ANNEX XXI

MAJOR PROJECT
REQUEST FOR CONFIRMATION OF ASSISTANCE UNDER ARTICLES 39 TO 41 OF REGULATION (EC) NO 1083/2006

EUROPEAN REGIONAL DEVELOPMENT FUND / COHESION FUND

INTEGRATED SOLID WASTE MANAGEMENT SYSTEM IN CARAS-SEVERIN COUNTY - ROMANIA

CCI No. 2009 RO 161 PR 038

A. ADDRESSES AND REFERENCES

A.1. Authority responsible for the application (i.e., managing authority or intermediate body)

A.1.1. Name: *Ministry of Environment and Forests*

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A.2. Organisation responsible for project implementation (beneficiary)

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B. PROJECT DETAILS

B.1. Title of project / project phase:

Integrated solid waste management system in Caras-Severin County - Romania

B.2. Categorisation of project activity[1]

	Code	*Percentage*
B.2.1. Code for the priority theme dimension	*44*	*100%*
B.2.2. Code for the form of finance dimension	*01*	*100%*
B.2.3. Code for the territorial dimension	*01*	*41%*
	05	*59%*
B.2.4. Code for the economic activity dimension[2]	*21*	*100%*
B.2.4.1. NACE Code[3]	E38	
B.2.5. Code for the location dimension (NUTS/LAU)[4]	*RO422*	*100%*

B.3. Compatibility and coherence with the Operational Programme

B.3.1. Title of the related Operational Programme:

Sectorial Operational Programme for Environment 2007-2013

B.3.2. Common Code for Identification (CCI) No of Operational Programme

2007 RO 161 PO 004

B.3.3. Fund

ERDF [X] Cohesion Fund [ ]

1 Annex II to Regulation (EC) No 1828/2006 unless otherwise specified.

2 Where a project involves more than one economic activity, multiple codes may be indicated. In that case the percentage share for each code should be indicated with the total not exceeding 100%.

3 NACE-Rev.2, 4 digit code: Regulation (EC) No 1893/2006 of the European Parliament and of the Council (OJ L 393, 30.12.2006, p.1).

4 Regulation (EC) No 1059/2003 of the European Parliament and of the Council (OJ L 154, 21.6.2003, p. 1). Use the most detailed and relevant NUTS code. Where a project affect multiple individual NUTS/LAU 2 level areas, consider encoding the NUTS/LAU1 or higher codes.

B.3.4. Title of the priority axis

Priority Axis 2 – Development of integrated waste management systems and rehabilitation of historically contaminated sites

B.4. Project description

B.4.1. Project (or project phase) description:

a) Description of the project (or project phase).

The project refers to the development of an integrated solid waste management system in Caras-Severin County.

Caras-Severin County is located in the South-Western part of Romania, Development Region West.

Figure B-1: Location of Caras-Severin County in Romania

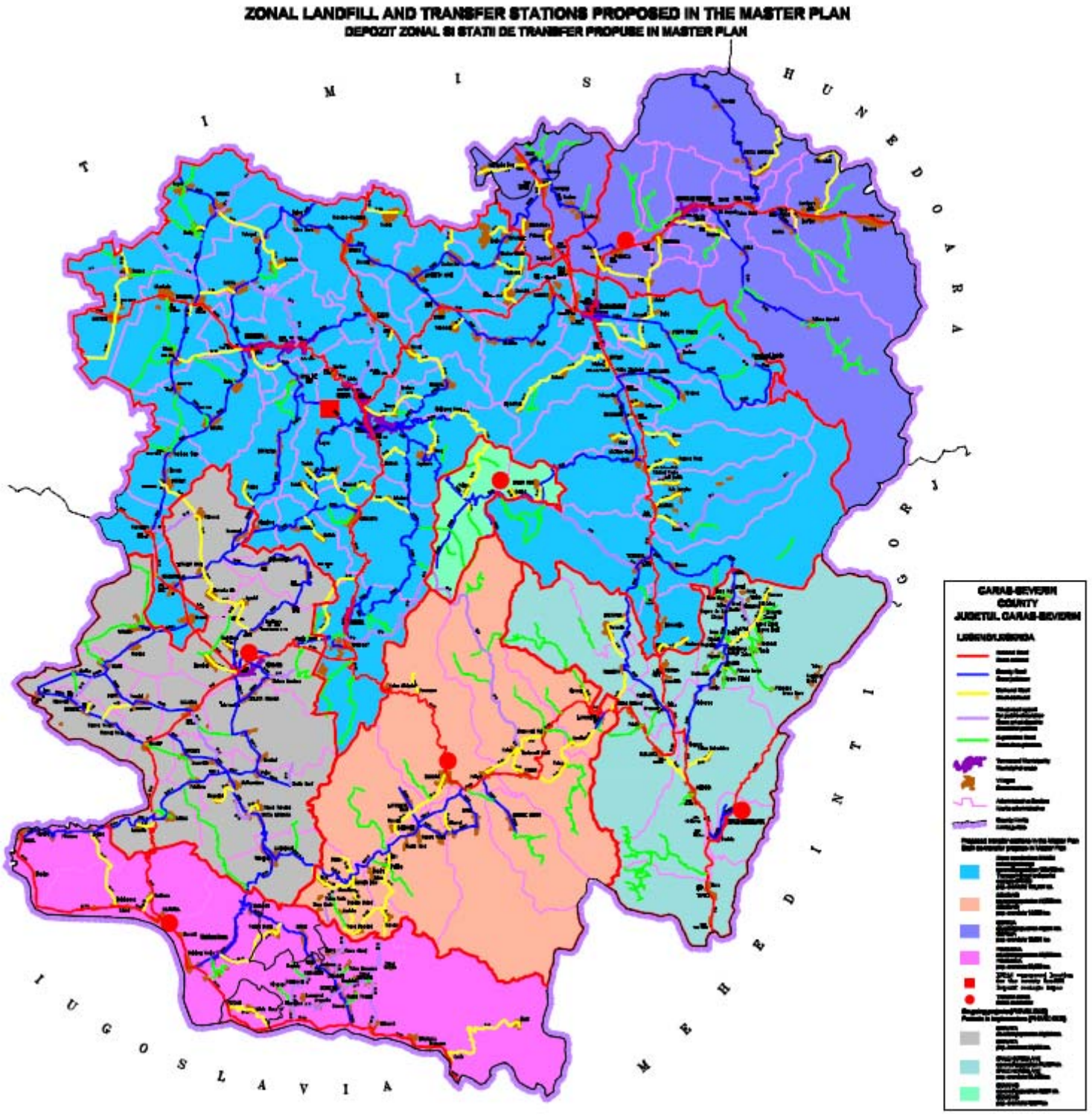
The population of the county is approximately 327,579 inhabitants, corresponding to 17% of the Region West population and 1.5% of the total country population. Approximately 56% of the county population is located in urban areas, while the rest (44%) is located in the rural part of the county. Caras-Severin County consists of 8 cities, out of which 2 municipalities, 69 communes, 287 villages.

Caras-Severin County has a total surface of 8,519.76 km^2 and is neighbouring upon Timis County in the North-West, Hunedoara County in the North-East, Gorj County in East, Mehedinti County in the South-East and Republic of Serbia in the South-West - state border.

The following map presents the main waste management infrastructure that will be developed in Caras-Severin County, namely the central waste management facility, consisting of:

- Central waste management facility in Lupac (landfill, sorting plant, simple MBT plant)
- 3 transfer stations in Pojejena (southern part), Bozovici (central part) and Otelu Rosu (north-eastern part).

Figure B-2: Main waste management infrastructure to be developed in Caras-Severin County



The current municipal waste management system in Caras-Severin County mainly consists of the collection and disposal of waste. Currently, about 95 % of the quantity of collected municipal waste is disposed of, and the disposal is realised only in non-compliant landfills. As a result the existing waste management practices do not comply with the EU and national waste management policy and legislation and create severe risks for the environment and public health. The current waste management system is unsustainable in all its components as indicated below:

- Waste collection:
    - 105,307 t of waste are collected on annual basis (reference year: 2013)
    - collection in several cases is performed by non authorised operators
    - the connection rate to sanitation services is 84.2% in rural area and 93.1% in urban area
    - selective collection is implemented only is few areas due to existing Phare projects
    - existing equipment are old and insufficient, especially in relation to selective collection
    - waste collection logistics should be improved considering that the non-compliant landfills will no longer exist and the waste should be transported to the central waste management facilities in the most cost-efficient manner (via a network of transfer stations).

In relation to the waste collection the effort should be focused on the expansion of selective collection system, on the improvement of waste collection logistics as well as on the acquisition of the necessary equipment to cover the waste collection needs of the whole county.

- Biological treatment of waste:
    - Non treatment of biodegradable waste – inability to reach the targets imposed by legislation
    - Non existence of facilities for treatment

The complete lack of biodegradable waste treatment generated significant environmental and public health threats, since this waste ends up untreated in landfills (currently these landfills are also not sanitary, and this fact further extends the environmental deterioration). Also, the very strict targets that need to be fulfilled in relation to the diversion of biodegradable waste from disposal may never be accomplished under the current waste management practices.

- Waste recycling:
    - very small sorting capacities mainly manually – no dedicated facilities - inability to reach the targets imposed by legislation

The complete lack of waste recovery and recycling results in depletion of natural resources, as well as to the extended need to put into the landfills significant amounts of waste. Also, the very strict targets that need to be fulfilled in relation to the recovery of recyclable material (especially packaging waste) may never be accomplished under the current waste management practices.

- Waste disposal:

- Disposal in 8 urban and 97 rural non-compliant landfills (more than 50,000 t/year), without lining, leachate and biogas management (beginning with 2009 the disposal is made only in 5 urban non-compliant landfills)
- Disposal of mixed waste and not treated residues and therefore production of significant quantities of biogas and heavily polluted leachate
- Non existence of a compliant landfill

This is considered to be the most important environmental problem related to waste management. The uncontrolled disposal of untreated waste in inappropriate dumpsites generates extremely severe environmental threats for the atmosphere, the soil and the waters. This situation, which has been occurring for many years, has already caused great environmental damage, which requires significant financial resources as well as time to be recuperated. In any case according to the EC and national legislation such disposal practices cannot be continued and a modern and safe landfill site needs to be developed in the area.

The proposed project seeks to resolve the significant environmental and operational problems related to waste generation and management and develop and integrated waste management system in the county that will improve the living conditions of its citizens and support Romania in achieving the waste management targets imposed by the Accession Treaty. The system as such will be in full compliance with the EU and national environmental principles and legislation and will address all elements of waste management namely from waste prevention and waste collection to disposal of residues. The proposed system is tailored to the needs of the county and it was identified as being the most cost-effective and affordable for the citizens of the county. The specific goals that the proposed system seeks to achieve include:

- The prevention of the waste generation via the promotion of home-composting and raising of public awareness
- The increase of the connection rate to sanitation services in urban areas to reach 100%
- The increase of the connection rate to sanitation services in rural areas to reach 100%
- The compliance with landfill and packaging directives and related Romanian legislation, via the implementation of selective collection and the construction and operation of sorting plant and biodegradable waste treatment plant
- The overall reduction of waste disposal into the landfill
- The protection of the environment and public health via the construction and operation of a compliant landfill and the cessation of the operation of the existing non-compliant landfills.
- The strengthening of the capacities of the Caras-Severin County in relation to waste management as well as to the implementation and monitoring of waste management works
- The financing of the new waste management facilities fully and directly by transfers/ gate fee by the member municipalities of ADI and waste generators.
- The establishment of unique sanitation tariffs throughout the county for equalization of costs, to ensure full cost recovery and the polluter pays principle.

- The raising of awareness of the citizens in relation to the benefits deriving from the project implementation as well as the change in their habits needed in relation to waste collection and management.

In this respect the project seeks to develop the necessary infrastructure in order for Caras-Severin County to be able to fulfil its obligations as they derive from the Accession Treaty and the relevant national legislation. The main quantified targets and deadlines are in the following table.

Table B-1: Main waste management targets

Waste management stage	Quantified target
Waste collection and transport	Connection rate to sanitation services in urban area of 100 % in 2013, from 93.1% in 2009 Connection rate to sanitation services in rural area of 100 % in 2013, from 84.2% in 2009
Waste recovery	Recovery and recycling in 2013 of: • 5,821 t/year paper and cardboard (60%) • 1,884 t/year plastic (22.5%) • 4,041 t/year glass (60%) • 911 t/year metal (50%) • 640 t/year wood (15%) • 16,994 t/year recycling (55%) • 18,539 t/year recovery (60%) Currently, approximately 3,000 t/year of recyclables are foreseen to be sorted under Phare projects
Waste treatment	Treatment of 30,000 t of biodegradable waste in 2013 (difference between the total biodegradable waste generated and the 50% of the biodegradable waste generated in 1995 that is allowed to be landfilled) and 41,000 t in 2016 (difference between the total biodegradable waste generated and the 35% of the biodegradable waste generated in 1995 that is allowed to be landfilled). The base figure for biodegradable waste generated in 1995 in Caras-Severin County was set at 77,777 t. Currently a very small amount is treated
Waste landfill	Construction of 1 county landfill in Lupac
Non-compliant landfills rehabilitation	Closure of all rural dumpsites by July 2009 (97 dumpsites of total surface of 41.17 ha) and all 8 urban non-compliant landfills (surface 30.3 ha) according to the imposed deadline by the Accession treaty

The waste quantity generated in the county is 105,307 t/year (referring to the design year, namely 2013). This waste will be collected in two fractions (dry for recyclables and wet for biodegradable and the rest) and will be transported directly or via the transfer station into the central waste management facility, in order for the recyclables to be recovered (approximately 18,000 t/year) and the biodegradable fraction to be treated in order to produce a compost like output (CLO) (approximately 17,000 t/year). The residues to be disposed will be approximately 46,700 t/year.

