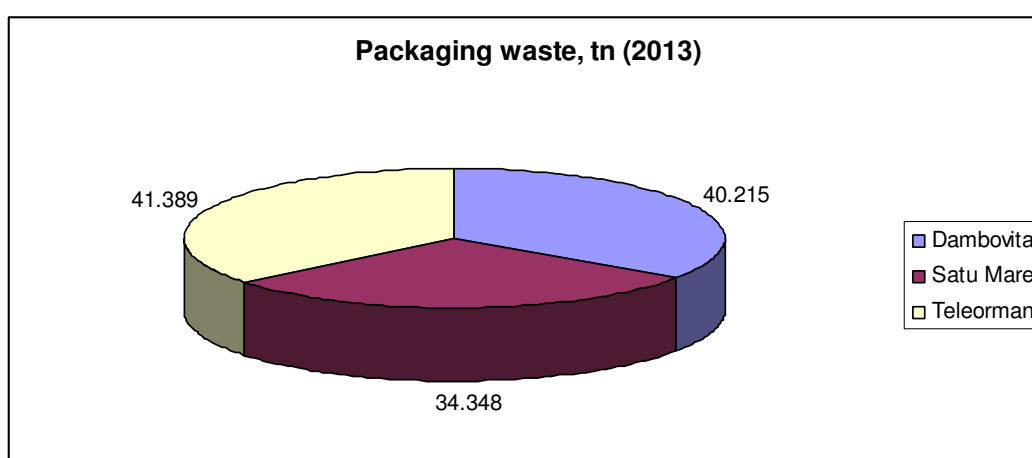
### 4.2.1. Counties presentation

Three counties have been identified in this category are i) Dambovita, ii) Teleorman, and iii) Satu Mare.

General geographic information, such as area, population, number of municipalities, etc as well as and economic data on GDP, income etc is provided in the project fiches, in Annex VII.

### 4.2.2. Waste statistics

The forecast for generation of municipal waste in 2013 is **306.500 tn**, whereas the figures for the same year for packaging waste can be seen in the next chart:



**Figure 3: Packaging waste generation in category I counties**

The forecast for generation of biodegradable waste in 2013 is 228.700 tn, out of which 150.900 tn are allowed to be landfilled and 78.600 tn have to be diverted (see Table 7).

**Table 7: Biodegradable waste data**

County	Generation of BDW, tn (1995)	BDW allowed to landfill, tn (2013)	BDW to divert, tn (2013)
Dambovita	117.905	58.952	17.348
Satu Mare	83.742	41.871	35.345
Teleorman	100.144	50.072	25.877
Total	301.791	150.895	78.570

### 4.2.3. Existing infrastructure

Currently, there are 2 compliant landfills in Dambovita, in Aninoasa and Titu, which have IPPC permits valid until 2021. The permit 223/23.12.2011 for Aninoasa is issued for the operation of the landfill, as well as for the composting and sorting facilities. There is also a waste management centre in Aninoasa that includes a sorting station and a composting plant, however presently these facilities are not operational. Teleorman has also a compliant landfill in Mavrodin, which serves the whole population of the county and has an IPPC permit valid till

2021. The permit no 225/29.12.2011) issued for Mavrodin landfill, also comprises of a sorting area and an intensive composting unit

Satu Mare County has no facilities for waste recycling or for compliant waste disposal.

#### 4.2.4. Planned infrastructure

From the examined documents it was found that limited analysis has been undertaken on the required infrastructure.

In **Satu Mare** there are no recycling facilities provided, only a county landfill and transfer stations. In **Teleorman**, there is a new landfill, a composting (for mixed waste) and a sorting plant, both with capacity of 5.000 tn/y. They are under-dimensioned and are not adequate to treat the packaging waste and the organic waste generated.

As mentioned, in **Dambovita** the waste management centre is at present not operational and the capacity is unknown.

Overall, the technical solutions in the three counties have to be re-assessed.

#### 4.2.5. Critical remarks for category I counties

All three counties have no suitable waste management facilities in regard to the Packaging waste and Landfill Directive.

The technical solutions for the revised Master Plans have to be clearly identified, properly dimensioned, updated and incorporate the provisions of the Waste Framework Directive. It is noticed, that the composting plant envisaged for waste treatment is not suitable on its own for the “wet bin” content, containing impurities in high percentages. Therefore, another technology has to be selected.

### 4.3. COUNTIES PREVIOUSLY INCLUDED IN THE 2007-2013 SOP, BUT UNABLE TO COMPLETE AN APPLICATION (CATEGORY II)

#### 4.3.1. Counties presentation

According to latest discussions with the involved authorities (MoEF) and current situation, it has been concluded that eight counties will finally fall under this category; Bucharest and Ilfov had planned common facilities at the stage of Master Plan, however recent development shows that Bucharest has decided not to participate in the project and develop its own integrated waste management system. The counties are:

- |              |              |
|--------------|--------------|
| 1. Brasov    | 5. Buzau     |
| 2. Ialomita  | 6. Maramures |
| 3. Bucharest | 7. Galati    |
| 4. Ilfov     | 8. Hunedoara |

General geographical information, such as area, population, number of municipalities, etc as well as economic information, such as GDP, income etc are provided in the project fiches, in Annex VII.

#### 4.3.2. Waste statistics

The forecast for generation of municipal waste in 2013 is about 2.650.000 t, out of which the relative share of biodegradable waste is about 1.540.000 t or 57%. Packaging waste amounts to 750.000 t.

#### 4.3.3. Closure of non-compliant landfills in the current and next programming period

According to GD 349/2005, all rural dumpsites have been closed and rehabilitated by 16/07/2009 (art. 3, paragraph (7)). Regarding the closure of urban non-compliant landfills, a total number of 170 were officially closed by 16/7/2011 and at least another 35 (taking also into account the information provided in the Application Forms) are expected to be closed until the end of 2015.

The remaining existing non compliant landfills have received a transition period from EU and will cease their activity until 2017 (the latest). The situation based on the provided documents, on a county basis, is as follows:

Buzau: One non compliant landfill will be closed and rehabilitated after the current period.

Galati: 1 non compliant landfill (Tecuci) will be closed and rehabilitated after the current period (Tecuci city is not part of IDA).

Brasov, Hunedoara, and Maramures: all non compliant landfills will be closed and rehabilitated within this period, regardless of the extension (provided the Applications are approved).

#### 4.3.4. Current and planned waste disposal facilities

Some of the above counties have proceeded to the construction of landfills compliant with the Landfill Directive, which are at present operational. In these counties, the landfill component has not been part of the SOP; there are cases where the construction of the new cell was an eligible expenditure. Although the National Plan envisages one compliant landfill per county, there maybe exceptions in certain cases. The situation is summarised in the following Table:

**Table 8: Waste disposal facilities in category II counties**

County	Existing compliant landfill	New landfill
Brasov	1 (Sacele), operational for 20 years	-
Bucharest and Ilfov	3 (Chiajna, Vidra, Glina)	-
Buzau	1 (Galbinasi), total 1.200.000 m <sup>3</sup> - Construction of cells 2 and 3	-
Galati	1 (Tecuci) / Construction of cell 2, 1.827.000 m <sup>3</sup> for 4-6 years	-
Hunedoara	-	New landfill in Bosorod designed for disposal of 101.000 t/y
Ialomita	Perieti, start 2004, 1.693.000 m <sup>3</sup> total	-
Maramures	-	New landfill in Sirbi with cell 1: 452.153 m <sup>3</sup>

#### 4.3.5. Provisions in terms of reaching the packaging waste targets

As mentioned, packaging waste amounts to 750.000 tn and the respective recycling target to 444.000 tn. Recovery of the various streams will take place in Sorting plants, typically semi-



automated, hand picking combined with equipment such as sieves, magnets. The situation is depicted in the following Table:

**Table 9: Sorting facilities in category II counties**

County	Packaging waste generated in 2013	Packaging waste recovery target	Existing infrastructure	New facilities	Total capacity (t/y)	Expected gap in 2013 (or end of 2015) (t/y)
Brasov	73.456	44.074	1 Sorting plant (121.600 t/y)	1 Sorting plant (10.500 t/y)	132.100	NO
Bucharest	353.780	212.268	1 Sorting plant (40.000 tn/y)*		40.000	Not clear
Buzau	37.132	14.768		1 sorting plant (33.700 t/y)	33.700	NO
Ialomita	33.514	20.108		1 Sorting (43.100 t/y)	43.100	NO
Ilfov	64.529	38.717		1 sorting plant (39.000 tn/y)	39.000	NO
Maramures	73.415	44.049		2 sorting plants (62.000 t/y)	62.000	NO
Galati	68.962	41.377	1 Sorting plant (12.100 t/y)	1 Sorting plant (37.800 t/y)	49.900	NO
Hunedoara	55.878	33.527		2 Sorting plants (49.733 t/y)	49.733	NO

\* Although the Master Plan states a capacity of 400.000 tn/y, according to actual data it has been overstated by an order of magnitude; We estimate that the number is close to 40.000 tn/y

Overall, we may comment that the capacities (existing and planned facilities) exceed the estimated target. This is something to be expected, as there was a great degree of uncertainty in the generation of packaging waste as well as a significant quantity of impurities assumed (about 20%) in the dry bin.

Additionally, we have two more comments: first, in some counties the sorting plants have been designed for mixed waste. This concerns a practice that has been abandoned in most countries due to health and safety issues, as well as due to low quality of recovered materials. The practice has to be re-evaluated in the next phases and the plants can be equipped with more automated machines (like optical sorting). Secondly, the sorting plants are expected to receive both packaging as well as non-packaging recyclables (especially paper such as newspapers, magazines, etc) from the dry bin and in this way the total input may come closer to the design value. This distinction was not evident in all Master Plans.

#### 4.3.6. Provisions in terms of reaching the diversion targets

As mentioned, biodegradable waste in 2013 amounts to about 1.540.000 tn. The biodegradable waste that is allowed to be disposed in the same year is about 716.000 tn. To achieve the necessary diversion, the following techniques have been considered: i) Waste to Energy Plants for the greatest counties Bucharest-Ilfov and Brasov (under PPP), ii) Mechanical Biological Treatment Plants, iii) Composting plants, iv) Home composting in rural areas and v) paper recycling. Paper has been estimated from the documents provided and wherever applicable non packaging paper has been included. Since wood has not been taken into account in many counties and because it is in small quantities anyway, it does not contribute to overall figure.

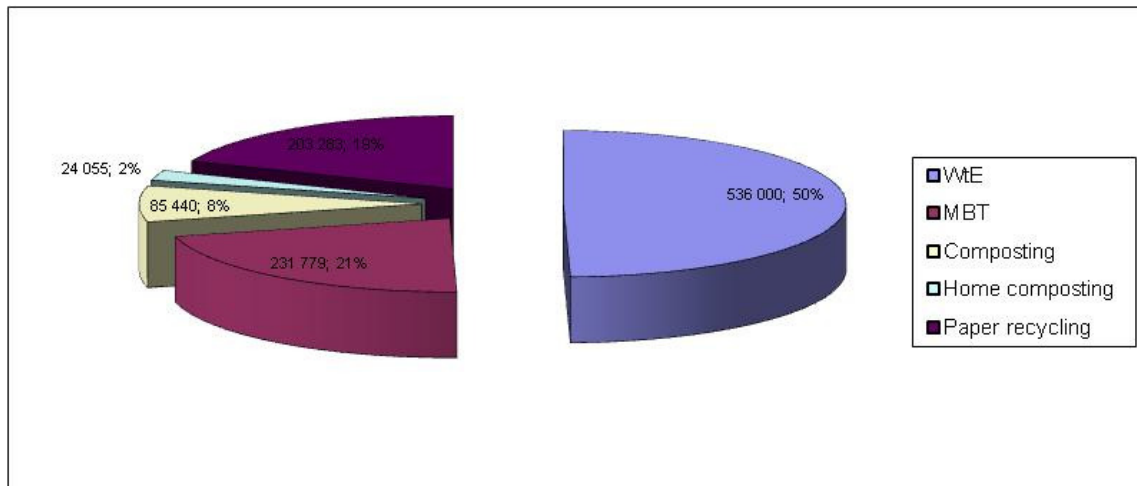
Mostly, the figures have been taken from the documents provided. The Consultant has made a quick calculation to check target achievement also for year 2016. The diversion achieved by the i) WtE plants ii) mixed waste composting plants and iii) the MBT plants has been assumed to a **70%** based on the provided documents (although it can be argued that the residue and the stabilised fraction going to landfill still contains a percentage of biodegradable matter). The diversion achieved by composting plants for segregated material on the contrary was taken equal to **100%**. Further, since mostly data on number of composting bins only was provided, a rule of thumb was used to convert items to tn/y based on the experience of the Consultant from the operation of similar bins (residence time, specific weight, etc). The information is shown in the following Table:

**Table 10: Waste diversion facilities in category II counties**

County	Biodegradable waste generated		Biodegradable waste Allowed to landfill		Biodegradable waste for diversion		Type of facility	Design capacity, t/y	Diversion from Paper recovery (t)	Home Composting (t/y)	TOTAL DIVERSION (t/y)	Expected gap in 2016 (t/y)
	2013	2016	2013	2016	2013	2016						
Brasov	178.477	182.834	67.822	47.475	117.777	136.634	Composting plant (exist.)	2.500 t/y	35.000	4.100	148.600	NO
							WtE (new)	156.000 t/y				
Bucharest	671.128	679.249	350.000	245.000	321.128	434.249	1 WtE (new)	380.000	100.000	0	404.000	30.249
							1 Composting plant (exist.)	40.000				
Buzau	87.003	89.847	54.267	37.987	32.736	51.860	1 MBT plant (new)	22.100	8.783	6.655	50.061	1.799
							1 "wet bin" composting plant (new)	30.000				
Galati	147.677	149.248	68.042	47.269	79.635	101.619	1 MBT plant (new)	87.300	16.000	6.800	90.300	11.319
							2 Composting plants (exist.)	5.500				
Hunedoara	103.543	104.044	57.793	40.455	45.751	63.589	1 MBT plant (new)	82.379	13.000	3.000	73.000	NO
Ialomita	43.380	41.809	32.275	22.592	11.105	19.216	1 "wet bin" Composting (new)	7.440	12.500	NOT INDICATED	17.700	1.516
Ilfov	66.090	70.385	29.474	20.632	36.616	49.753	1 MBT plant (new)	40.000	18.000	3.500	49.500	253
Maramures	113.726	116.387	56.697	39.688	57.029	76.699	1 "wet bin" Composting plant (new)	n.s.	n.s.	n.s.	n.s.	n.s.

<sup>1</sup>: a rather high value of diversion assumed for the number of bins provided

The overall relative share of each method is shown in the diagram:



**Figure 4: Capacities of Waste treatment technologies in category II counties**

Several conclusions are drawn from the analysis of the 8 counties: the values in the above Table represent target values; the actual diversion that can be achieved on the long run for the given collection system and the waste facilities, when in place, was not calculated. Nevertheless, the designed capacities for the facilities in Brasov and Hunedoara are sufficient to achieve the required diversion also for 2016.

In the counties, the gap in infrastructure to meet the 2016 target is given in the last column. For Maramures county, the capacities have not been specified.

Attention is drawn to the fact that the wet bin does not contain “organic” waste but residual waste, with a high percentage of inert material, recyclables placed to wrong receiver and other material that is not compostable. In this respect, direct composting without pre-treatment is a not suitable technology; however it can be utilized to treat pure biowaste only.