With respect to the existing waste management system, as already mentioned this refers to waste collection and disposal and they will be addressed in the project via the upgrading of the collection equipment, the construction of the transfer stations and the rehabilitation of the non-compliant landfills. Also in small areas of the county, PHARE projects are under implementation which concern mainly the development of selective collection, the recovery of small quantities of recyclables and the treatment of small quantities (3,000 t/year) of biodegradable waste. These projects are integrated into the system especially in relation to the utilization of the collection equipment that they include.

As already mentioned the proposed project addresses all elements of an integrated waste management system:

- Waste generation prevention
  - Promotion of homecomposting
  - Raising of public awareness campaigns
  - Imposition of tariffs to big waste generators (institutions, commercial infrastructures, etc.)
  - Implementation of a tariff policy directly connected to the waste each citizen generates, (i.e. charging per kg or bag of waste produced, etc.)
- Waste collection:
  - Extension of selective collection
  - Upgrade of waste collection equipment
  - Development of transfer stations
- Waste recovery / recycling:
  - Introduction of selective collection
  - Development of sorting station
- Waste treatment
  - Development of simple MBT plant for biodegradable fraction of waste including market and garden waste. The treatment will include mechanical pre-treatment (shredding, recovery of ferrous metals and screening), fermentation of the humid fraction, refining and maturation
- Waste disposal
  - Development of 1 county compliant landfill
  - Cessation of operation and rehabilitation of all rural and urban non-compliant landfills.

The following table presents the project components as well as the budget allocated for each component.

Table B-2: Project components

Component	Waste management stage	Objective	Set of works involved	Budget (Euro) of construction/ purchase to be funded by ERDF (connections to utilities and designs excluded)	Budget (Euro) of construction/ purchase not to be funded by ERDF
Component 1	**Waste collection**	Expansion of selective collection Improvement of waste collection and logistics Promotion of homecomposting	Purchase of 3,300 bins (trucks are not funded under ERDF and they will be provided by the operator) Purchase of 16,800 home composters Construction of 3 transfer stations and purchase of equipment (containers and hauling trucks) Purchase of containers for special waste (21 containers for bulky and 8 containers for hazardous municipal waste) Construction of bring centre	Bins: 907,500 Homecomposters: 840,000 Containers for bulky waste: 52,500 Transfer stations: 3,044,111 Total: 4,844,111	Containers for special waste (WEEE and municipal hazardous waste): 16,000 Transfer stations: 100,000 Total: 116,000
Component 2	**Waste treatment**	Recovery/ recycling of recyclables treatment of biodegradable waste	Construction of 1 sorting plant Construction of 1 simple MBT plant	Sorting station: 4,124,067 Simple MBT plant: 8,353,975 Total: 12,478,042	Sorting station: 50,000 Simple MBT plant: 50,000 Total: 100,000
Component 3	**Waste disposal**	Safe waste disposal	Construction of 1 county landfill Closure and rehabilitation of the old urban and rural non-compliant landfills	1st landfill cell: 6,757,722 Closure of all the urban and rural non-compliant landfills: 9,172,052 Total: 15,929,773	Access road: 1,557,300 Total: 1,557,300
Component 4	**Technical assistance and public awareness**	Raising of public awareness Capacity building Supervision of works Project management	Implementation of public awareness campaigns Technical assistance for project management Works supervision	Public awareness: 300,000 Technical assistance: 280,000 Supervision: 946.124 Total: 1,526,124	

		Training			
Taxes / credits / designs / PIU				1,811,735	94,300
Grand total				**36,589,735**	**1,917,600**

The project is in full compliance with the National Waste Management Plan as well as the Regional Waste Management Plan for West region. Also the project is the result of the County Waste Management Plan and Integrated Solid Waste Management Master Plan for Caras-Severin County. The project refers to the priorities identified in these strategic documents, which concern the development of the necessary infrastructure and capacities in order to achieve the targets set into the Accession treaty until 2013. This infrastructure will be funded under the SOP. After 2013 further investments are needed in relation to landfill extension, 1st cell rehabilitation and if needed, extension in the capacity of the sorting and biodegradable treatment plants.

b) Where the project is a phase of an overall project, provide a description of the proposed stages of implementation (explaining whether they are technically and financially independent).

N/A

c) What criteria have been used to determine the division of the project into phases?

N/A

B.4.2. Technical description of the investment in infrastructure

a) Describe the proposed infrastructure and the work for which assistance is being proposed specifying its main characteristics and component elements.

The project consists of the following components:

- **Component 1- Waste collection:** includes the following elements:
  - Separation of Caras-Severin County in 7 waste management zones
  - Implementation of selective collection: The selective collection refers to the separation of waste in dry fraction (recyclables) and wet fraction (biodegradable waste and remaining). It will be implemented in all urban areas and rural areas in zones 1, 3 and 6. In zone 2, bring centre will be located in the transfer station in order for the citizens to bring the recyclables. The already developed systems of selective collection will be maintained**.**
  - Construction of 3 transfer stations
  - Promotion of homecomposting in rural areas
  - Selective collection of special waste streams, namely the bulky waste, the hazardous municipal waste and waste electric and electronic equipment (WEEE)
- **Component 2- Waste treatment:** includes the following elements:
  - 1 sorting plant for the separation of the dry fraction into the different recyclables (metals, glass, plastics and paper)

- 1 simple MBT plant for the treatment of the wet fraction including the market and garden waste

- **Component 3- Waste disposal:** includes the following elements:
  - Construction of 1 county compliant landfill
  - Cessation of operation and land rehabilitation of the 8 urban and 97 rural non-compliant landfills.
- **Component 4 – Technical assistance and public awareness**

The central waste management facility, which is the core of the system, will be located in Lupac area, on a public land of 52.2 ha total surface (of which only 42 ha are required for investment). The site is located in the northern part of Carasova Basin, in the eastern part of Dognecea Mountains. The field's surface, in the researched area, is inscribed in the general landscape: collinear relief, with smoother or arduous slopes, function of the geomorphologic and erosion processes.

Component 1 - Collection

The main targets of waste collection and sanitation include:

- Extend the collection system coverage to 100% in urban areas until 2013.
- Extend the collection system coverage to 100% in rural area until 2013.
- Develop selective collection system
- Upgrade and modernize existing waste collection and transportation equipment (vehicles, bins, etc.)

The municipal solid waste generated in Caras-Severin County and need to be collected is 105,307 t/year.

Initially the county is separated into 7 waste management zones as follows:

- Zone 1 covers the north-western and the north-central part of the county and it will be served directly by the central waste management facilities, located in Lupac;
- Zone 2 covers the south-central part of the county and it will be served by a transfer station in Bozovici;
- Zone 3 covers the southern part of the county and it will be served by a transfer station and a composting plant located in Pojejena (made from Phare funds);
- Zone 4, in the western part of the county, will be served by a transfer station in Oravita, as foreseen in the relevant Phare project;
- Zone 5, in the eastern part of the county, will be served by a transfer station in Baile Herculane, as foreseen in the relevant Phare project;
- Zone 6 covers the north-eastern part of the county and it will be served by a transfer station in Otelu Rosu;
- Zone 7, in the central part of the county, will be served by a recyclables collection centre (5 fractions) in Valiug (Semenic area), as foreseen in the relevant Phare project.

The waste collection will be carried out as follows:

- Collection in 1-bin system for mixed waste for Zone 1, corresponding to approximately 21,900 inhabitants in rural areas (7% of the population). Generated recyclable material amounts are insignificant and locations of these communities are isolated, making separate collection and transportation financially inconvenient. However, the inhabitants will have access to bring centre, where they will be able to deliver the selectively collected recyclables.
- Collection in 2-bins system, 1 for the wet and 1 for dry fraction, which will be converted into 4-bins system (for paper, glass, plastic and mixed waste) after 2012, for zones 4 and 5, corresponding to approximately 60,600 inhabitants in both rural and urban areas (6,5% of the population).
- Collection in 2-bins system, 1 for the wet and 1 for dry fraction, which will be converted into 3 bin system (for paper collection), in the urban and the rural areas of zones 1, 3 and 6, corresponding to approximately 212,900 inhabitants (76,5% of the population).
- Collection in 4-bins system (1 for paper, 1 for glass, 1 for plastic, 1 for mixed fraction) in zones 4 and 5, corresponding to approximately 28,600 inhabitants in urban area, after 2012 (9% of the population).
- Collection in 5-bins system (1 for paper, 1 for glass, 1 for plastic, 1 for metal and 1 for mixed waste) in Zone 7, corresponding to approximately 1,400 inhabitants in rural areas (1% of the population).

It is noted that the equipment (bins and trucks) for the implementation of the system is not included in the application for funding from the ERDF. However for the completeness of the relevant information the following tables presents the current situation, the demand in equipment to reach the targets and equipment that will be purchased from national and/or local resources.

Table B-3: Waste collection needs

Current situation	Demand	Additional capacities needed
4,446 m^3 of bin volume of which 90% of old and small bins for mixed waste and 451 m^3 of new bins for selective collection	5,873 m^3 of bin volume: • 2,059 m^3 for wet/mixed fraction • 3,814 m^3 for dry waste fraction	3,630 m^3 (or 3,300 bins of 1.1 m^3 volume): • 1,270 m^3 for wet/mixed fraction • 2,360 m^3 for dry fraction
579 m^3 of truck volume of which 40% of old and small bins for mixed waste and 66 m^3 of new trucks volume	1,152 m^3 of truck volume: • 59 trucks or 708 m^3 for wet waste • 35 trucks or 420 m^3 for dry waste • 2 trucks or 24 m^3 for mixed waste	470 m^3 of truck volume or 40 trucks of capacity of 12m^3

The total cost of the equipment is estimated at 1,800,000 (eligible 2011) and 16,000 (non-eligible 2011) Euro and it will be covered by the County Council resources.

The proposed project includes the development of three transfer stations as previously mentioned. The construction of the transfer stations is proposed to be covered by the ERDF. The following table presents the main elements of the transfer stations.

Table B-4: Transfer stations design parameters

	Bozovici	Pojejena	Otelu Rosu
Design year	2013	2013	2013
Input waste at the design year, tons/year	**3.400**	**8.060**	**8.388**
Wet waste, tons/year	3.223	5.198	5.239
Wet waste, tons/d	10,33	16,66	16,79
Wet waste, m^3/d	15,89	25,63	25,83
Peak day (Monday shall have double input), m^3/d	31,79	51,26	51,67
no. of containers needed	2	4	2
no. of bring centres needed	1	-	-
Dry waste, tons/year	-	2.862	3.149
Dry waste, tons/d	-	9,17	10,09
Dry waste, m^3/d	-	14,11	15,53
Peak day (Monday shall have double input), m^3/d	-	28,22	31,06
no. of containers needed	-	2	1
Drive route (total), km	144	178	80
Time for drive route, h	4,11	5,09	2,29
Interval times for each truck (loading, unloading, maneuvering, traffic), h	0,67	0,67	0,67
Total time for one route, h	4,78	5,76	2,96
no. of trucks needed for waste stream	1	1	1
Access road needed (m)	300	2.035	1.500

From the transfer stations the wet / dry / mixed fractions will be transported to the central waste management facility.

Each transfer station shall consist of the following:

- Fencing and entrance gate
- Weighbridge
- Weighing – entrance building
- Unloading (upper) level
- Access road (ramp) to the upper level
- Discharging (lower) level
- Access road to the lower level
- Discharge hoppers

- Self-pressing containers
- Tractors

The total costs of the transfer stations are estimated at 3,144,111 Euro, out of which 100,000 are non-eligible.

Component 2- Waste treatment

The main targets for the waste treatment component include:

- The promotion of the recovery and recycling of recyclables and the specific targets for the year 2013 include:
  - 4,381 t/year paper and cardboard
  - 2,015 t/year plastic
  - 2,915 t/year glass
  - 1,004 t/year metal
- The diversion of biodegradable waste from landfill and more specifically:
  - Treatment of at least 30,200 t of biodegradable waste in 2013
  - Treatment of at least 40,900 t of biodegradable waste in 2016
- The overall reduction of the waste that end up into the landfill thus increasing its lifetime

In this respect the project foresees the construction and operation of 1 sorting plant, in which the content of the dry bin, as mentioned above, will be treated as well as the construction and operation of a simple MBT plant in which the content of the dry bin, as mentioned above, and the market and garden waste will be treated. Both investments are proposed to be financed by the ERDF.

Sorting plant

The sorting plant is in connection with a two-bin collection system, as already presented. Recyclable materials shall be collected separately from the rest municipal solid waste (MSW). This way an adequate level of purity shall be succeeded. The quantity of separately collected recyclables expected for the design year (2013) is 33,731 tons. The total quantity of recyclables will be approximately 19,000 t/year, while the residues to be disposed into the landfill will be around 14,800 t/year.

The sorting plant will be constructed in the central waste management facility in Lupac, alongside the landfill and the MBT plant. The area needed is approximately 3,500 m^2.

The fractions that will be separated are 12 in total, as follows:

- Paper: cardboard, printed paper, mixed paper (3 fractions)
- Plastic: foils, HDPE, PET, PVC and other plastics (5 fractions)
- Glass: brown glass, white glass (2 fractions)
- Metals: ferrous metals, non-ferrous metals (2 fractions)

It should be noted that the sorting plant has a flexible design that can be rearranged during operation phase according to the market requirements

Based on the above the following hand-sorting sections shall be needed:

- Cardboard: one section with 2 workers
- Printed-paper: one section with 4 workers
- Rest paper: one section with 6 workers
- PET: one section with 4 workers
- HDPE: one section with 4 workers
- PVC: one section with 3 workers
- LDPE: two sections with 10 workers
- Rest plastics: one section with 5 workers
- Non ferrous metals: one section with 2 workers
- White glass: one section with 4 workers, total 4 hand-sorting positions
- Coloured glass: one section with 8 workers, total 4 hand-sorting positions.