It is finally mentioned that the Mechanical Biological Treatment (MBT) plants described follow an elementary technology. During the first stage of mechanical treatment, waste is separated into two fractions:

- a light one that goes directly for disposal to landfill and;
- a heavy one that goes as an input to composting.

Apart from ferrous metals, other recyclables are not recovered. The stabilized product is used in landfill operations (daily cover, final cover) or for restoration of contaminated sites. This practice is regarded as recovery but NOT as recycling activity by the new WFD.

#### 4.3.7. Possibility that the projects be included within SOP 2014-2020

The projects in counties under Category II will be implemented either as bridge projects between current and next period or totally in the next programming period 2014 – 2020. Although not very likely, some of them may also be implemented totally within the current period in case they proceed quickly to the approval of the AF.

## 4.4. COUNTIES THAT HAD AN APPLICATION APPROVED AND WILL COMPLETE THE PROJECT BY 2015 THE LATEST (CATEGORY III)

### 4.4.1. Counties presentation

Thirty one counties have been identified in this category. These are:

1. Arad *	11. Cluj *	22. Olt *
2. Alba**	12. Constanta**	23. Prahova **
3. Arges*	13. Covasna *	24. Salaj *
4. Bacau *	14. Dolj **	25. Sibiu *
5. Bihor**	15. Harghita **	26. Suceava *
6. Bistrița-Năsăud*	16. Iasi**	27. Timis *
7. Botosani *	17. Giurgiu *	28. Tulcea **
8. Braila**	18. Gorj**	29. Valcea **
9. Calarasi *	19. Mehedinti**	30. Vaslui *
10. Caras Severin**	20. Mures *	31. Vrancea *
	21. Neamt*	

\*Counties with already approved application

\*\* Counties for which the application is likely to be approved and which will complete their projects at the latest by 2015

General geographical information, such as area, population, number of municipalities etc as well as economic data such as GDP, income etc are provided in the project fiches.

### 4.4.2. Category III - Waste statistics

The forecast for generation of municipal waste in 2013 is about **5.720.000** t, out of which the relative share of biodegradable waste is about 3.265.000 tn or 57%. Packaging waste amounts to 1.569.000 tn. The figures for municipal and packaging waste for 2013 can be seen in the next diagram:

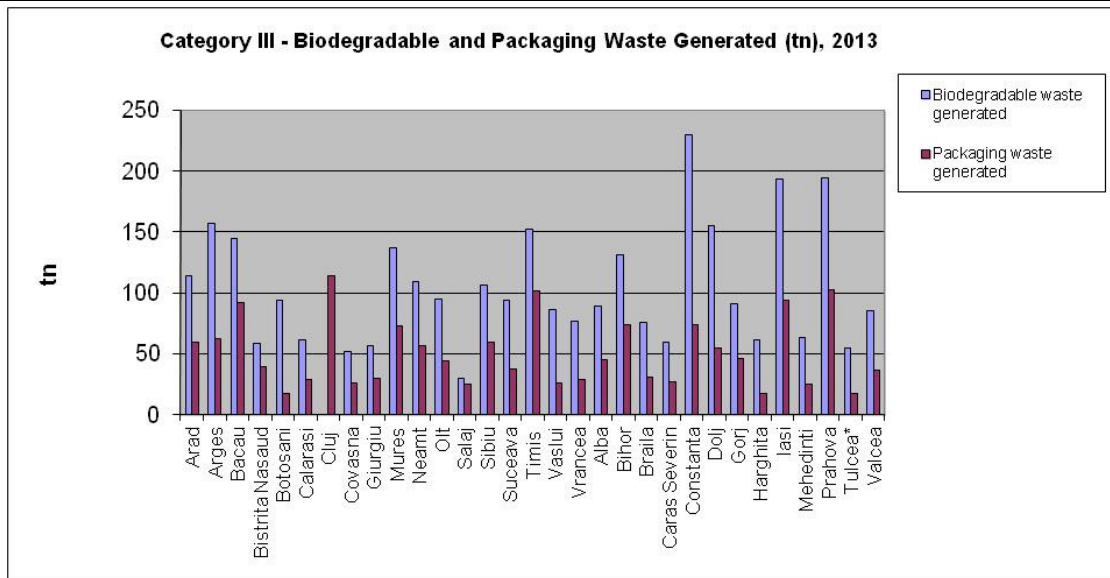


Figure 5: Biodegradable and Packaging waste forecast for 2013 (Category III counties)

#### 4.4.3. Closure of non-compliant landfills in the current and next programming period

As mentioned in § 4.3.3, certain existing non compliant landfills have received a transition period from EU and will cease their activity until 2017 (the latest). Closure of all other non compliant landfills has been part of SOP1. The situation based on the provided documents, on a county basis, is as follows:

**Arad:** In Zone 5 the non-compliant landfill of Lipova still has an approved transition period as well as available capacity until 2017. After that, the residual waste of Lipova will be directly transported to Arad Landfill.

**Bihor:** Although two landfills have received an approved transition period, all 8 non compliant landfills will be closed and rehabilitated within this period.

**Bistrita:** the site in Beclean, 1,6 ha, will be closed by 2016.

**Botosani:** There are at present four non-compliant landfills in Botosani County. Of the four landfills, two (Dorohoi, Botosani) are due to be closed under the current project period. Darabani and Saveni landfill closure is not part of the project.

**Giurgiu:** There are three non-compliant landfills, of which the Mihalesti landfill (2 ha) is in private land and its closure was not included in the project and left for 2017.

**Olt:** even though 3 sites (Corabia, Bals and Caracal) have received an extension period, all 6 non-compliant landfills will be closed and rehabilitated as part of the project.

**Salaj:** even though 3 sites have received an extension period, all 4 non-compliant landfills will be closed and rehabilitated as part of the project.

**Covasna:** even though 2 sites have received an extension period, they will be closed and rehabilitated as part of the project (4 in total). A fifth site, Baraolt, will be closed with local funds, as Baraolt has decided not to participate in the project, but it is unknown whether this will be done before or after 2015.

Vrancea: all 5 sites will be closed by end of 2015, as part of the project (regardless of the extension given).

Arges : Site in Mioveni will be closed by end of 2015, as part of the project (regardless of the extension given).

Dolj, Braila and Tulcea: all non compliant landfills will be closed and rehabilitated within this period, regardless of the extension (provided the Applications are approved).

Prahova: According to GD 349/2005, there is one non compliant landfill in Valenii de Munte to be closed and rehabilitated in 2017, however the landfill in Valenii de Munte is compliant, holds an environmental permit and has a lifetime until 2015. In any case, since it is private it will be closed with own funds.

Valcea: One non compliant landfill will be closed and rehabilitated after the current period.