The sorting station building shall comprise of the following areas:

- The reception hall;
- The sorting area;
- The baling unit;
- The storage area.

The total cost of the sorting plant is estimated at 4,174,067 Euro, out of which 50,000 are non-eligible.

Simple MBT plant

The waste entering the MBT facility is directly connected to the collection system. The waste presented hereafter is in connection with a two-bin collection system. The mixed municipal solid waste, excluding the Recyclable materials that will be collected separately, will feed the MBT plant. The quantity of mixed waste expected for the design year (2013) is 63,869 tons.

The humid fraction represents 62.7% w/w of the incoming stream, while the residues are expected to be 36.02% w/w. Due to the fact that the adopted collection system is the two-bin system, the ferrous metal fraction is expected to be very small, while the rest of the waste is not recyclable and there is no need for its further treatment.

The simple MBT plant will be constructed in the central waste management facility in Lupac, alongside the landfill and the sorting plant.

The simple MBT plant consists of the following:

- Waste Reception area (under a metallic shed)

- Pre-treatment building
- Biological treatment cells
- Maturation area (under a metallic shed).
- Administration building.

The area needed for the simple MBT plant is approximately 10,500 m^2.

The mechanical pre-treatment consists of the following equipment:

- shredder
- permanent magnet
- rotary screen

The humid fraction enters in the cells where forced aeration is applied. The material remains in the cells for 21 days and 30% of the incoming mass is lost as water vapours, CO_2, volatile compounds and leachate. The stabilized waste coming out from the cells is then screened in order to separate the CLO from possible admixtures.

The estimated amount of CLO (compost like output) to be produced is around 17,759 t/year (~28% of input) while residues of around 23,384 t/year (~38 % of input) will be disposed in the landfill. The losses in the biological treatment are approximately 20,438 /year (~32 % of input). The ferrous metals are 830 t/year (~2% of input).

A critical value that has to be calculated is the number of cells needed for the total annual quantity of incoming waste (see table below).

Table B-5 Dimensioning of biological treatment

Daily volume entering the cells	205.82	*m^3/d*
Volume of cell	400.00	*$m^3/cycle$*
Number of days for filing each cell	1.94	*days*
Number of days that the humid fraction remains inside cells	21.00	*days*
Total days for each cycle	24.00	*days/cycle*
Number of days that the plant receives waste	312	*days/year*
Treatment cycles per year for each cell	13	*cycles/year*
Number of cells		***13 Cells***

The biologically treated material, after the refinery is forwarded to the maturation area. It remains there for 15 days in piles in order to mature and obtain its final desired characteristics. The loader turns the material in order to accelerate the maturation process.

The daily produced quantity that goes to the maturation area is 129.36 m^3. That means that in order to keep the material for 15 days in the maturation area we need heaps with a total volume of 2,250 m^3.

The material stays in 3.2 piles with trapezoidal shape. The total surface of the maturation area is 3,700 m^2, which includes the surfaces needs for the piles (1,850 m^2) and the surface needed for the movement of the vehicles and the refinement screen.

A market for this compost like output – CLO, should be developed. It is expected that during the first year of implementation, the impurities in wet bin are high, so the plant will mainly operate as a simple MBT Plant. But gradually, since the public participation will be improved, the quality of produced compost like output will be also improved, and it may be acceptable for soil improving purposes. Alternatively, these products could be used in the landfill as cover material or in the rehabilitation of the existing non-compliant landfills and other contaminated land in the county. Possible destination for this product is the 8 urban non-compliant of Caras-Severin County as well as other contaminated areas.

The total cost of the simple MBT plant is estimated at 8,403,975 Euro, out of which 50,000 are non-eligible.

Component 3- Waste disposal

The main targets for the waste disposal component include:

- The development of 1 county landfill compliant with the EC and national legislation as imposed by the Regional Waste Management Plan
- The cessation of operation and land rehabilitation of the 97 rural dumpsites (already performed) and the 8 urban non-compliant landfills according to the provisions of the Accession treaty

The construction of the 1st cell of the landfill and the relevant supplementary infrastructure as well as the closure of urban non-compliant landfills is proposed to be financed from the ERDF.

County landfill

The county landfill will be located in Lupac along with the sorting station and the simple MBT plant.

The landfill will receive the following fractions:

- Residues from the sorting plant
- Residues from the biological treatment plant
- Mixed waste from small rural areas, where the 1 bin system will be implemented / Street sweeping waste
- Sewage sludge

The annual estimated capacity of the residues that will be landfilled will be approximately 49,000 t/year (38,500 t/year is the municipal solid waste) or 57,700 m^3/year.

The landfill will be developed in 3 main cells. The first cell, to be financed by the ERDF will have an estimated surface of 3.2 ha and a total capacity of 430,000 m^3. The 2nd cell will be developed after 2017 and it will have a surface of 5.4 ha and a total capacity of 1,125,000 m^3. The 3rd cell will have a surface of about 4.0 ha and a total capacity of 780,000 m^3.

The landfill that will be developed will be in line with the legislation and the respective specifications and will consist of:

- Lining system (including a geological barrier constructed as a built-in compacted clay layer and a geosynthetic clay liner (GCL), Geosynthetic liner, geotextiles which will be completed by a sand layer and a drainage layer)

- Leachate collection and management system: the leachate will be collected via an appropriate pipe network which will be positioned having an adequate inclination (minimum 1%) to achieve effective flow of leachate to the lower level of the basin, installed within the drainage layer, in a special surface formation of the deposition basin. The leachate will be collected in a leachate equalization tank with a volume of at least 1.000 m³. It will be treated in a wastewater treatment plant consisting of a pre-filtration unit a stripping unit and a reverse osmosis unit. The generated concentrate will be collected in a sealed basin. Samples will be undertaken in view of identifying the concentrate's hazardous or non-hazardous features. Afterwards, the concentrate will be brought to the closest treatment facility, for treatment/ final disposal, according to legislation in force.
- The permeate will have the quality to be discharged in Starcovat Valley according to the requirement of the legislation.

In particular the treatment will consist of:

  - mechanical phase, when the pH value is reduced and the leachate is pre-filtred
  - biological phase, where the proper treatment is taking place through reverse osmosis and nano-filtration. The permeate will be stored in a tank, and after it reaches the quality conditions it is eliminated in the 250 m^3 retention basin. The generated concentrate will be collected in a sealed basin. Samples will be undertaken in view of identifying the concentrate's hazardous or non-hazardous features. Afterwards, the concentrate will be brought to the closest treatment facility, for treatment/ final disposal, according to legislation in force.

- Biogas collection and management system: the gas will be collected via an appropriate wells and pipe network and via biogas collection stations will be incinerated in a flare unit
- Rainwater management system
- Monitoring system
- General infrastructure and utilities
- Provision of its closure and aftercare.

The total cost for the construction of the 1st cell of the landfill as well as the supplementary infrastructure will be 6,807,722 Euro (out of which 50,000 are non-eligible). Additionally the amount of 1,557,300 Euro is needed for the construction of the access roads to the central waste management facility. However, this amount will be covered by the Council's own resources.

Closure of non-compliant landfills

Caras-Severin County has had 97 rural dumpsites that have been environmentally cleaned and there are still 8 urban non-compliant landfills that need to be closed and rehabilitated by implementing complete capping system as the relevant Romanian legislation imposes, i.e.:

- support layer of minimum 0.50 m thickness with k >$1x10^{-4}$ m/s;
- gas drainage layer made of granular or artificial materials having minimum 0.30 m thickness;

- compacted clay liner of minimum 0.50 m thickness, with $k<5x10^{-9}$ m/s or other equivalent barrier;
- rainwater drainage layer made of granular materials of minimum 0.30 m thick and k > 1x10-3 m/s or of artificial materials;
- separation geotextile;
- soil cover layer of minimum 1 m thickness, from which the upper 0.15 m will be enriched topsoil

Additionally, at the urban non-compliant landfills the following works will take place:

- for the exhaustion of the landfill gases, wells (of different average depth) will be drilled in the waste mass and perforated pipes of 500 mm diameter will be inserted, which are:
  - top with biofilters in Anina, Bocsa, Caransebes, Baile Herculane, Moldova Noua, Oravita and Otelu Rosu
  - connected to a flare system in Resita (for biogas combustion)
- perimetric rain water collection system
- for the collection of leachate in Caransebes and Resita, a collection perforated perimetric pipe will be sited into the waste body of the landfill, which will lead collected leachate outside of the waste body to the corresponding collection sump by the use of gravity. The collected leachate will be send to the leachate collection tank, via a flexible non perforated HDPE pipe The tank will be emptied by a special vehicle. The collected leachate will be transported to Caras Severin Landfill and treated in the leachate treatment plant.
- fencing.

The following table presents the main elements related to the rehabilitation of each urban non-compliant landfill.

Table B-6: Main elements of urban non-compliant landfills land rehabilitation

Element	Anina	Baile Herculane	Bocsa	Caransebes	Moldova Noua	Oravita	Otelu Rosu	Resita
Surface (ha)	0.38	1.53	1.08	0.82	1.13	1.23	0.48	1.42
Estimated waste disposed (m^3)	222,000	62,000	233,731	546,000	172,000	179,000	147,000	2,830,000
Excavations (m^3)	190	790	320	10	390	500	30	8,390
Embankment – moving of waste(m^3)	5,720	16,920	9,200	38,920	13,140	11,170	9,100	49,270
Lining surface (ha)	0.5	1.5	2.3	1.7	1.4	1.3	0.7	2.9
Rainwater ditch (m)	300	690	555	509	620	500	375	690

Biogas wells (No)	3	11	16	12	9	9	5	21
Leachate collection	-	-	-	√	-	-	-	√
Flare	-	-	-	-	-	-	-	√

The total cost for the rehabilitation of the urban non-compliant landfills is estimated at approximately 9,172,053 Euro.

Component 4 – Technical assistance and public awareness (including publicity measures for the project financed through SOP Environment)

A core part of the proposed integrated waste management system is the raising of public awareness for two reasons:

- The active participation of the citizens in the waste reduction and separate collection of the household waste is crucial for the success of the system
- The proposed system will raise the waste management tariffs. It is necessary to communicate to the citizens how this increase will correspond to the improvement of the living standards and how the value of the waste management scheme to be implement will exceed that additional amount of money the citizens will have to pay

The basic means for rising of the public awareness in relation to waste management and for promote the project financed through SOP Environment may include (the list is not exhaustive):

- Strategy for communication, information and assurance of the project's publicity (the minimum publicity requirements in accordance with the Visual Identity Manual, including: a webpage of the project, project's launching and closure conferences, press releases – at the beginning, during and at the end of the project, temporary display panels, permanent display panels, banners etc)
- Awareness campaigns in the media (indicatively TV and radio spots, newspaper ads, etc.)
- Campaigns in schools (e.g. special information materials aiming at students, speeches, etc)
- Organizations of hearings, open public discussions
- Organization of a local 'green help desk' in the big urban areas
- Other types of campaign (flyers, brochures, polls, etc.).

A Consultant should be employed as Technical Assistance during the project implementation. The Technical Assistance shall focus mainly on:

- PROJECT MANAGEMENT
- WORKS SUPERVISION

The scope of work to be performed by a qualified (national or international) Consultant will include, but is not limited to, the following tasks:

- Planning and coordination
- Implementation and management

- Institutional coordination and representation
- Reporting functions

The Consultant in charge of Construction Supervision will be responsible for managing and supervising the works contracts and in general will fulfil all duties of the Engineer as defined in the FIDIC Yellow and Red Book Conditions of Contract for Construction.

Construction Supervision will be necessary to: ensure the works are constructed in accordance with the design and specifications, safeguard the quality of construction, oversee the safety of the works, and when required, to provide a cost-monitoring service to the client.

The total cost for the raising of public awareness and technical assistance is estimated at 1,526,124 Euro.

With respect to the environmental impacts related to the project implementation, these include (they are presented analytically in section F):

- Underground and surface waters pollution sources:
    - The leachate collected using the collection system installed on the landfill's bottom (waste water content and rainwater infiltrated through the waste volume)
    - Waste water from technological activities, platforms', floors and closed areas cleaning (concrete hardstand for recyclable waste unloading, sorting station floor, recyclable materials storage hardstand, sorting refuse processing platform)
    - Waste water form technological activities and MBT area platform cleaning
    - Household faecal waste water from the administrative building restrooms
    - Waste water from cars and car shop platforms washing
    - Waste water form fuel pump platform washing
    - Rainwater collected from the property surfaces
- Air pollution sources:
    - Collection and pre-collection stage – There are no significant air pollution sources
    - Treatment and disposal (operation) stage – The main air pollution sources are:
        - Digestion gases generated during the fermentation of the biodegradable fraction
        - Landfill gas
        - Exhaust gases from transport vehicles and processing equipments with internal combustion engines
    - Existing landfills rehabilitation stage – The main air pollution sources are:
        - Landfill gas
        - Exhaust gases from transport vehicles and construction equipments with internal combustion engines

- Construction sites dust, spread by transport and construction equipments and blown by the wind

- Noise and vibration sources:
  - Collection and pre-collection stage – There are no significant noise and vibration sources with important effects on the environment
  - Treatment and disposal (operation) stage – The main noise and vibration sources are:
    - Treatment and disposal installations and equipments
    - High capacity waste trucks
  - Existing landfills rehabilitation stage – The main noise and vibration sources are:
    - Construction machines
    - High capacity waste trucks
- Ground and underground pollution sources

During the operation stage, construction activities are conducted as well, but they take place on the property only, due to the fact that the transport is done using the already built access roads.