#### 4.4.4. Current and planned waste disposal facilities

Some of the above counties have proceeded to the construction of landfills compliant with the Landfill Directive, which are at present operational. The situation, with data on capacity figures wherever possible, is summarised in the following Table:

**Table 11: Waste disposal facilities in category III counties**

County	Existing compliant landfill	New landfill
<b>Arad</b>	One compliant landfill in Arad municipality (private/ PPP), 2.400.000 m <sup>3</sup> until 2030	–
<b>Arges</b>	One Compliant Landfill in Albota – Construction of Cell 2 with capacity 1.100.000 m <sup>3</sup>	–
<b>Bacau</b>	One Compliant Landfill in Bacau – Construction of Cell 2 with capacity 1.756.000 m <sup>3</sup> for 2015-2023	–
<b>Botosani</b>	–	New landfill in Stauceni, with cell 1: designed for disposal of 950.000 tn, 11,8 ha and capacity for 7 yr
<b>Calarasi</b>	–	New landfill in Ciocanesti, with cell 1: designed for 1,04Mtn, 6,6 ha and capacity for 12 yr
<b>Cluj</b>	–	New landfill in Cluj-Napoca, with cell 1: designed for 1.350.000 m <sup>3</sup> , 7,7 ha and capacity for 5 yr
<b>Covasna</b>	–	New landfill in Borosneu Mare, with cell 1: 4,4 ha and capacity for 8,8 yr
<b>Giurgiu</b>	–	New landfill in Fratesti, with cell 1: designed for 1,9 ha and capacity for 7 yr
<b>Mures</b>	One existing landfill in Sigishoara operational until 2017 (and closed afterwards)	New landfill in Sanpaul, with cell 1: designed for 1.250.000 m <sup>3</sup> and capacity for 5 yr
<b>Bistrița-Năsăud</b>	–	New landfill in Dumitra (Tarpiu), with cell 1: designed for 420.000 tn, 4,3 ha and capacity for 7 yr,



County	Existing compliant landfill	New landfill
Neamt	Existing landfill in Piatra Neamt operational until 2017	New landfill in Girov, with cell 1: designed for 7,76 ha and capacity for 5 yr
Olt	–	New landfill in Balteni, with cell 1: designed for 880.000 m <sup>3</sup> and capacity for 12 yr
Salaj	–	New landfill in Dobrin, with cell 1: designed for 350.000 m <sup>3</sup> , 3,4 ha and capacity for 7 yr
Sibiu	Existing site in Cristian, designed capacity of 2.647.059 m <sup>3</sup> - 8 cells (992,647 m <sup>3</sup> phase I).	–
Suceava	–	Two new landfills i) in Moara, with cell 1: designed for 1.380.000 t and capacity for 8 yr ii) in Pojorita total capacity 0.35 Mtons
Timis	–	New landfill in Ghizela, with cell 1: designed for 623.000 m <sup>3</sup> , 7 ha and capacity for 5 yr
Vaslui	–	New landfill in Rosiesti, with cell 1: designed for 1.380.000 m <sup>3</sup> and capacity for 13 yr
Vrancea	–	New landfill in Haret, with cell 1: designed for 5 ha and capacity for 7 yr
Alba	–	New landfill in Galda de Jos with cell 1: 540.000 m <sup>3</sup> , capacity for 6 years
Bihor	1 private, Oradea, operational for 20 years	–
Braila	1 private, Muchea, start 2002, 1.669.000 m <sup>3</sup> total, operational until 2028	New landfill in Ianca with cell 1: 72.500 m <sup>3</sup> , 1,17 ha
Caras Severin	–	New landfill in Lupac with cell 1: capacity for 7 years
Constanta	3 (Ovidiu, Costinesti and Albesti)	New landfill in Tortoman (Zones 4-8), cell 1: 250,000 m <sup>3</sup> , 3 ha, capacity for 8 years
Dolj	1, Mofleni (Craiova), capacity for 30 years	–
Gorj	1 in Tg Ziu operational for 25 years	–
Iasi	1 (Tutora), start 2009, 2.500.000 m <sup>3</sup> 1st cell - Construction of cells 2 and 3	–
Mehedinti	1, in Drobeta Turnu operational for 25 years	–
Prahova	2 (Valenii de Munte and Boldesti), start 2007 and 2001, 80.000 m <sup>3</sup> and 2.000.000 m <sup>3</sup> total capacities	–
Tulcea	1, in Mihai Bravu start 2009, 1.700.000 m <sup>3</sup> total 2 more landfills in operation to be closed in 2017	–
Valcea	1 Feteni 321.000 m <sup>3</sup>	New landfill in Roesti, with cell 1: 185.000 m <sup>3</sup> , capacity for 5 years
Harghita	1 private in Techend - Odorheiu Secuiesc City*	New landfill in Remetea, with cell 1: 670.000 m <sup>3</sup> and 5 ha, capacity for 8 years

\* Due to legal problems and partly the lack of free built capacity, the landfill on Techend Plateau could not be integrated in the present project. Techend landfill will only serve Odorheiu Secuiesc City (under conditions).

Overall (both Categories I, II and III), there are currently 29 compliant landfills in Romania.

#### 4.4.5. Provisions in terms of reaching the packaging waste targets

As mentioned, packaging waste amounts to 1.569.000 tn and the respective recycling target to 892.000 tn. Recovery of the various streams will take place in Sorting plants (typically semi automatic). The overview of infrastructure is illustrated in the following Table:

**Table 12: Sorting facilities in category III counties**

County	Packaging waste generated in 2013	Packaging waste - recovery target	Type of facility	Design capacity, t/y	Total capacity (t/y)	Expected gap in 2013 (or end of 2015) (t/y)
Arad	59.880	35.928	Sorting plant /MOCREA (new)	6.100	51.500	NO
			Sorting plant/ Ineu (exist.)	1.400		
			Sorting plant/ Arad (exist.)	15.000– 44.000		
Arges	62.645	37.587	1 Sorting plant (exist.)	18.600	38.600	NO
			1 Sorting plant (new)	20.000		
Bacau	92.425	55.455	1 Sorting plant (exist.)	57.200	71.200	NO
			1 Sorting plant (new)	14.000		
Bistrita Nasaud	39.943	23.966	1 Sorting plant (new)	13.000	13.000	11.000
Botosani	17.272	10.363	1 Sorting plant (new)	24.500	24.500	
Calarasi	28.623	17.174	1 Sorting plant (new)	15.500	15.500	2.500
Cluj	114.279	68.567	1 Sorting plant (new)	92.000		
Covasna	26.141	15.685	1 Sorting plant (new)	11.000	11.000	5.000
Giurgiu	29.871	17.923	1 Sorting plant /Fratesti (new)	12.000	12.000	6.000
Mures	73.415	44.049	6 sorting plant (exist.)	28.900	56.900	NO
			1 Sorting plant (new)	28.000		
Neamt	56.270	33.762	Sorting plant/ Cordun (new)	17.000	52.000	NO
			Sorting Plant / Piatra Neamt (exist.)	21.000		
			Sorting Plant /Roznov (exist.)	2.800		
			Sorting Plant /Bara Neamt (exist.)	1.000		
			Sorting Plant /Targu Neamt (exist.)	5.000		
			Sorting Plant/ Tasca (exist.)	5.200		
Olt	44.082	26.449	1 Sorting plant (new)	29.000	29.000	NO
Salaj	25.412	15.247	1 Sorting plant (new)	19.100	19.100	NO

County	Packaging waste generated in 2013	Packaging waste - recovery target	Type of facility	Design capacity, t/y	Total capacity (t/y)	Expected gap in 2013 (or end of 2015) (t/y)
Sibiu	59.095	35.457	Sorting plant /Agnita (exist.)	912	51.100	NO
			Sorting plant /Cisnadie (exist.)	5.184		
			Sorting plant /Medias (exist.)	20.000		
			Sorting plant /Saliste (exist.)	5.000		
			Sorting plant /Sura Mica (new)	20.000		
Suceava	37.697	22.618	1 Sorting plant (new)	23.780	23.780	NO
Timis	101.384	60.830	1 Sorting plant (exist.)	41.834		NO
			1 Sorting plant (new)	16.111		
Vaslui	25.673	15.404	Sorting plant / Rosiesti (new)	28.500	28.500	NO
Vrancea	29.237	17.542	1 Sorting plant (new)	15.000	15.000	2.600
Alba	45.222	27.133		1 Sorting plant (42.300 t/y)	42.300	NO
Bihor	73.509	44.105	3 sorting plants (46.000 t/y)	3 sorting plants (16.000 t/y)	62.000	NO
Braila	30.943	18.566		2 sorting plants (35.000 t/y)	35.000	NO
Caras Severin	27.145	16.287		1 Sorting plant (34.000 t/y)	34.000	NO
Constanta	74.138	44.483	1 Sorting plant (9 t/h)	3 sorting plants (61,200 t/y)	78.500	NO
Dolj	55.169	33.101		1 Sorting plant (54.200 t/y)	54.200	NO
Gorj	45.731	27.439	3 sorting plants (18.900 t/y)	1 Sorting plant (22.100 t/y)	41.000	NO
Harghita	17.446	9.595	1 sorting plant (5.700 t/yr)	1 sorting plant (15.200 t/yr)	20.900	NO
Iasi	94.351	56.611		3 sorting plants (100.000 t/y)	100.000	NO
Mehedinti	25.228	15.137		1 Sorting plant (33.200 t/y)	33.200	NO
Prahova	102.980	61.788	2 sorting plants (without glass) (total 14.400 t/y)	1 sorting station in Boldesti - Scaeni: 49.000 t/y	62.400	NO
Tulcea*	17.222	10.333	5 sorting plants (1,773 t/y)	1 sorting plant (3,934 t/y)	5.707	NO
Valcea	36.770	22.062	1 Sorting plant (3.800 t/y)	1 Sorting plant (41.100 t/y)	44.900	NO