Thus, the activities which may be considered harmful to the soil quality or which have as main consequence ground and underground pollution sources generation are:

- Changing the land use by top soil removal and the subsequent influence of the new landfill on the local environment.
- Regarding the removed vegetal top soil layer, the project provides its separate storage away from the soil excavated from underneath. Long time storage (over 2 – 3 years) will reduce its fertility and by killing the specific micro-flora and the micro-fauna.
- Dust and chemical pollution agents (resulted from technological processes, landfill activities and waste transport on public roads) which may settle on the ground or which could eventually generate acid rains
- The indirect effect caused by the direct air pollution with dust and chemical polluting agents will be felt on variable distances. In the case of settleable dust the distances will be short due to large particle dimension. In the case of gaseous pollutants, the distances may be longer but, because of the dispersion the concentrations will decrease.
- Accidental spills of untreated waste waters in the natural emissary or discharging the insufficiently treated effluent from the treatment plant. This could affect emissary water quality and indirectly the soil and phreatic water quality, leading to soil acidification.
- Accidental waste drop on the transport route

b) In respect of the work involved, identify and quantify the key output indicators and, where relevant, the core indicators to be used:

Table B-7: Physical indicators

Component	Description	Units	Number of units
Component 1 – Waste collection and transport			
Collection bins*	1.1 m^3	Items	3,300
Collection trucks*	12 m^3	Items	40
Transfer stations		Item	3
Bozovici	Capacity 3,400 t/year		
Pojejena	Capacity 8,060 t/y		
Otelu Rosu	Capacity 8,388 t/y		
Homecomposters	220 l	Item	16,800
Hazardous municipal waste containers	6 m^3	Item	8
Bulky waste containers	15 m^3	Item	21
Component 2 – waste treatment			
Sorting plant	capacity (t/year): 33,731	Item	1
Simple MBT plant	capacity (t/year): 63,869	Item	1
Component 3 – waste disposal			
County landfill	1st cell surface 3.2 ha Lifetime 7 years	Item	1
Non-compliant landfills	Land rehabilitation of the rural and urban non-compliant landfills	Item	97 rural dumpsites with a total surface 41.17 ha and 8 urban of total surface 30.3 ha
Component 4 – Technical assistance and public awareness			
technical assistance and public awareness		Item	1

Table B-8: Performance indicators / Core indicators

Indicator	Unit	Before Project (2009)	After Project (2013)
Component 1 – waste collection and transport			
Total population in human settlements **(Core Indicator)**	capita*1000	325.6	321.7
Total generated municipal waste **(Core Indicator)**	t / year	105,000	105,000
Total collected municipal waste **(Core Indicator)**	t / year	99,200	105,000
Total collected domestic waste	t / year	82,000	85,000
Total collected domestic-like waste	t / year	15,300	15,500
Total collected street waste	t / year	2,400	2,500
Separate collected market, park and garden waste	t / year	2,200	2,200
Separate collected recyclable waste	t / year	165	37,915
Other separate collected waste	t / year	400	32,200

Indicator	Unit	Before Project (2009)	After Project (2013)
Specific municipal waste production (domestic + domestic-like + institutions)	kg/inh x a	240	240
Specific domestic waste collection	kg/inh x a	223	223
Percent of population connected to collection services in total and in urban, rural areas **(Core Indicator)**	%	Total: 89.0% Urban: 93.1% Rural: 84.2%	Total: 100% Urban: 100% Rural: 100%
Percent of population connected to separate collection services in total and in urban, rural areas **(Core Indicator)**	%	Total: 17% Urban: 9 % Rural: 20%	Total: 82% Urban: 100% Rural: 70%
Provided container volume for waste collection	m^3 / inh x year	0.01	0.02
No and volume of containers for mixed waste collection	m^3	3,631 bins of total volume: 3,995 m^3	144 bins of total volume: 158 m^3
No of and volume of containers for separate waste collection **(Core Indicator)**	m^3	410 bins of total volume: 451 m^3	4,374 bins of total volume: 4,811 m^3
No and capacity of collection vehicles	no and m^3	Waste compacting trucks: 25 Trucks for bin transport: 12 Tow tractors: 9 Tipping trucks: 3 Total tracks number: 49 Total capacity: 513 m^3	Total trucks number: 96 Total capacity: 1,152 m^3
No of transfer stations **(Core Indicator)**	no	0	3 covering the whole county and 3 very small already designed
No and capacity of press containers	no and m^3	0	14 of 30 m^3 each
No and capacity of hauling vehicles	no	0	3
No and capacity of bring and drop centres	no and m^3/year	0	1 of 35 m^3
No and volume of containers for special waste (bulky and hazardous waste)	no and m^3	0	29 of 363 m^3 total volume
Component 2 – waste treatment			
Total population in human settlements concerned	capita*1000	140.0	321.7
Recycling rate for paper and cardboard	% and t/ year	41.8% 3,369	86.0% 6,300
Recycling rate for plastic	% and t/ year	8.5 % 758	68.0% 6,080
Recycling rate for glass	% and t/ year	24.6 % 1,195	96.0% 4,650
Recycling rate for metal	% and t/ year	38.5% 772	97.0% 1,952
No and capacity of sorting plants **(Core Indicator)**	No and capacity	2 of 3000 t/year	3 of 33,731 t/year

Indicator	Unit	Before Project (2009)	After Project (2013)
Total diversion rate for biodegradable waste not disposed of in landfills **(Core Indicator)**	% and t / year	0% 0	69.1% 47,433
No and capacity of MBT plants **(Core Indicator)**	no and t/year	0	1 of 63,869 t/year
Amount of CLO produced	t/year	0	17,800
Amount of biodegradable waste diverted through home-composting	% and t / year	0% 0	20% (in rural area) – 3,700
Component 3 – waste disposal			
Total population in human settlements concerned	capita*1000	139	321
Amount of waste disposed of in compliant landfills **(Core Indicator)**	t/year	0	49,000
No and capacity of landfills compliant with EU standards **(Core Indicator)**	no and m^3	0	1 landfill of total capacity of 2.2 million m^3
No and volume of rehabilitated urban landfills **(Core Indicator)**	no and m^3	0	8 landfills of approximately 4,450,000 m^3 of waste
Component 4 – Technical assistance and public awareness			
Total population in human settlements concerned	capita	0	321

c) Main beneficiaries of the infrastructure (i.e. target population served, quantified where possible):

The project beneficiary is Caras-Severin County Council, as representative of the Intercommunity Development Association (IDA - Asociația de Dezvoltare Intercomunitară, ADI) set up in the county. ADI has been formulated by the total of the local administrative units of the county. The project seeks to benefit the whole population, urban and rural of the Caras-Severin County. Currently the population of the county is estimated at 327,579 inhabitants of which 56% is located in urban areas, while the rest (44%) is located in the rural part of the county.

Under the recently legal provisions introduced in the Law of sanitation for localities no. 101/2006 the activity of creation and management of components of integrated waste management system is the responsibility of the county council. Under article 61 of Law no. 101/2006 the county councils may have expertise on the establishment, organization, management and coordination of integrated waste management and the specific activities undertaken by them.

d) Is the construction of the infrastructure to be delivered through a public-private partnership (PPP)?

Yes ☐ No ☒

If yes, describe the form of the PPP (i.e., selection process for private partner, structure of PPP, infrastructure ownership arrangements, risk allocation arrangements, etc.):

N/A

Give details of how the infrastructure is to be managed after the project is completed (i.e., public management, concession, other form of PPP).

The Contract of Association for the implementation of the project: "Integrated solid waste management system in Caras-Severin County" (CDA) which it was signed on 13/01/2009 and together with the additional act on 23/11/2010, defines the main measures to achieve a clear and functional management system. It takes into consideration the short time to complete all procedures till planned opening of integrated countywide solid waste facilities in 2012. Furthermore it respects the demands of EU regulations.

Definition of project

The project stipulated in CDA contains the complete operational steps of solid waste operations from collection till disposal within the County of Caras-Severin. CDA commits partners to collect and transport solid waste to fixed central TS to be further transferred and disposed of. Local authorities are obliged to use the central facilities of County Council and are not allowed to contract different services. Following results of the technical and operational results of Feasibility Study each community is attached to a defined collection zone. Annex 2 of CDA specifies the locations to which each local authority is allocated and the assigned population.

Duration of CDA and cooperation

Current contract is concluded for a duration of 30 (thirty) years. Agreement duration is deducted from the period of 30 years planned as lifetime of investments in the project. County Council and Local Authorities may agree on prolongation.

Delegation of services

In both circles of responsibility, central and local, it is planned to delegate the management and operating works under contracts of delegated management to one or more operators.

The evaluation commission will select two operator categories for the activities of CT (Collection and Transport) and of TTPD (Transfer stations and transport inclusive IWMC).

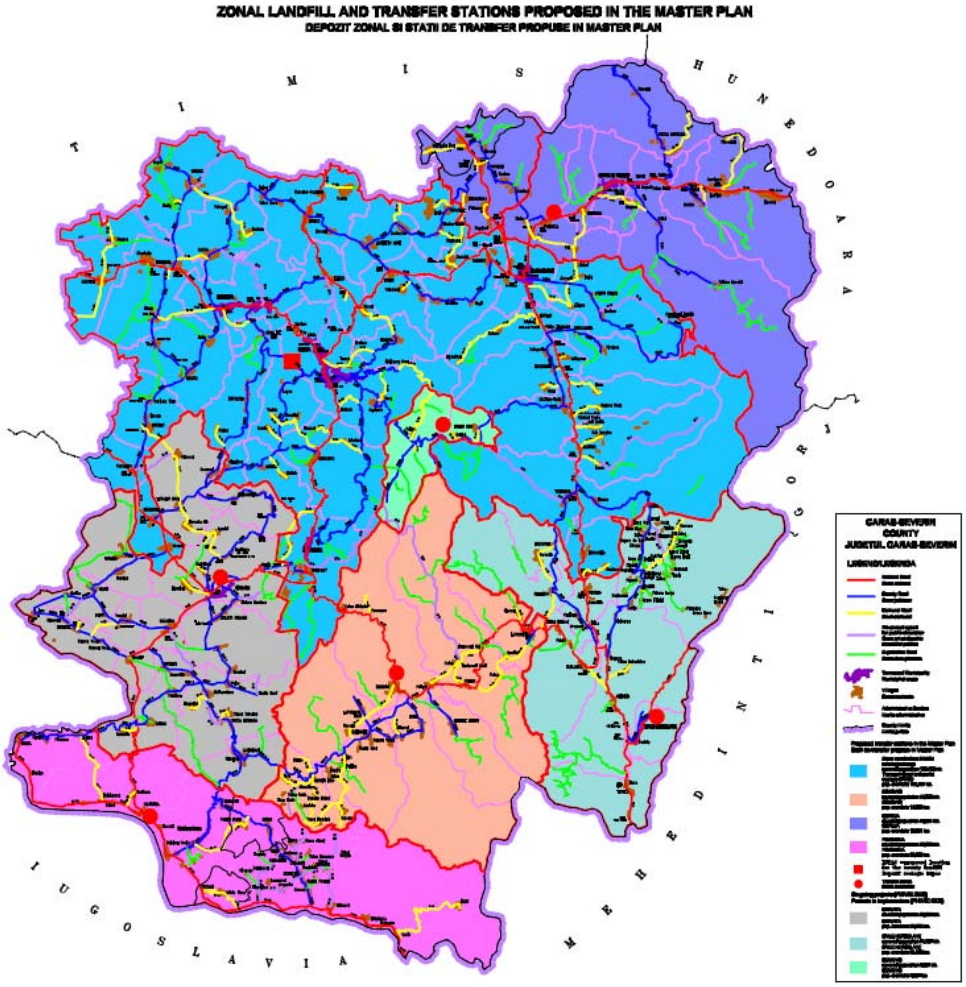


Figure B-3: Allocation waste management operations

County Council of Caras-Severin intends to prepare a call for tenders for:

- the construction works of Central Landfill site and relative installation construction;
- the construction works of transfer stations ;
- for public procurement for assets and services relative to Project's operation;
- contract of delegation of activities relative to services achieved by landfill operation (including the maintenance of landfill and relative installation and also waste processing and disposal), waste transport from TS to landfill and TS operation;
- achievement of works related to the closure and land rehabilitation of the 97 rural and 8 urban non-compliant landfills.

Number of CT operators for collection and transport activities is minimum 1 that will cover the entire county and maximum 7, one for each collection area. Collection zones cannot be divided and allocated to different operators. A special situation is in Zone 1, where 2 Phare Projects were already implemented (in Caransebes and Semenic areas); the public operators already assigned under these 2 projects will operate 5 more years, by the end of 2014.

An open competitive bidding following the relevant national and EU regulations will take place. For every tendering, County Council, or depending on the case, ADI based on local authorities proposal will establish the component of Assessment Committee.

Each Local Authority will agree on commissioning the services of collection and transport of the respective collection zone. ADI may sign the contracts on behalf of the authorities.

Ownership of investments and goods

It is assured that lands needed for realization of project belong to public property of the local authorities and are at the Projects availability, as all administration rights are given to the County.

Caras-Severin County Council will be the owner of the new central infrastructure. It is approved that lands needed for realization of the Project are not under any other legal dispute.