\* in Tulcea County, Tulcea Municipality is not part of IDA (although based on private communication Tulcea has decided eventually to become part of IDA)

From the documents examined it was not clear whether the required capacity in Bistrita, Giurgiu, Covasna, Calarasi and Vrancea will be covered by increasing the shifts or by contribution from private operators or by surplus capacity in neighbouring counties. In Arad the existing plant currently operates with mixed waste and it is planned to switch to source separated waste. In case there are other plants operating with mixed waste, it is advised to switch to segregated waste for health and safety reasons.

#### 4.4.6. Provisions in terms of reaching the diversion targets

As mentioned, biodegradable waste in 2013 amounts to about 2.954.000 tn. The biodegradable waste that is allowed to be disposed in the same year is about 1.656.000 tn. To achieve the necessary diversion, the following techniques have been considered: i) Mechanical Biological Plants, ii) Composting plants, iii) Home composting in rural areas and iv) paper recycling (including non packaging paper). Waste-to-Energy Plants were not considered in the Category III projects.

The overview of infrastructure is illustrated in the following Table 13, together with an approximate calculation to check target achievement also for year 2016. Since some of the Applications Forms are under revision, it is underlined that the figures for each county of Table 13 are as of December 2011. Again, the figures have been taken from the documents provided. Similarly, i) the diversion achieved by MBT plants has been assumed to a **70%** whereas by composting plants for segregated material to 100%, ii) a rule of thumb was used to convert number of composting bins to tn/y and iii) wood has not been taken into account.

The overall relative share of each method is shown in the diagram, in which it is clear that MBT plants dominate:

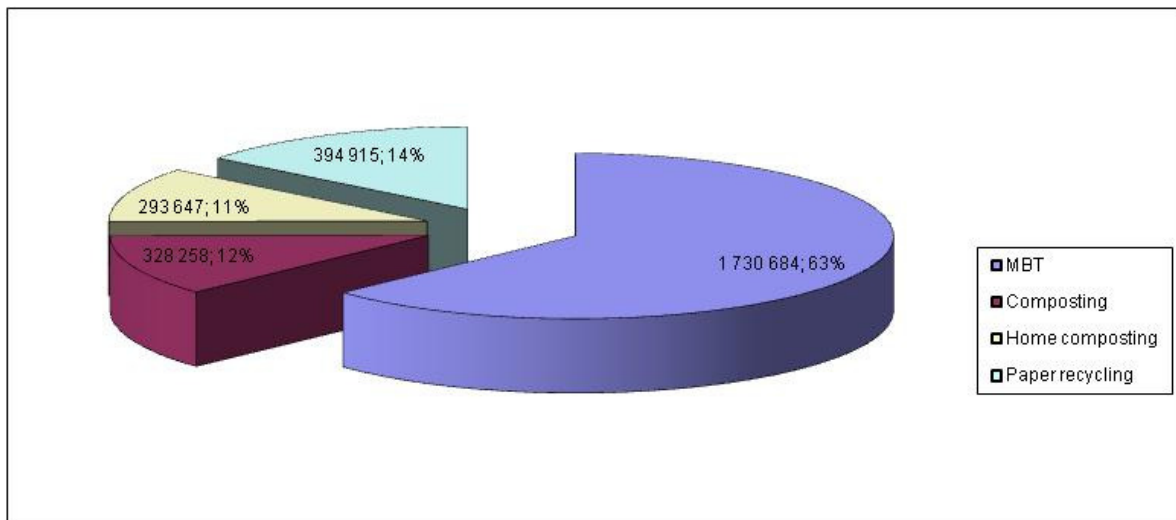


Figure 6: Capacities of Waste treatment technologies in category III counties

**Table 13: Waste diversion facilities in category III counties**

County	Biodegradable waste generated		Biodegradable waste Allowed to landfill		Biodegradable waste for diversion		Type of facility	Design capacity, t/y	Diversion from Paper recovery (t)	Home Composting (t/y)	TOTAL DIVERSION (t/y)	Gap in 2016 (t/y)
	2013	2016	2013	2016	2013	2016						
Arad	114.488	114.831	50.747	35.523	63.741	79.308	Composting Plant/ Arad (new)	19.000	25.100	10.900	57.000 <sup>1</sup>	22.308
							Composting Plant / Mocrea (new)	700				
							Composting Plant/ Ineu (exist)	1.300				
Arges	157.351	150.844	71.818	50.272	85.533	100.572	2 Composting plant (exist.)	25.000	12.400	22.500	74.900 <sup>1</sup>	25.672
							2 Composting plant (new)	15.000				
Bacau	144.576	145.839	78.745	76.862	66.353	69.065	1 Composting plant (exist.)	8.500	21.000	14.286	48.800 <sup>1</sup>	20.265
							1 Composting plant (new)	5.000				
Bistrita Nasaud	58.789	60.996	35.380	24.766	23.409	36.230	1 Composting plant (new)	12.000	5.000	1.535	18.535 <sup>1</sup>	17.695
Botosani	93.685	96.811	50.788	35.552	42.897	61.259	1 Composting plant (new) (non eligible)	4.400	12.700	23.500 <sup>2</sup>	40.600 <sup>1</sup>	20.659
Calarasi	61.033	63.228	35.169	24.618	25.864	38.610	1 Composting plant (new) (non eligible)	10.000	7.000	16.000 <sup>2</sup>	33.000	22.308
Cluj	154.833	159.274	76.997	67.097	116.900	142.100	1 MBT plant (new)	206.000	26.100	4.900	150.000	NO
Covasna	51.862	52.930	23.608	16.526	28.254	36.404	1 Composting plant (new)	12.000	7.000	8.300	27.300 <sup>1</sup>	9.104
Giurgiu	56.382	56.973	33.718	29.383	22.664	33.371	Composting plant/ Fratesti (new)	11.000 -12.000	5.000	7.700 <sup>2</sup>	24.700	8.671
Mures	137.125	144.589	64.100	44.870	68.550	99.719	1 MBT plant (new)	65.000 (expanded to 120.000 in 2016)	10.400	10.000	76.000 (114.400 in 2016)	NO

County	Biodegradable waste generated		Biodegradable waste Allowed to landfill		Biodegradable waste for diversion		Type of facility	Design capacity, t/y	Diversion from Paper recovery (t)	Home Composting (t/y)	TOTAL DIVERSION (t/y)	Gap in 2016 (t/y)
	2013	2016	2013	2016	2013	2016						
							1 Composting plant for green waste (new)	10.000				
Neamt	109.165	110.626	61.834	53.883	47.332	56.742	Composting Plant /Piatra Neamt (exist)	25.000 <sup>3</sup>	25.000	8.100	63.600	NO
							Targu Neamt Composting Plant (exist)	5.500 <sup>3</sup>				
Olt	95.446	n/a	53.300	37.300	42.146	63.996	"In situ" composting in parks	2.716	14.700	24.730 <sup>2</sup>	42.146	21.850
Salaj	29.870	30.105	27.816	24.240	7.000	15.800	1 MBT plant (new)	32.000	5.320	2.800	30.500	NO
Sibiu	106.690	109.217	47.453	33.217	59.237	76.000	1 Composting plant (exist.)	3.600	26.000	7.685	59.300	16.700
							1 Composting plant (new)	22.000				
Suceava	94.045	95.961	78.500	54.900	58.976	72.649	"In situ" composting in gardens	2.641	20.000	36.335 <sup>2</sup>	58.976	13.673
Timis	152.432	144.388	77.350	67.405	89.254	115.719	1 Composting plant (exist.)	9.481	19.374	8.480	91.869	23.850
							1 MBT plant (new)	77.018				
Vaslui	86.522	89.302	50.780	35.546	35.742	53.756	"In situ" composting in gardens	1.070	11.800	24.300 <sup>2</sup>	37.127	16.629
Vrancea	77.095	78.072	42.420	36.966	36.159	40.861	Composting plant	15.000	9.000	capacity n.s.-non eligible	unknown	Unknown (max 16.861)
Alba	89.451	94.615	42.986	30.090	46.465	64.525	1 MBT plant (new)	85.566	7.700	3.700	71.300	NO
Bihor	131.194	131.635	66.955	46.868	64.239	84.766	1 MBT plant (new)	60.000	28.100	4.600	85.337	NO
							2 Composting plant (exist.)	6.700				
Braila	76.121	76.008	41.382	28.967	34.739	47.041	1 MBT plant (new)	26.000	11.663	4.750	34.739	12.302
							1 "wet bin" composting	NOT				

County	Biodegradable waste generated		Biodegradable waste Allowed to landfill		Biodegradable waste for diversion		Type of facility	Design capacity, t/y	Diversion from Paper recovery (t)	Home Composting (t/y)	TOTAL DIVERSION (t/y)	Gap in 2016 (t/y)
	2013	2016	2013	2016	2013	2016						
							plant (exist.)	INDICATED				
Caras Severin	59.604	60.050	38.760	33.777	47.995	48.280	1 MBT plant (new)	64.000	2.000	3.900	50.700	NO
Constanta	229.526	234.631	78.000	54.600	151.526	180.031	1 MBT plant (new)	21.000	28.329	n.s.	151.526	28.505
							1 MBT plant (new)	85.000				
Dolj	154.807	156.350	80.030	56.021	74.777	100.329	3 Composting plant (new)	44.750	33.000	24.500 <sup>2</sup>	102.250	NO
Gorj	91.190	91.237	42.027	29.419	49.164	61.818	1 MBT plant (new)	82.000	9.100	5.100	67.500	NO
Harghita	61.649	62.377	32.467	22.727	29.182	39.650	1 Composting plant	23.600	NOT INDICATED	4.600	Approx. 32.000	Unknown
Iasi	193.598	195.418	86.530	60.571	107.068	134.847	1 Composting plant (new)	10.000	22.000	8.000	138.000	NO
							1 MBT plant (new)	140.000				
Mehedinti	62.965	62.366	34.762	24.333	28.203	38.032	1 MBT plant (new)	54.800	7.650	2.800	49.000	NO
Prahova	194.270	198.707	92.262	64.583	102.008	134.124	1 MBT plant (new)	150.000	29.630	19.057	138.800	NO
							1 composting plant (exist.)	1.800				
Tulcea	54.598	55.634	28.324	19.827	26.274	35.807	1 "wet bin" composting plant (exist.)	5.500	1.749	10.286	26.274	9.533
							1 Composting plant (exist.)	14.000 40.000 (future extension)	10.000	4.700	52.570	NO
Valcea	85.007	84.755	46.156	32.309	38.852	52.446	1 MBT plant (new)	34.100				

<sup>1</sup>: marginal capacity to meet the 2013 target

<sup>2</sup>: a rather high value of diversion assumed for the number of bins provided

<sup>3</sup>: the capacity of the composting plants is currently limited by biowaste separate collection service



From the data of the previous Table, it can be seen that in Alba, Caras Severin, Dolj, Gorj, Iasi, Mehedinti, Prahova, Valcea, Cluj, Mures, Neamt and Salaj, the facilities are sufficient to achieve the required diversion also for 2016, whereas in some counties infrastructure is marginal to meet the 2013 diversion target (Arad, Arges, Bacau, Bistrita, Botosani and Covasna).

It is mentioned that in certain cases, a rather high value of diversion has been assumed for home composting or the number of home composting bins provided is quite high (above 80.000).

Finally, same as for counties II, an elementary technology has been adopted for the design of the MBTs.

Detailed information, graphs and tables regarding the Category III counties are presented in Annex IV.

#### 4.4.7. Overview of investment costs and unit capital costs

Following the examination of the provided documents, the envisaged technical measures and the associated budget have been codified in a spreadsheet. They include collection, transportation, transfer station, sorting facilities, composting, MBT, WtE plants, home composting, landfill, landfill closure and others (Technical Assistance, audit, Public Awareness, etc). The scope was to calculate a range of unit costs as well as average values. The detailed spreadsheet for the 31+8 counties is presented in Annex VI, whereas the main data is summarised below:

**Table 14: Summary of SOP1 Financial Costs**

Technology	Unit Capital Cost	
	SOP1 Average	SOP1 Range
Sorting Facility – Semi-automated sorting	123 €/tn/y	52-260 €/tn/y
Composting - Open air windrow	169 €/tn/y	38-323 €/tn/y
MBT - Simple MBT	109 €/tn/y	84 - 153 €/tn/y
WtE	735 €/tn/y	700-769 €/tn/y
Transfer Station	115 €/tn/y	61 – 225 €/tn/y
Collection - 1,1 m3 bins	370 €/pc	275 – 490 €/pc
Home composting - bins	40 €/pc	15 – 50 €/pc
Landfill -Construction of 1st cell and auxiliary facilities	11 €/m <sup>3</sup> or 160 €/m <sup>2</sup>	3-21 €/m <sup>3</sup> or 101-211 €/m <sup>2</sup>
Landfill Closure	37 €/m <sup>2</sup>	14 – 61 €/m <sup>2</sup>

The large variation in the above unit costs is attributed to the significant range of designed capacities.

The total investment cost (eligible and non eligible) for the ISWM facilities in the 39 counties amounts to **1,3 billion €** (or an average of 33 million € per county). This figure does not include the expenditure for the two WtE plants that will be constructed with PPP procedure and combined funding (private and public/EU funds) and their budget has been estimated to **386 million €**.

#### 4.4.8. Capacity for co-incineration in cement kilns

In Romania there is a significant number of cement industries operating, that have installed the necessary equipment to receive secondary fuel, i.e. sludge, fluff, residues derived from waste

sorting/ MBT plants usually called SRF and/or RDF, etc. In particular, there are 3 cement firms with 7 plants located in the following counties:

- CARPATCEMENT (Hunedoara, Neamt and Dambovita); 3 x 40.000 tn/y secondary fuel capacity each,
- HOLCIM (Bihor and Arges); 2 x 45.000 tn/y secondary fuel capacity each,
- LAFARGE (Constanta and Brasov); 50.000 & 30.000 tn/y secondary fuel capacity.

The cement plants are also shown in the respective maps in Annex V.

Based on the requirements of CEN/TS 15359 (SRF specifications and classes), each of the companies has set certain specifications (limits) to accept waste, such as moisture, heavy metals, Cl, S, etc. The total capacity for secondary fuel input is approximately **290.000 t /y** (in 2010). However, this figure can be significantly increased, depending on the market development. The current gate fee depends on the qualitative characteristics of the material received and generally ranges from 8-22 €/t (has to be paid to cement plants for disposing SRF).

More specifically, the information that has been received for each cement firm concerning input characteristics and gate fee, is as follows:

1. **CARPATCEMENT HOLDING** owns 3 factories in: Deva (Hunedoara County), Bicaz (Neamt County) and Fieni (Dambovita County).