Land will be given into possession use of County Caras-Severin for the whole period of Project from the Territorial Administrative Unit (TAU) that owns this land. The whole Period of project is defined with 30 years. Conclusion of any legal document in the future having as object these lands is forbidden. TAUs commit by CDA to register, under legal provisions in force, the property rights over the lands prior to the availability of the Project.

Investments planned in each associated TAU were approved by Caras-Severin County Council decision no. 175/29.10.2008. All buildings, mobile equipment and goods constructed or purchased during the Project will get part of public patrimony of County Caras-Severin.

Each TAU receives right of utilization of investments as long as Project lasts.

Tariffs and fees

Currently, In Caras-Severin County, waste fees are collected in the form of a municipal tax by the local authorities or in the form of a tariff, collected directly by the operator (Resita, Bocsa, Moldova Noua).

The tariffs vary from 0.6 – 0.88 €/inhabitant / month for households and reach up to 10.62 €/month or 11.27 Euro/ m3 for the institutions. A main deficiency of the system is the insufficient collection of the fees especially in rural areas and the inadequate implementation of the “polluter pays” principle. Also, in most cases the fees fail to recover the costs of waste management.

The payment mechanism to be proposed in Caras-Severin County for the waste management services should cover the entire running costs of the waste management system, including savings for the closure of landfill, reinvestment and replacement investments during the operational phase and all administrative costs. Future household tariffs shall be oriented to the income of the lowest decile of population, in such a way that the monthly waste bill including 24% VAT shall not exceed 1.8% of this lowest decile income (affordability threshold).

The local authorities in Caras-Severin County decided to introduce a mixed system for payment of sanitation services. Therefore, in rural area, the sanitation services will be paid as sanitation tax,

collected by the local authorities, while in urban areas, as well as for the non-domestic users (both urban and rural areas), a tariff system will be set, which shall be collected directly by the sanitation operators. This decision, assumed by the local authorities in Caras-Severin County, is properly reflected in the Position Paper for Project Implementation.

Beginning with the date of setting up of the post project public sanitation services for localities, the public authorities in Caras-Severin County, according to their competences, shall set specific taxes and tariffs for the direct beneficiaries of these services. Thus, the responsibility concerning the support and development of the public services is with the public authorities, the tax covering the actual cost of the services, as well as an infrastructure maintenance and development component.

The pre-existing operators shall be remunerated at the tariffs established in their existing contracts.

Relevant regulations for existing contracts

The local authorities decided that if one or several of the TAUs of the area connected to a transfer station/collecting centre or landfill, at the time of delegation of the public sanitation services, has under implementation a valid contract with an operator (and it was decided this contract to be maintained), the tender for the delegation of the service will be carried out also for that administrative-territorial unit, highlighting that the selected operator will begin operation only starting with the date of expiration of the existing contract. Thus, the new operator will not be able to start the operation on the entire collection area, being obliged to gradually extend its coverage area and, implicitly, its revenues. In case that the existing contracts can be early terminated without any penalties, this will happen when the IWMS becomes functional, i.e. when the new operators are selected. Thus, the existing contracts will not be extended in any case.

However, from technical and juridical point of view, the existing contracts require an adaptation to the new waste management system and will have to be amended in terms of the activities afferent to the public service carried out, meaning that the existing operator shall collect only residual waste, at the same time carrying out their transport to the transfer station or landfill, depending on the case. It will be thus necessary for the implementation of new waste collection contracts to be phased in such a way as to both ensure proper continuation of waste collection service where existing contracts are maintained. Provisions must be made to ensure that existing services are incorporated into the new waste management collection system.

As well, the existing contracts which are not in accordance with the provisions of the national legislation and acquis communautaire related to public sanitation services for localities and public procurement (i.e. they do not foresee separate collection, even they were signed after 2006 or they were not awarded by public tender though this procedure was mandatory at that time) will be cancelled.

On the other hand, in the localities where the sanitation service is carried out by public operators or direct management (i.e. a specialized department within the City Hall), as soon as the new operator is selected, the new contracts will become functional for those localities as well.

As regards the PHARE contracts, these will be integrated in the new waste management structure when the commitments assumed by the local authorities cease. At that moment, the service delegation will be carried out by ADI, in the name and on behalf of the localities involved and the areas covered by PHARE services will be also included in the operation under the SOP project.

The existing PHARE collection and transport equipment will remain in the ownership of the administrative-territorial units involved, but an administration right will be awarded to the ADI.

The transfer/sorting stations built with PHARE funds will be integrated in the IWMS as such; No additional quantities are envisaged to be transferred, thus no need to increase the capacity or extend the coverage area.

Through the Position Paper signed at county level, the administrative-territorial units which are members of PHARE small ADIs will assume the commitment according to which the waste coming from PHARE transfer stations to be landfilled at the ecological landfill (Lupac) or transported to other treatment facilities which are part of the IWMS in Caras-Severin County.

In terms of property regime, the existing PHARE facilities will remain in the public ownership of the administrative-territorial units involved, but an administration right will be awarded to the County Council.

In the same time, if for those PHARE projects small Intercommunity Development Associations were created according to the legal provisions in force, the local authorities who are members in these small ADIs will take the commitment to cease the activity of these ADIs when the new contracts are operational.

Project implementation

County of Caras-Severin takes responsibility for construction of all waste management facilities and has the obligation to ensure complete financing and transparency of the connected operations. County Council organizes the procurement and the tender procedures and it guarantees the legality of the evaluation and closure of contracts and the correctness of expenses.

To manage its obligations, the County Council of Caras-Severin established in 2009 (Disposition no. 70/2009) the Implementation Unit of the Project (PIU) "Integrated waste management system in County Caras-Severin". The PIU was instated as a distinct unit within the Service of works with international Financing directly subordinated to the President.

The PIUs management system must be able to provide timely and reliable information, give early warning of problems in the Project implementation and operational phases and allow all stakeholders to monitor Project's progress toward its agreed objectives. Project financial management brings together planning, budgeting, accounting, financial reporting, internal control, auditing, procurement, disbursement and the physical performance of the Project with the aim of managing project resources properly and achieving the project's development objectives. PIU will need to eventually elaborate a procedures manual that addresses, among other things, assurance of overall quality, quality controls, and internal audits. Avoiding any irregularities is a key component under this consideration.

The Dispositions of the President no. 35/2009 appointed the persons that were to occupy the 12 positions of the PIU. The persons with activity in the PIU are the following: Victor Naidan - project manager; Carmen Ciruglea , Ana Berei, Corina Vuc, Lavanda Novac, Dumitru Covaci- responsible technicians; Mihaela Barbulescu, Dan Stan – responsible legal counselors, Gina Pavel- financial expert, Adina Ungunreanu- institutional expert and Diana Frenti, Magdalena Balazs - assistants. All persons are employees of the County Council.

e) Does the project form part of a Trans-European Network agreed at Community level?

Yes		No	X

N/A

B.5. Project objectives

B.5.1. Current infrastructure endowment and impact of the project

The aim of the project is to achieve the minimum standards for the compliance with the relevant EU directives and to respect Romania's commitments assumed in the pre-accession negotiations. Thus, the proposed project seeks to resolve the significant environmental and operational problems related to waste generation and management and develop and integrated waste management system in the county that will improve the living conditions of its citizens and support Romania in achieving the waste management targets imposed by the Accession Treaty. The system as such, will be in full compliance with the EU and national environmental principles and legislation and will address all elements of waste management namely from waste prevention and waste collection to disposal of residues. The proposed system is tailored to the needs of the county and it was identified as being the most cost-effective and affordable for the citizens. The specific goals that the proposed system seeks to achieve include:

- Increase of the coverage rate for the population that benefits from municipal waste collection and adequate quality management services at acceptable tariffs;
- Reduction of the landfilled waste quantities;
- Increase of the recycled and reused waste quantities;
- Set-up of efficient waste management facilities;
- Reduction in the number of historic contaminated sites

In this respect the project seeks to develop the necessary infrastructure in order for Caras-Severin County to be able to fulfil its obligations as they derive from the Accession Treaty and the relevant national legislation. The main quantified targets and deadlines are presented in Table B-1: Main waste management targets.

Table B-9: Waste generation in Caras-Severin County

	Waste type	EWC Code	2009	2013	2016
1	**Generated municipal solid waste out of which:**	**20 03**	**103,673**	**105,307**	**106,660**
1.1	Mixed domestic waste	20 03 01, 20 01	71,441	85,148	85,952
1.2	Similar mixed waste from commerce, industry, institutions	20 03 01, 20 01	15,011	15,497	15,872
1.3	Park and garden waste – market waste	20 02, 20 03 02	2,101	2,211	2,326
1.4	Street waste	20 03 03	2,375	2,451	2,510
1.5	Generated but uncollected waste	20 01 15 01	12,745	0	0
2	Sewage sludge	19 08 05	290	21,135	-

	Waste type	EWC Code	2009	2013	2016
3	Construction and demolition waste	17	2886	-	-
4	Waste electrical and electronic equipments	16 02	0.6	-	-
5	Hazardous waste in municipal waste	20 01 with asterisk	357	426	430
6	Bulky waste	20 03 07	4338	-	-

The following table presents the main discrepancies of the current waste management system and the ways the proposed project seeks to overcome these discrepancies

Table B-10: Proposals for improvement of Caras-Severin waste management system

Waste management stage	Current situation	Proposed interventions	Impacts
Waste collection	Existing old equipment is inefficient and requires high level of maintenance Connection to sanitation services: 93.1% in urban areas and 84.2% in rural areas Collection in rural areas is made by operators which do not have the necessary permits	• Implementation of selective collection in 100% urban area and 90% rural area • Purchase of bins of total storage capacity of 3,630 m^3 • Development of three transfer stations in Bozovici, Pojejena, Otelu Rosu	Increase connection rate to 100% of the population in 2013 Optimization of waste logistics Upgraded waste collection equipment Fulfilment of the targets according to the Regional Waste Management Plan
Waste recovery	Very low level of recycling Lack of necessary sorting infrastructure	• Development of one sorting plant in Lupac	Fulfilment of the packaging directive targets Reduction of waste that end up into the landfill
Waste treatment	Lack of facilities for the treatment of biodegradable waste	Development of 1 simple/MBT plant in Lupac Purchase of 16,800 homecomposters that will be handed over in 16,800 household in rural areas	Fulfilment of the landfill directive targets Reduction of waste that end up into the landfill Reduction of the environmental impacts related to landfill operations

Waste management stage	Current situation	Proposed interventions	Impacts
Waste landfill	There were 97 rural dumpsites and there are still 8 urban non-compliant landfills creating significant environmental threats	Construction of the class "b" compliant county landfill in Lupac, having a total capacity of 2,335,000 m^3 (first cell will have a capacity of approximately 430,000 m^3) Closure and rehabilitation of the 97 rural dumpsites (already performed) and of the 8 urban non-compliant landfills in Baile Herculane, Caransebes, Resita, Anina, Bocsa, Otelu Rosu, Moldova Noua, Oravita, with a total estimated volume of waste disposed by the end of 2008 of approximately 4,390,000 m^3	Disposal in compliant landfill in line with EC and Romanian standards Reduction of the environmental impacts related to landfill operation via the management of leachate and biogas
Public awareness	Very limited initiatives Absence of strategy	Implementation of public awareness campaigns focused on the need of sustainable and cost effective waste management	Successful implementation of the proposed waste management system
Institutional infrastructures	Fragmented and weak institutional structure for waste management not designed on facilitating expansion and improvements throughout the county. Absence of bylaws for operational procedures and penalties. Insufficient financing capabilities of local beneficiary. Absence of cost recovery through introduction of 'polluter pays' principle	Establishment of Technical Assistance for the PIU that will gradually develop into a permanent unit in charge of integrated waste management in Caras-Severin County Gradual enforcement of cost recovery through application of "polluter pays principle"	Creation of an institutional framework suitable for effective waste management Increased capability to manage an integrated waste management system Adequate, cost effective and financial sustainable waste management system

B.5.2. Socio-economic objectives

The project seeks to improve the living status of the citizens of Caras-Severin County, which is deteriorated by the current waste management practices. More specifically, the proposed project seeks, among other things to:

- Reduce the environmental impacts related to current waste disposal. These impacts are associated with the pollution of surface and groundwater with leachate and the emission of biogas, which is a greenhouse gas.
- Increase the utilization of material included in the waste and preservation of natural resources (mainly mineral resources – global impact)
- Reduce the quantity of waste that end up in landfill thus increasing the landfill lifetime and providing the opportunity to utilize free land for more valuable purposes than waste disposal
- Reduce the visual disamenities, odours, verms and other health risks related with the current waste management practices
- Allow all citizens of Caras-Severin County to have access to waste management services
- Reduce the waste management cost via the optimization of the waste collection system.

In this respect the main socio-economic benefits from the implementation of the proposed project can be grouped into three main categories:

- The reduction of visual disamenities, odours and direct health risks. The quantification of these benefits is presented in section E.2.2 and is based on (i) increase in land values in the areas surrounding the rehabilitated dump sites; (ii) avoided cleaning costs for not having to treat impact of uncontrolled discharges of leachate and/or the cost to develop alternative water sources when applicable and (iii) reduction of disamenities related to uncollected waste.
- The resource cost savings, which is related to (i) the recovery of recyclable products and the production of CLO and (ii) the reduction of the total amount of waste finally going to final disposal, which extends the economic life of the landfills. The quantification of these benefits is presented in section E.2.2 and is based on (i) proceeds for the sale of recyclable products, CLO and energy and (ii) when applicable to the project, avoided investment and operating costs at the landfill site
- The reduction of greenhouse gas emissions, which is related to (i) the avoidance (or proper collection) of methane and carbon dioxide emissions, which typically account for 64% and 34% in volume, respectively, of all gas generated from decomposing waste; and (ii) the emissions saved when the project results in the generation of heat and/or electricity and the alternative source for this heat and/or energy implies the use of fossil fuels. The quantification of these benefits is presented in section E.2.2 and is based on the estimation of the annual expected reduction in tonnes of methane and carbon dioxide (CO_2) due to the project, transformation of the methane quantities into CO_2-equivalent using a standard conversion factor and monetization of the resulting quantities of CO_2 and CO_2-equivalent using a standard value of EUR per tonne of CO_2

Also the project as such involves the development of complex and big infrastructure which requires the employment of specialized and non specialized personnel. More specifically during the construction phase numerous workers will have the opportunity work in the development of the infrastructure (temporary workers). From the initiation of the operation of the facilities it is foreseen that more than 100 people with various backgrounds will have the opportunity to work. Also at least 10 people will be employed at County Council level in order to carry out the tasks of the Project Implementation Unit.