Type of waste	Waste parameters	Gate fee
Sorting residues	Moisture: 30% -40% Cl: <1% S: < 1% Hg < 2 ppm Cd + Tl < 25 ppm Total heavy metals: < 2000 ppm No metals, stones etc.	2013: 16 - 18 €/t 2020: 26 - 30 €/t 2040: 36 - 42 €/t
Simple MBT	Moisture:15% -30% Cl: <1% S: < 1% Hg < 2 ppm Cd + Tl < 25 ppm Total heavy metals: < 2000 ppm No metals, stones etc.	2013: 13 - 15 €/t 2020: 22 - 26 €/t 2040: 32 - 38 €/t
Simple MBT with bio-drying	Moisture:10% - 20% Cl: <1% S: < 1% Hg < 2 ppm Cd + Tl < 25 ppm Total heavy metals: < 2000 ppm No metals, stones etc.	2013: 10 - 12 €/t 2020: 18 - 22 €/t 2040: 28 - 34 €/t

2. **HOLCIM (ROMANIA) CIMENT** owns 2 factories in: Alesd (Bihor County) and Cimpulung (Arges County).

Type of waste	Waste parameters	Gate fee
light fraction resulted from the gravimetric sorting (rotary sieves with variable eyes) of the residual recyclable waste (which are not recyclable), after removal of the heavy fraction	Moisture: 20% -40% Cl: < 1% S: < 0.8% Total of Hg,Cd, Tl : max 100 ppm Total of heavy metals < 2500 ppm No metals, stones, broken glass, waste batteries etc Calorific power: 8 -10 Gj/t	2010 - 2013: 12 - 16 €/t 2013 - 2020: 16 - 22 €/t 2021 - 2030: 22 - 34 €/t 2031 - 2040: 34 - 44 €/t
waste (SRF/RDF/fluff) derived from the simple MBT	Moisture: 15% -30% Cl: < 1% S: < 0.8% Total of Hg,Cd, Tl : max 100 ppm Total of heavy metals < 2500 ppm No metals, stones, broken glass, waste batteries etc Calorific power:10-12 Gj/t	2011 - 2013: 10-12 €/t 2013 - 2020: 12-20 €/t 2021 - 2030: 20-30 €/t 2031 - 2040: 30-40 €/t
waste (SRF/RDF/fluff) derived from the MBT with bio-drying	Moisture: 10% - 20% Cl: < 1% S%: < 0.8% Total of Hg,Cd, Tl : max 100 ppm Total of heavy metals < 2500 ppm No metals, stones, broken glass, waste batteries etc Calorific power: >15 Gj/t	2012 - 2013: 8 -10 €/t 2014 - 2020: 10-16 €/t 2021 - 2030: 16 - 26 €/t 2031 - 2040: 26 - 36 €/t

**3. LAFARGE CIMENT ROMANIA** owns 2 factories in: Medgidia (Constanta County) and Hoghiz (Brasov County). Both factories are currently accepting sorting residues, having the following parameters:

- Moisture: 20-40%
- Cl < 1%
- S < 2%
- Total of heavy metals < 10000 ppm
- No metals, stones etc.

Co-incineration is a particularly attractive, long term solution for many countries and also for Romania which has to be further expanded since it can contribute to targets achievement. On one hand it leads to savings for the cement industry, also in terms of greenhouse gas emissions allowances; on the other hand it is part of an integrated waste management system, which helps to achieve recovery and diversion targets.

## 4.5. CONCLUSIONS – RECOMMENDATIONS

In this section, some critical remarks are presented with focus to the identified “bottlenecks”.

**Waste generation and composition:** Since a number of projects in Romania have been already implemented, it is proposed that the municipal waste generation, packaging waste generation and waste composition be re-established with greater detail taking data from existing facilities in the various counties.

**Landfill:** At present, there are operating 29 compliant landfills. Even though disposal is the least preferable option, sanitary landfills constitute a major part of the integrated system. The gate fee is approximately 10-15 €/t of waste which is considered as rather low. It is underlined that the gate fee should not only account to cover operational cost and adopt environmental mitigation measures; it should also account to cover i) construction of future cells ii) closure and aftercare cost after the end of the cell’s useful life for a period of at least 30 years, iii) insurances and iv) environmental monitoring in operational and after-care phases.

In order to boost waste management competitive technologies, it has been correctly decided in the Strategy to impose the so-called “landfill tax”.

**Separate collection:** In most of the counties according to existing Master plans and strategies, the “dual” system has been adopted to promote separate collection, namely a dry bin for recyclables and a wet bin for the residuals. The system will be enhanced with additional bins or bell containers for paper, plastics, metals and glass, since the Romanian Regulation GD 247/2011 requires selective collection in three fractions. Separate collection from the private sector (according to the principle of “producers’ responsibility”) is still poorly developed; the participation of public is expected to be low in the first 1-2 years of project’s commencement. In the Master Plans a typical contamination level of 20% has been assumed for the dry bin, resulting also in a respective over sizing of the sorting plants. It is obvious that contaminations lower the quality of the recovered material (especially paper) and worsen the confidence of public. For this reason, awareness campaigns are part of the new projects and will take place prior to and throughout the implementation.

Nevertheless, apart from some limited sources (garden and market waste in selected areas), in general separate collection of organic waste has not been adopted in the counties. Issues such as purity of input, willingness to participate, product marketability and quality were also not investigated. Source separation of the organic waste stream is a critical sector that EU is currently emphasising following the release of the “Green paper on the Management of biowaste in EU”. Biowaste management and separate collection scoping to produce clean and safe compost should be a priority in the new SOP 2014-2020.

**Waste treatment:** Romania has followed until now a “low cost” approach for waste treatment. Treatment takes typically place in a so called “simple MBT”: waste is divided into a light fraction that goes directly to landfill and a heavy fraction that is first directed to composting. The stabilized product is either landfilled or used for applications where good quality material is not demanded, such as dumpsite and land remediation. Apart from ferrous metals, other recyclables are not recovered. **There is a certain potential of the produced “light” fraction to be further treated with the objective to extract some recyclables with an acceptable degree of purity or produce a fraction with characteristics of secondary fuel with a significant heating value for utilisation in incinerators or cement kilns.**

Co-incineration is a particularly attractive, long term solution for many countries, including Romania, which has to be further expanded. On one hand it leads to savings for the cement industry, also in terms of greenhouse gas emissions allowances; on the other hand it is part of a waste management system and helps to achieve recovery and diversion targets. In this respect,

it will be also useful to have official “end of waste” criteria by the EC or encourage the use of SRF standards, in order to create a market for high quality and environmentally safe secondary fuel.

In Brasov and Bucharest counties, two WtE plants will be constructed with PPP procedure using combined funding (Private and Public Funds), however the planning procedure of the facilities has not yet been finalised and therefore these projects are more likely to be implemented in the new programming period. Subject to measures higher up the waste hierarchy, there may remain scope for further thermal facilities in the coming programming period – in particular where district heating networks are already installed in some of the larger cities in Romania.

Romania has followed a “low cost” approach for residual waste treatment whereby treatment typically takes place in a so called “simple MBT”: waste is divided into a light fraction that goes directly to landfill and a heavy (or fine) fraction that is first directed to a simple biostabilisation (composting) stage prior to landfill. More sophisticated MBT configurations that are now state of the art in Europe use significantly more advanced material processing and separation technologies (like optical sorting), and have sophisticated process control systems which (as well as achieving better material recycling from the mixed residual waste) ensure effective stabilisation of the active waste prior to landfill. In addition, these more advanced processes can be readily modified into the biodrying mode of operation where (instead of producing stabilised output for landfill) a solid recovered fuel (SRF) is produced which is suitable to be utilised in cement industries or other co-combustion applications. These more advanced systems are therefore more appropriate for effective integrated waste management for the next programming period.