The project will have direct impact in the recyclables market which will be expanded in order to absorb the increases quantities of recyclables that will be produced in the sorting plant. Also, as soon as the system operation smoothens and the public becomes educated the generated CLO in the simple MBT plant may be of better quality and a market could potentially be developed

Currently in the area Phare initiatives are under development referring mainly to the improvement of waste collection. These initiatives are taken into account and are integrated into the system.

Finally, this project alongside all other waste management projects developed in other counties in Romania seeks to contribute in the fulfilment of all waste management obligations undertaken by the Romanian Government during the process of Accession into the EU.

B.5.3. Contribution to the achievement of the Operational Programme

The project seeks to contribute to the objectives identified under:

Priority Axis 2 "Development of integrated waste management systems and rehabilitation of historically contaminated sites"

of the Sectorial Operational Programme for Environment, namely:

- To increase the population covered by municipal waste collection and management services of adequate quality and at affordable tariffs:

  This is achieved by the implementation of the selective collection system described previously which is expected to cover the 100% of the population in 2013 from 65% that is covered today (today mixed collection is implemented and not selective collection). The proposed project is the most cost-efficient and it is viable respecting the affordability level of 1.8% of lowest decile impact.

- To reduce the quantity of landfilled waste

  This is achieved via the selective collection scheme that will be implemented, which will by supplemented by a sorting plant and a simple MBT plant. The total waste quantity that will be landfilled will be approximately 45% of the collected waste and it will be treated residues and not mixed waste

- To increase the quantity of recycled and reused waste

  This is achieved via the selective collection scheme that will be implemented of recyclables (paper, plastic, glass, metals, wood) from the municipal waste via dry bin, which will by supplemented by a sorting plant. In total approximately 19,000 t/year of recyclables will be recovered

- To set up efficient waste management structures

This is achieved via the organization and operation of the Project Implementation Unit and the technical assistance contract that will concern the monitoring and management of the works

- To reduce the number of historically contaminated sites

  8 urban non-compliant landfills will cease their operation and in situ rehabilitated (full capping)

  97 rural dumpsites were already environmentally cleaned

The following table presents indicators related to the project's contribution to the SOP objectives.

TableB-11: Indicators related to SOP Objectives

Indicator	Unit	Project contribution
Output		
New or completed integrated waste management systems at county/regional level	1	Development of 1 integrated solid waste management system at county level
Old municipal waste landfills closed in urban and rural areas	8	Land rehabilitation of all rural and urban non-compliant landfills
Result		
Population benefiting from improved waste management systems	321,700 inhabitants	The whole county population will be benefited in terms of connection to sanitation services as well as improvement of the living conditions via the reduction of the environmental impacts related to current waste management practices

The project fulfils all relevant eligibility and selection criteria in order to be financed by ERDF in the framework of SOP Environment. More specifically:

- From institutional point of view the ADI has been formulated by the total of the local administrative units of the county and the PIU has been formulated, staffed and is in operation
- The proposed project falls within the priorities of the SOP Environment (Priority Axis 2)
- The implementation period of the project is prior to 2013
- The project seeks to fulfil the county obligations in relation to waste management legislation, which cannot be fulfilled otherwise
- The project is not correlated with any other EC financing

- All proposed eligible costs are according to the Romanian legislation (Order 1182/2643/7.9.2009)
- The land on which the waste management infrastructure will be located are under the public / local ownership
- All background documentations (Feasibility study, CBA and EIA studies have been concluded)
- The necessary permits have been issued

C. RESULTS OF FEASIBILITY STUDIES

C.1. Provide a summary of the main conclusions of the feasibility studies conducted

The feasibility study conducted in order to assess the waste management needs of Caras-Severin County resulted in the following major conclusions:

- The current waste management is inappropriate since:
    - Waste collection in several cases is performed by non authorised operators
    - Selective collection is implemented in few areas only
    - Existing equipment is old and insufficient
    - Non treatment of biodegradable waste is carried out and hence it is not possible to reach the targets imposed by legislation
    - No sorting facilities exist in order to recover the recyclable waste and hence it is not possible to reach the targets imposed by legislation
    - Disposal in the past years was carried out in 8 inappropriate non-compliant landfills in urban areas, without lining, leachate and biogas management. Currently, waste disposal is carried out in 5 urban non-compliant landfills
    - The waste is disposed without treatment contrary to the requirement of the legislation.
- An integrated waste management system will need to be implemented in order to ensure the fulfilment of the targets foreseen by the legislation and ensure the environmental protection in the most cost efficient manner. The system's main components will include:
    - In terms of waste collection:
        - Division of the county in 7 waste management zones
        - Collection of 105,307 t/year of waste, as follows:
            - 1-bin system for mixed waste for approximately 21,900 inhabitants (7% of the population: 100% of the population come from rural areas)
            - 2-bins system, 1 for the wet and 1 for dry fraction, which will be converted into 4-bins system (for paper, glass, plastic and mixed waste) after 2012, for approximately 60,600 inhabitants (19% of the

population: 68% of the population come from rural area and 32% from urban area)

- 2-bins system, 1 for the wet and 1 for dry fraction, which will be converted into 3-bins system (for paper collection) for approximately 212,900 inhabitants (65% of the population: 36% of the population come from rural area and 64% from urban area)
- 4-bins system (1 for paper, 1 for glass, 1 for plastic, 1 for mixed fraction) for approximately 28,600 inhabitants (9% of the population: 100% of the population come from urban area)
- 5-bins system (1 for paper, 1 for glass, 1 for plastic, 1 for metal and 1 for mixed waste) for approximately 1,400 inhabitants (1% of the population: 100% of the population come from rural area).

- In terms of waste treatment/disposal:
  - Development of 1 central waste management facility in Lupac, which will include the following:
    - 1 simple MBT plant for the treatment of biodegradable waste, in which the content of the wet bin will be treated. The capacity of the plant is 63,869 t/year, and it will produce CLO (17,800 t/year) and residues (23,800 t/year)
    - 1 sorting facility, in which the content of the dry bin will be treated. The capacity of the plant is 33,731 t/year, and it will produce recyclables (19,000 t/year) and residues (14,800 t/year)
    - 1 county landfill, constructed according to the provisions and specifications of the legislation, which will receive annually 49,000 t of waste (including sludge)
  - Promotion of home-composting in rural areas
  - Land rehabilitation of the all existing non-compliant landfills:
    - 97 small rural non-compliant landfills of total surface of 41.17 ha and waste content of 81,366 m^3 will be in situ environmentally cleaned as the relevant Romanian legislation imposes.
    - 8 urban landfills of total surface of 30.3 ha and waste content of 1,000,000 m^3 will be in situ rehabilitated with complete capping system as the relevant Romanian legislation imposes.

It is noted that the preparation of this CF/ERDF application and supporting documents (feasibility study, environmental study, tender documents etc.) is financed under the ISPA Measure 2005 RO 16 P PA 001 – 05 and the project under the title: 'Technical Assistance for project preparation in the environment sector – Romania' under EuropeAid/123053/D/DV/RO.

The following table describes the main results of the background studies (Master plan, Feasibility study, cost benefit analysis and environmental impact assessment study).

Table C-1: Main results of background studies

Crt no	Key dimension of the feasibility study	Description	Reference
1	Technical analysis	The proposed system includes: • Selective collection in urban areas and 85% of the rural areas • Purchase of the necessary equipment for selective collection • Construction of 1 sorting plant of capacity of 33,731 t/year • Construction of 1 simple MBT plant of capacity of 63,869 t/year • Construction of 3 transfer stations of total capacity of 20,300 t/year • Construction of 1 county landfill. The lifetime of the first cell will be 7 years • Land rehabilitation of all the rural (97) and urban (8) non-compliant landfills	Chapter 8 of the FS
2	Institutional aspects	Weakness of existing institutional set up can be summarized as: • The existing system of waste management is inefficient both in terms of environmental protection and the economic. • Separate collection systems are incomplete and only limited to central areas • Sector over-fragmentation as regards waste services • Limited expertise of the Local Authorities in the management and monitoring of waste management services • Low awareness as regards proper waste management in key points of waste avoidance, reduction, recycling and reuse • Significant differences in completeness of services and standards between rural and urban areas • No equate tariff system to cover the overall public costs and to improve services • Data related to amount and quality of waste collected are incomplete or not available • Insufficient cooperation between administrative units (rural and urban) The Caras-Severin County Council has elaborated a Contract of Association for Caras-Severin County (CDA) and negotiated with all local authorities. It is confirmed that all founder members of ADI agree on the principles of contract and will sign as soon as initial tariffs are calculated and confirmed. CDA includes the decision to jointly establish an ADI for coordination of cooperation on county level, which is already performed and constituted. CDA defines the main measures to achieve a clear and functional management system. It takes into consideration the short time to complete all procedures till planned opening of integrated countywide solid waste facilities in 2012. The foundation of an “Intercommunity Development Association” is concluded under the name “ADI INTERCOM DESEURI CARAS-SEVERIN”. Members of ADI INTERCOM DESEURI CARAS-SEVERIN are County Council of Caras-Severin and all Local Councils within the county. The PIU has been established as distinct unit within the Direction of Project Management, External Relations and Regional Development. Main point and big step to complete the preparation of an adequate institutional and functional arrangement for Integrated Waste Management system in Caras-Severin County will be the signing of the contract of association for Caras-Severin County.	Chapter 11 of the FS
3	Environmental aspects	The project has been subject to full EIA. The agreement has been issued in May 2011.	EIA report
4	O&M	The total O&M costs are estimated at 49,47 Euro/t billed (being the O&M part of the Dynamic Prime Cost (DPC), not including investment costs or depreciation thereof)	Chapters 9 and 10 of the FS
5	Financial	The project is considered affordable to population and financially viable in the case of co-	Chapter 10

<table>
<tr><th>Crt no</th><th>Key dimension of the feasibility study</th><th>Description</th><th>Reference</th></tr>
<tr><td></td><td>indicators</td><td>financing from the EC. The main financial indicators are:
FRR/C: -4.8%
FNPV/C: -29.559.831 EUR
FRR/K: 2.1%
Funding gap: 90.6%</td><td>of the FS</td></tr>
<tr><td>6</td><td>Tariff and affordability</td><td>The proposed tariff forecast (in constant 2009 terms) foresees:
• for households, to introduce in 2012 a tariff corresponding to the limit of 1.8% of the lowest decile's income (192 Lei/t) and to increase it continuously along the affordability limit of 1.8% until 2028, after that, it will be equal to the DPC. 228 Lei/t correspond to an average monthly charge per person, including VAT, of about 5.39 Lei (up from 4.07 Lei in 2010);
• for commercial, industrial and institutional consumers, to have a price per tonne going up from about 154 Lei/t in 2009 to 342 Lei/t in 2012, being the Dynamic Prime Cost (DPC) of waste management, and staying at that level
<table>
<tr><th>Year</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2021</th><th>2026</th><th>2031</th><th>2034</th></tr>
<tr><td colspan="12">Tariffs in Lei/t, excl. VAT</td></tr>
<tr><td>Projected residential tariff (households)</td><td>192.00</td><td>192.00</td><td>192.00</td><td>199.22</td><td>206.09</td><td>213.58</td><td>223.73</td><td>271.11</td><td>317.50</td><td>336.86</td><td>336.86</td></tr>
<tr><td>Affordability ratio (in % of lowest decile income)</td><td>1.40%</td><td>1.61%</td><td>1.67%</td><td>1.80%</td><td>1.80%</td><td>1.80%</td><td>1.80%</td><td>1.80%</td><td>1.80%</td><td>1.63%</td><td>1.48%</td></tr>
<tr><td>Projected non-residential tariff (economic units)</td><td>154.00</td><td>154.00</td><td>245.43</td><td>336.86</td><td>336.86</td><td>336.86</td><td>336.86</td><td>336.86</td><td>336.86</td><td>336.86</td><td>336.86</td></tr>
<tr><td colspan="12">Tariffs in Lei/cap/month (residential), incl. VAT</td></tr>
<tr><td>Average</td><td>4.07</td><td>4.61</td><td>4.84</td><td>5.40</td><td>5.62</td><td>5.86</td><td>6.18</td><td>7.75</td><td>9.41</td><td>10.35</td><td>10.58</td></tr>
<tr><td>Urban households</td><td>5.62</td><td>6.24</td><td>6.52</td><td>7.22</td><td>7.51</td><td>7.83</td><td>8.25</td><td>10.35</td><td>12.58</td><td>13.84</td><td>14.14</td></tr>
<tr><td>Rural households</td><td>2.06</td><td>2.49</td><td>2.65</td><td>3.04</td><td>3.16</td><td>3.29</td><td>3.47</td><td>4.35</td><td>5.29</td><td>5.81</td><td>5.94</td></tr>
</table></td><td>Chapter 10 of the FS</td></tr>
<tr><td>7</td><td>Economic analysis</td><td>According to the economic analysis performed:
ERR/C: 16.3 %
ENPV: 29,716,088 EUR
B/C ratio: 1.59</td><td>Chapter 10 of the FS</td></tr>
<tr><td>8a</td><td>Sensitivity analysis (financial)</td><td>The main variables examined were: the investment costs, the O&M costs and the revenues. All of them have been found to be key variables.</td><td>Chapter 10 of the FS</td></tr>
<tr><td>8b</td><td>Sensitivity analysis (economic)</td><td>The main variables examined were: the level of economic benefits, the economic investment costs and the economic O&M costs. The economic profitability being relatively high, none of these parameters appears as being critical.</td><td>Chapter 10 of the FS</td></tr>
<tr><td>9a</td><td>Risk analysis (financial)</td><td>The main variables examined were the investment costs, the O&M costs and the revenues. There exists a 99.9% probability that the FNPV is negative.</td><td></td></tr>
<tr><td>9b</td><td>Risk analysis (economic)</td><td>The main variables examined were: the level of economic benefits, the economic investment costs and the economic O&M costs. There exists a 100% probability that the ENPV is positive.</td><td></td></tr>
</table>

C.1.1. Demand analysis

The proposed project will be implemented in Caras-Severin County, in the Western Development Region of the country. The population of the county is approximately 327,000 inhabitants corresponding to 17% of the Region West population and 1.5% of the total country population. Approximately 56% of the county population is located in urban areas, while the rest (44%) is located in the rural part of the county.