Moreover, attention is drawn to the fact that the wet bin does not contain “organic” waste but residual waste, with a high percentage of inert material, recyclables placed to wrong receiver and other material that is not compostable. In this respect, direct composting without pre-treatment, envisaged in certain counties, is a not suitable technology.

**Biowaste treatment (recycling):** By the end of the SOP1 programming period, around 740Ktpa of organic waste treatment is expected to be in place across Romania. There are not full details on all systems used, but it is expected that the majority of these will be simple aerobic facilities. Nevertheless, in recent years it has become clear that Anaerobic Digestion (AD) plants are environmentally more favourable compared to aerobic composting, particularly from the carbon emission saving and energy perspectives. Many Life Cycle Assessment studies have concluded that treatment of separately collected food waste by AD is the most environmentally sound option for this material stream. This technology ought thus to feature in the next programming period. Since AD is an effective process for dealing with food waste (with aerobic composting better at handling plants and garden waste), and considering that food waste (which is the main target material of the WFD) is understood to constitute the large proportion of “organic waste” within the waste composition, this also makes AD the most appropriate technology to build in the next programming period to complement the pre-existing aerobic composting facilities, in order to fulfil the until now legislative requirements for 50% recycling.

**Sorting plants:** The sorting plants that are promoted in the counties operate semi-automated. Some of them have capacities around 4.000 – 5.000 t/y or even lower - such low capacities are not financially viable. Upgrade of the larger ones with more automatic separation systems, like optical sorting for the plastic fractions which have higher value can be implemented in the next SOP.

Contribution of the private Recycling Schemes (“Green Dot”) is at present at a low level and in the Master Plans it was not expected to expand significantly (contrary to the “producers responsibility” principle).

Of course, responsibility of producers does not end in the collection/ treatment phase. According to the new WFD, *“The introduction of extended producer responsibility in this Directive is one of the means to support the design and production of goods which take into full account and facilitate the efficient use of resources during their whole life-cycle including their repair, re-use, disassembly and recycling”*; and *“In order to strengthen the re-use and the prevention, recycling and other recovery of waste, Member States may take legislative or non-legislative measures to ensure that any natural or legal person who professionally develops, manufactures, processes, treats, sells or imports products (producer of the product) has extended producer responsibility”*.

Local authorities are also required to collaborate with the producers.

**Capacities of the required infrastructure:** Most counties have waste treatment facilities with not sufficient capacity to meet the 2016 Landfill Directive targets. The future situation in these counties is the objective of the next task of the current project.

**Home composting:** In the Master Plans, provision of home composting bins up to a certain percentage of the rural households was adopted. Home composting is a solid technology that can contribute not only to the diversion target but to environmental awareness as well.

On the other hand, it cannot be applied massively and the Authorities should be cautious about a large scale use. In some counties the number of bins was unrealistically high. It is unknown how the composting bins will be distributed in a fair manner to urban population. The public should be clearly informed how to use the bins, what material to avoid and how to apply the product in their gardens/ fields.

**Other:** The counties have to proceed faster to a 100% collection coverage rate and to a full closing and rehabilitation of dumpsites, if possible before the closing date of 2017.

The main findings regarding the fulfilment of the EU Directive Targets is presented in the following table 15, which is based on the data included in the relative Feasibility Studies and Application Forms (the cases where the closure of a non compliant landfill was not in the scope of SOP1 have been indicated):

**Table 15: Meeting the EU Directive Targets**

County	Category	Packaging Directive Recycling Targets	Landfill Directive Biodegradable Tonnage Targets**		Landfill Directive Compliant Sites Obligation**	Waste Framework Directive	
			2013 (or latest 2015)	2013		2016	End of 2015
Alba	III	YES	YES	YES	YES	YES	NO
Arad	III	YES	YES (Marginally)	NO	YES, Closure not part of SOP1	YES	NO
Argeş	III	YES	YES (Marginally)	NO	YES	YES	NO
Bacău	III	YES	YES (Marginally)	NO	YES	YES	NO
Bihor	II	YES	YES	YES	YES	YES	NO
Bistriţa-Năsăud	III	YES (Partially)*	YES (Marginally)	NO	YES, Closure not part of SOP1	YES	NO
Botoşani	III	YES	YES (Marginally)	NO	YES, Closure not part of SOP1	YES	NO
Braşov	II	YES	YES	YES	YES	YES	NO
Brăila	II	YES	YES	NO	YES	YES	NO
Bucureşti	II	NOT CLEAR****	YES	NO	YES	YES	NO
Buzău	II	YES	YES	NO	YES, Closure not part of SOP1	YES	YES
Caraş-Severin	II	YES	YES	YES	YES	YES	NO
Călăraşi	III	YES (Partially)*	YES	NO	YES	YES	NO
Cluj	III	YES	YES	YES	YES	YES	NO
Constanţa	II	YES	YES	NO	YES	YES	YES
Covasna	III	YES (Partially)*	YES (Marginally)	NO	YES, Closure not part of SOP1	YES	NO
Dâmboviţa	I	NO	NO	NO	NO	NO	NO
Dolj	II	YES	YES	YES	YES	YES	NO
Galaţi	II	YES	YES	NO	YES	YES	NO
Giurgiu	III	YES (Partially)*	YES	NO	YES, Closure not part of SOP1	YES	NO
Gorj	II	YES	YES	YES	YES	YES	NO
Harghita	II	YES	YES	Unknown	YES	YES	YES
Hunedoara	II	YES	YES	YES	YES	YES	NO
Ialomiţa	II	YES	YES	NO	YES	YES	NO

County	Category	Packaging Directive Recycling Targets	Landfill Directive Biodegradable Tonnage Targets**		Landfill Directive Compliant Sites Obligation**	Waste Framework Directive	
		2013 (or latest 2015)	2013	2016	End of 2015	2015 (materials)	2020 (50% target)
Iași	II	YES	YES	YES	YES	YES	NO
Ilfov	II	YES	YES	NO	YES	YES	NO
Maramureș	II	YES	YES	NO	YES	YES	NO
Mehedinți	II	YES	YES	YES	YES	YES	NO
Mureș	III	YES	YES	YES	YES	YES	NO
Neamț	III	YES	YES	YES	YES	YES	NO
Olt	III	YES	YES	NO	YES	YES	NO
Prahova	II	YES	YES	YES	YES	YES	NO
Satu Mare	I	NO	NO	NO	NO	NO	NO
Sălaj	III	YES	YES	YES	YES	YES	NO
Sibiu	III	YES	YES (Marginally)	NO	YES	YES	NO
Suceava	III	YES	YES	NO	YES	YES	NO
Teleorman	I	NO	NO	NO	YES	NO	NO
Timiș	III	YES	YES	NO	YES	YES	NO
Tulcea	II	YES	YES	NO	YES	YES	NO
Vaslui	III	YES	YES	NO	YES	YES	NO
Vâlcea	II	YES	YES	YES	YES, Closure not part of SOP1	YES	YES
Vrancea	III	YES (Partially)*	YES***	NO	YES	YES	NO

\* Additional capacity or shifts needed

\*\* For Category II counties, the target is achieved (YES) under the condition of project implementation within the current period

\*\*\* Under the condition of sufficient home composting

\*\*\*\* please see page 20 footnote

Some brief explanation follows:

Dambovita, Satu Mare and Teleorman counties belong to Cat I, are not included in the 2007-2013 SOP program and therefore will have no waste infrastructure in place. In column Landfill Directive Biodegradable Tonnage Targets - 2016, NO implies that the facilities have sufficient infrastructure for the 2013 but not for the 2016 targets. Finally, the last column shows that the planned infrastructure, with the exception of 4 counties, is not sufficient to achieve the 50% recycling target of the new WFD. These issues will be dealt with in the subsequent pipeline report.