The following table presents the main characteristics of the county.

Table C-2: Main characteristics of Caras-Severin County

Parameter	Baseline information		
Surface area (km^2)	• Total county: 8,519.76 (26.59% of the total region's surface and 3.6% of total country's surface) • Urban areas: 1,013.85 (11.9 % of county) • Rural areas: 7,505.91 (88.1 % of county)		
Settlements	• 8 cities, out of which 2 municipalities, 69 communes and 287 villages • 131,524 households • 2.9 persons per household		
Main economic activities	Processing industry (e.g. metal industry)		
GDP		GDP 2006* (million RON)	GDP 2006 (RON/capita)
	County	4,445.2	13,512.1
	Region 5	35,788.9	18,570.1
	Romania	344,650.6	15,967.6
	*Data for GDP on 2007 is not available yet at county and regional level		
Income		Average net income (RON per household per month)	
		2008	2009
	Region 5	1,850.8	2,043.5
	Romania	1,828.5	1,983.7

The following table presents the present and future figures in relation to population and waste generation in Caras-Severin County.

Table C-3: Evolution of population and waste generation in Caras-Severin County

	Unit	2003	2007	2009	2011	2013	2016	2021	2025	2030	2037
Population											
urban	inhab	188,926	185,246	184,144	183,042	181,909	180,350	178,946	178,231	177,342	176,104
rural	inhab	143,782	142,354	141,507	140,661	139,790	138,592	137,513	136,964	136,281	135,329
total	inhab	332,708	327,600	325,651	323,702	321,699	318,942	316,459	315,195	313,622	311,434
Waste generation											
Urban areas											
Household waste	t/y	51,271	46,875	53,557	60,239	63,769	64,387	66,131	67,817	69,979	73,116
Similar commercial, industrial and institutional waste	t/y	12,781	10,493	10,662	10,833	11,007	11,273	11,546	11,638	11,732	11,825
Garden and park wastes, waste from markets	t/y	5,067	2,011	2,059	2,107	2,167	2,279	2,472	2,580	2,701	2,903
Street-cleaning residues	t/y	5,044	2,290	2,328	2,365	2,402	2,460	2,560	2,643	2,750	2,908
Total	**t/y**	**95,319**	**73,333**	**75,792**	**78,255**	**79,345**	**80,398**	**82,709**	**84,678**	**87,162**	**90,753**
uncollected waste	t/y	21,156	11,664	7,188	2,712	0	0	0	0	0	0
Rural areas											
Household waste	t/y	16,587	15,164	17,326	18,407	20,820	21,008	21,565	22,105	22,803	23,818
Similar commercial, industrial and institutional waste	t/y	4,135	4,280	4,349	4,384	4,490	4,598	4,709	4,747	4,785	4,823
Garden and park wastes, waste from markets	t/y	103	41	42	43	44	47	50	53	55	59
Street-cleaning residues	t/y	103	47	47	48	49	50	52	54	56	59
Total	**t/y**	**27,772**	**30,918**	**29,283**	**28,466**	**27,367**	**27,669**	**26,377**	**28,930**	**29,673**	**30,737**
uncollected waste	t/y	6,844	9,426	5,557	3,623	0	0	0	0	0	0
Grand total											
Household waste	t/y	67,858	62,597	71,441	80,284	85,148	85,952	88,255	90,481	93,340	97,493
Similar commercial, industrial and institutional waste	t/y	16,916	14,773	15,011	15,252	15,497	15,872	16,256	16,386	16,517	16,649
Garden and park wastes, waste from markets	t/y	5,171	2,052	2,101	2,150	2,211	2,326	2,522	2,632	2,756	2,963
Street-cleaning residues	t/y	5,147	2,337	2,375	2,413	2,451	2,510	2,612	2,697	2,807	2,967
Total	**t/y**	**126,289**	**108,576**	**103,673**	**104,500**	**105,307**	**106,660**	**109,644**	**112,196**	**115,420**	**120,071**
uncollected waste	t/y	28,000	21,090	12,745	4,401	0	0	0	0	0	0

As it can be derived from the figures above there is a small annual reduction in population in the period 2007 – 2037, of approximately 5%. At the same period, the waste generated and collected is expected to increase by approximately 0.3% annually. It is noted that after 2012, the uncollected waste in rural areas refer to the waste that will be homecomposted.

The following table presents the generation in Caras-Severin County in kg/capita/year

Table C-4: Waste generation in Caras-Severin County (kg/capita/year)

	2003	2007	2009	2011	2013	2016	2021	2025	2030	2037
Urban	505	396	412	428	436	446	462	475	491	515
Rural	193	203	193	183	182	185	192	197	203	213
Total	380	314	318	321	327	334	346	356	368	386

The following table presents the composition of the waste generated in Caras-Severin County

Table C-5: Projected composition of municipal waste

Type of waste	urban		rural		county average	
	%		%		%	
	2017	2027	2017	2027	2017	2027
Paper and board waste	13	16	13	20	13	17,0
Glass waste	7	5	7	9	7	6,0
Metal waste	6	8	5	7	6	7,7
Plastic waste	12	17	12	15	12	16,5
Wood waste	2	1	1	0	2	0,7
Biodegradable waste	50	42	55	40	51	41,5
Other waste (1)	10	11	7	9	9	10,5
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**

(1) Sand, dust, sweepings, ash, HHW, WEEE, C& DW, etc.

The following table presents the gaps and demands in the various stages of waste management:

Table C-6: Demands to implement integrated waste management

Waste management stage	Problems identified	Gaps and demands compared to existing situation
Waste collection	• collection in several cases is performed by non authorised operators contrary to legal requirements • selective collection is implemented only is few areas due to existing Phare projects, contrary to the targets imposed by the legislation and the waste management plans • existing equipment are old and insufficient	Total required bin volume: 5,873 m^3 Additional bin volume needed: 3,630 m^3 Total required truck volume: 1,152 m^3 Additional truck volume needed: 470 m^3

Waste management stage	Problems identified	Gaps and demands compared to existing situation
Transfer stations locations	• non – existence, poor waste collection logistics	No transfer station in the area, need to optimize the waste collection logistics via transfer stations
Biodegradable waste treatment	• Non treatment of biodegradable waste – inability to reach the targets imposed by legislation and the waste management plans • Non existence of facilities for treatment	Diversion of biodegradable waste from landfill: • 30,158 t in 2013 • 40,892 t in 2016 Currently there is almost zero treatment in the area
Recovery of recyclable material	• selective collection is implemented only is few areas due to existing Phare projects • very small sorting capacities mainly manually – no dedicated facilities - inability to reach the targets imposed by legislation and the waste management plans	In year 2013 there is need to recover / recycle*: • 5,821 t of paper • 1,884 t of plastic • 4,041 t of glass • 911 t of metals • 640 t of wood • 16,994 t of total recycling • 18,539 t of total recovery Currently there is almost zero recycling in the area
Landfill	• Non existence of landfill complaint with the national and EC standards	Current landfilling occurs in non-compliant urban and rural landfills. One landfill of capacity of more then 2.3 million m^3 will be constructed and 1st cell capacity of approximately 430,000 m^3
Old non-compliant landfills	• Disposal in 8 urban and 97 rural non-compliant landfills without lining, leachate and biogas management (after 2009 the disposal is made only in 5 urban non-compliant landfills) • Disposal of mixed waste and not treated residues and therefore production of significant quantities of biogas and heavily polluted leachate • Severe environmental threats due to the operation of the dumpsites	Closure of 8 urban non-compliant landfills of 30.3 ha surface; the 97 rural dumpsites were already rehabilitated

the targets refer to the packaging waste

All facilities that are proposed to be constructed in the framework of the project are designed to receive the capacities of the year 2013. However considering the relevantly small increase (in terms of t/year) in waste quantities in the county it can be considered that the facilities may also serve the additional quantities with some operational modification (e.g. increase of shift, potential increase in storage areas etc), without the need to expand their capacity (e.g. add a new line). The following table presents the design capacities of the main infrastructure.

Table C-7: Design capacity of main infrastructure

Type of facility	Design capacity
MBT plant	63,869 t/year
Sorting plant	33,731 t/year
Transfer stations:	
Bozovici	3,400 t/year
Pojejena	8,060 t/year
Otelu Rosu	8,388 t/year
Landfill:	
1st cell	430,000 m^3 of disposed waste (lifetime 7 years)
2nd cell	1,125,000 m^3 of disposed waste (lifetime additional 15 years)
3rd cell	780,000 m^3 of disposed waste (lifetime additional 10 years)

It is noted that all facilities will be constructed according to Romanian and EC standards and best practices. Particularly for the landfill it will respect the 1999/31/EC Directive and the Romanian Technical specifications (Ministerial Order 757/2004)

C.1.2. Options considered

The options analysis was made in two levels:

- Location of the central waste management facility
- Technological options for the integrated waste management facilities

Location of the central waste management facility

With respect to the central waste management facility, the extensive consultation with the stakeholders as well as the search for the location of the central waste management site resulted in 2 acceptable locations for the county under examination. One location is in LUPAC and the second location is in BREBU.

The site in Lupac is public property with the total surface of 54 ha (the suitable surface for investments has 42 ha). The access to the site is good. The public utilities (electricity) are close to the

site. The site is very close to the main waste generator (Resita). The public seems to accept with no problem the proposed interventions in Lupac area.

The site in Brebu is also public land with similar surface to the one in Lupac. Public utilities are close to the site. There were big oppositions on the public's behalf regarding the proposed investments in Brebu area.

The comparative examination that was carried out included:

- Environmental criteria
- Implementation criteria
- Financial criteria

The analysis of the two locations resulted to the conclusion that the central waste management facility should be constructed in Lupac mainly due to:

- Its visual isolation
- Good road accessibility
- Public acceptance

Technological alternatives

The following table presents the alternative options evaluated at Master Plan level, as well as at Feasibility Study level:

Table C-8: Overview of the options under evaluation

	Option 1	Option 2	Option 3	Option 4
Waste collection	• 1 bin system for mixed waste including green points: 7% of the population (100% of the population connected to the system comes from rural areas) will be served by the system • 2 bins system, 1 for the wet and 1 for dry fraction, initially which will be converted into 4 bins system (for paper, glass, plastic and mixed collection): 6.5% of the population (37% of the population connected to the system comes from urban area and 63% from rural areas) will be served by the system • 2 bins system, 1 for the wet and 1 for dry fraction, initially which will be converted into 3 bins system (for paper collection): 76.5% of the population (60% of the population connected to the system comes from urban areas and 40% from rural areas) will be served by the system • 4 bins system (1 for paper, 1 for glass, 1 for plastic, 1 for mixed fraction): 9% of population (100% of the population connected to the system comes from urban areas) will be served by the system • 5 bins system (1 for paper, 1 for glass, 1 for plastic, 1 for metal and 1 for mixed	• 1 bin system for mixed waste including green points: 7% of the population (100% of the population connected to the system comes from rural areas) will be served by the system • 2 bins system, 1 for the wet and 1 for dry fraction, initially which will be converted into 4 bins system (for paper, glass, plastic and mixed collection): 6.5% of the population (37% of the population connected to the system comes from urban areas and 63% from rural areas) will be served by the system • 2 bins system, 1 for the wet and 1 for dry fraction, initially which will be converted into 3 bins system (for paper collection): 76.5% of the population (60% of the population connected to the system comes from urban areas and 40% from rural areas) will be served by the system • 4 bins system (1 for paper, 1 for glass, 1 for plastic, 1 for mixed fraction): 9% of population (100% of the population connected to the system comes from urban areas) will be served by the system • 5 bins system (1 for paper, 1 for glass, 1 for plastic, 1 for metal and 1 for mixed	• 1 bin system for mixed waste including green points: 7% of the population (100% of the population connected to the system comes from rural areas) will be served by the system • 2 bins system, 1 for the wet and 1 for dry fraction, initially which will be converted into 4 bins system (for paper, glass, plastic and mixed collection): 6.5% of the population (37% of the population connected to the system comes from urban areas and 63% from rural areas) will be served by the system • 2 bins system, 1 for the wet and 1 for dry fraction, initially which will be converted into 3 bins system (for paper collection): 76.5% of the population (60% of the population connected to the system comes from urban areas and 40% from rural areas) will be served by the system • 4 bins system (1 for paper, 1 for glass, 1 for plastic 1 for mixed fraction): 9% of population (100% of the population connected to the system comes from urban areas) will be served by the system • 5 bins system (1 for paper, 1 for glass, 1 for plastic, 1 for metal and 1 for mixed	• 1 bin system for mixed waste including green points: 7% of the population (100% of the population connected to the system comes from rural areas) will be served by the system • 2 bins system, 1 for the wet and 1 for dry fraction, initially which will be converted into 4 bins system (for paper, glass, plastic and mixed collection): 6.5% of the population (37% of the population connected to the system comes from urban areas and 63% from rural areas) will be served by the system • 3 bins system, 1 for the wet, 1 for dry fraction and 1 for paper: 76.5% of the population (60% of the population connected to the system comes from urban areas and 40% from rural areas) will be served by the system • 4 bins system (1 for paper, 1 for glass, 1 for plastic, 1 for mixed fraction): 9% of population (100% of the population connected to the system comes from urban areas) will be served by the system • 5 bins system (1 for paper, 1 for glass, 1 for plastic, 1 for metal and 1 for mixed fraction): 1% of population (100% of the population connected to the system

	Option 1	Option 2	Option 3	Option 4
	fraction): 1% of population (100% of the population connected to the system comes from urban areas) will be served by the system	fraction): 1% of population (100% of the population connected to the system comes from urban areas) will be served by the system	fraction): 1% of population (100% of the population connected to the system comes from urban areas) will be served by the system	comes from urban areas) will be served by the system
Assumption on waste collection	60% of population from urban and rural areas (approximately 190,000 inhabitants) contributes successfully to the selective collection scheme, namely separates the waste in the proper way while the remaining population is assumed to put its waste mainly in the wet bin	60% of population from urban and rural areas (approximately 190,000 inhabitants) contributes successfully to the selective collection scheme, namely separates the waste in the proper way while the remaining population is assumed to put its waste mainly in the wet bin	30% of population from urban and rural areas (approximately 80,000 inhabitants) contributes successfully to the selective collection scheme, namely separates the waste in the proper way while the remaining population is assumed to put its waste mainly in the wet bin. This means that in the areas of 2 bins system, the actual practice will imply 1 bin system	60% of population from urban and rural areas (approximately 190,000 inhabitants) contributes successfully to the selective collection scheme, separating the waste in the 3 bins in the proper way, an additional 10% of the population (30,000) separates the paper and put the rest in the wet bin, while the rest of the population is assumed to put its waste mainly in the wet bin
Recyclables treatment	Approx 31% of the waste coming from the dry bin content will be sorted in the central sorting station, which will be located together with the landfill and the simple MBT (Zone 1) Approx. 1% of the waste will be sorted outside the central sorting station in 2 separate small plants (in Oravita and Baile Herculane). The materials that will be recovered include metal, glass, paper/cardboard, plastic and wood. Also residues will be generated that will end up in the landfill.	Approx 31% of the waste coming from the dry bin content will be sorted in the central sorting station, which will be located together with the landfill and the biological treatment plant (Zone 1) Approx. 1% of the waste will be sorted outside the central sorting station in 2 separate small plants (in Oravita and Baile Herculane). The materials that will be recovered include metal, glass, paper/cardboard, plastic and wood. Also residues will be generated that will end up in the landfill.	Approx 20% of the waste coming from the dry bin content will be sorted in the central sorting station, which will be located together with the landfill and the MBT plant (Zone 1) Approx. 1% of the waste will be sorted outside the central sorting station in 2 separate small plants (in Oravita and Baile Herculane). The materials that will be recovered include metal, glass, paper/cardboard, plastic and wood. Also residues will be generated that will end up in the landfill.	Approx 23% of the waste coming from the dry bin content will be sorted in the central sorting station, which will be located together with the landfill and the MBT (Zone 1) Approx. 1% of the waste will be sorted outside the central sorting station in 2 separate small plants (in Oravita and Baile Herculane). The materials that will be recovered include metal, glass, paper/cardboard, plastic and wood. Also residues will be generated that will end up in the landfill.
Organic fraction treatment	Approx 60% of the waste coming from the wet bin content will be treated in the central simple MBT plant, which will be located together with the landfill and the MRF facility	Approx 60% of the waste coming from the wet bin content will be treated in the main central biological treatment plant producing either CLO or SRF, which will be located	Approx 74% of the waste coming from the wet bin content will be treated in the main central sophisticated MBT plant producing either CLO or SRF, which will be located	Approx 59% of the waste coming from the wet bin content will be treated in the central simple MBT plant, which will be located together with the landfill and the MRF facility

	Option 1	Option 2	Option 3	Option 4
	(Zone 1). The plant will generate compost like output to be used as landfill cover, for the rehabilitation of old non-compliant landfills and depending on its quality as soil conditioner. Also residues will be generated that will end up in the landfill.	together with the landfill and the MRF facility (Zone 1). Also residues will be generated that will end up in the landfill.	together with the landfill and the MRF facility (Zone 1). Also residues will be generated that will end up in the landfill.	(Zone 1). The plant will generate compost like output to be used as landfill cover, for the rehabilitation of old dumpsites and depending on its quality as soil conditioner. Also residues will be generated that will end up in the landfill.
Capacities / waste flows of waste treatment infrastructures (MBT plant, sorting, landfill and transfer stations)	**MRF (33,800 t/y):** **Input** 32% of total waste (75% from urban areas and 25% from rural areas) **Output**: recyclables 56% of input, residues 44% of input	**MRF (33,800 t/y)**: **Input** 32% of total waste (75% from urban areas and 25% from rural areas) **Output**: recyclables 56% of input, residues 44% of input	**MRF (22,100 t/y):** **Input** 21% of total waste (75% from urban areas and 25% from rural areas) **Output**: recyclables 44% of input, residues 56% of input	**MRF (26,200 t/y):** **Input** 24% of total waste (75% from urban areas and 25% from rural areas) **Output**: recyclables 48% of input, residues 52% of input
	simple MBT plant (63,900 t/y): **Input** 60% of total waste (75% from urban areas and 25% from rural areas) **Output**: compost like output 28% of input, residues 37% of input, losses 35%	**Biological treatment plant (63,900 t/y)**: **Input** 60% of total waste (75% from urban areas and 25% from rural areas) **Output**: compost like output 23% of input, SRF 40%, residues 37% of input	**Sophisticated MBT plant (78,800 t/y)**: **Input** 74% of total waste (75% from urban areas and 25% from rural areas) **Output**: compost like output 20% of input, SRF 35%, residues 29% of input, losses 16%	**simple MBT plant (62,600 t/y):** **Input** 59% of total waste (75% from urban areas and 25% from rural areas) **Output**: compost like output 30% of input, residues 37% of input, losses 33%
	Landfill (44,600 t/y) Input: 42% (33% from MRF, 53% from biodegradable treatment, 8% of mixed waste from rural areas and 6% street sweeping waste)	**Landfill (40,000 t/y)** Input: 37% (37% from MRF, 48% from biodegradable treatment, 9% of mixed waste from rural areas and 6% street sweeping waste)	**Landfill (38,200 t/y)** Input: 36% (32% from MRF, 61% from biodegradable treatment, 8% of mixed waste from rural areas and 7% street sweeping waste)	**Landfill (43,100 t/y)** Input: 40% (32% from MRF, 54% from biodegradable treatment, 8% of mixed waste from rural areas and 6% street sweeping waste)
	Transfer station – Zone 2 (3,500 t/y): input 3.3% of total waste (100% from rural areas) **Transfer station – Zone 3 (8,200 t/y)**: input 7.7% of total waste (66% from urban areas and 34% from rural areas) **Transfer station – Zone 4 (8,300 t/y)**: input 7.8% of total waste (61% from urban areas and 39% from rural areas) **Transfer station – Zone 5 (5,600 t/y)**: input	**Transfer station – Zone 2 (3,500 t/y)**: input 3.3% of total waste (100% from rural areas) **Transfer station – Zone 3 (8,200 t/y)**: input 7.7% of total waste (66% from urban areas and 34% from rural areas) **Transfer station – Zone 4 (8,300 t/y)**: input 7.8% of total waste (61% from urban areas and 39% from rural areas) **Transfer station – Zone 5 (5,600 t/y)**: input	**Transfer station – Zone 2 (3,500 t/y)**: input 3.3% of total waste (100% from rural areas) **Transfer station – Zone 3 (8,200 t/y)**: input 7.7% of total waste (66% from urban areas and 34% from rural areas) **Transfer station – Zone 4 (8,300 t/y)**: input 7.8% of total waste (61% from urban areas and 39% from rural areas) **Transfer station – Zone 5 (5,600 t/y)**: input	**Transfer station – Zone 2 (3,500 t/y)**: input 3.3% of total waste (100% from rural areas) **Transfer station – Zone 3 (8,200 t/y)**: input 7.7% of total waste (66% from urban areas and 34% from rural areas) **Transfer station – Zone 4 (8,300 t/y)**: input 7.8% of total waste (61% from urban areas and 39% from rural areas) **Transfer station – Zone 5 (5,600 t/y)**: input

	Option 1	Option 2	Option 3	Option 4
	5.3% of total waste (38% from urban areas and 62% from rural areas) **Transfer station – Zone 6 (8,500 t/y)**: input 8% of total waste (53% from urban areas and 47% from rural areas) **Transfer station – Zone 7 (650 t/y)**: input 1% of total waste (100% from urban areas)	5.3% of total waste (38% from urban areas and 62% from rural areas) **Transfer station – Zone 6 (8,500 t/y)**: input 8% of total waste (53% from urban areas and 47% from rural areas) **Transfer station – Zone 7 (650 t/y)**: input 1% of total waste (100% from urban areas)	5.3% of total waste (38% from urban areas and 62% from rural areas) **Transfer station – Zone 6 (8,500 t/y)**: input 8% of total waste (53% from urban areas and 47% from rural areas) **Transfer station – Zone 7 (650 t/y)**: input 1% of total waste (100% from urban areas)	5.3% of total waste (38% from urban areas and 62% from rural areas) **Transfer station – Zone 6 (8,500 t/y)**: input 8% of total waste (53% from urban areas and 47% from rural areas) **Transfer station – Zone 7 (650 t/y)**: input 1% of total waste (100% from urban areas)
Home-composting (t/year)	3,700	3,700	3,700	3,700

Table C-9: Overall performance of alternative options

	Option 1	Option 2	Option 3	Option 4
Prudent use of land	Relatively low energy and water needs Large space for central facility (MBT, sorting station and landfill) Approx 42% of residues Big landfill needs Also the produced CLO may end up in landfill as covering material Relatively big material recovery Needs for sorting station	Relatively big energy needs Potential for energy recovery Potential for smaller land needs in central facility than option 1 Approx 37% of residues Smaller landfill needs than option 1 Relatively big material recovery Needs for sorting station	Big energy and water needs (depending on technology) Potential for energy recovery Potential for smaller land needs in central facility than options 1 and 2 Approx 35% of residues Smaller landfill needs than options 1 and 2 Needs for mechanical treatment for material recovery Potential for big material recovery	Relatively low energy and water needs Bigger fuel use for paper collection Smaller land space needed in transfer stations Smaller land needs in central facility than option 1 Approx 40% of residues Big landfill needs Also the produced CLO may end up in landfill as covering material Recovery of clean paper Relatively big material recovery Needs for sorting station
Reduction of greenhouse gases	Greenhouse gas (mainly methane) is produced and emitted mainly during the pre-treatment of the waste as well as the fermentation phase. Also carbon dioxide is emitted during the waste transportation. The disposal of the produced residues to landfill also generates greenhouse gases.	Greenhouse gas (mainly methane) is produced and emitted mainly during the pre-treatment of the waste as well as the waste treatment phase. However in that case the greenhouse gasses emitted from the disposal of the produced residues to landfill is much less, as these residues are more stabilized. Also carbon dioxide is emitted during the waste transportation (similar to option 1). This option also has the potential to substitute conventional fuel with secondary fuel containing high fraction of renewable resources	Greenhouse gas (mainly methane) is produced and emitted mainly during the pre-treatment of the waste as well as the waste treatment phase. However in that case the greenhouse gasses emitted from the disposal of the produced residues to landfill is much less, as these residues are more stabilized. Also carbon dioxide is emitted during the waste transportation (similar to option 1). This option also has the potential to substitute conventional fuel with secondary fuel containing high fraction of renewable resources	Greenhouse gas (mainly methane) is produced and emitted mainly during the pre-treatment of the waste as well as the waste treatment phase. However in that case, since more paper (biodegradable fraction) is collected and recycled, less greenhouse emissions from its degradation are expected. Also carbon dioxide is emitted during the waste transportation, which in this case is relatively bigger due to the separate paper collection

	Option 1	Option 2	Option 3	Option 4
Impacts on public health	Odour is emitted during the fermentation phase	Less odour than option 1 is emitted due to the nature of the process and the biofilters that will be installed	Less odour than in options 1, 2 is expected to be emitted according to the technology that will be employed. Also, odour abatement systems will be installed (biofilters or regenerative thermal oxidation).	Odour (less than option 1) is emitted during the fermentation phase.
Protection of local amenities	The treatment occurs in open spaces so vermin and litter problems are expected. Noise is generated mainly in the sorting station	Part of the process may occur in closed area, so less vermin and litter problems are expected.	The process takes in closed area, so less vermin and litter problems are expected. Mechanical treatment generated significant noise	The treatment occurs in open spaces so vermin and litter problems are expected. Noise is generated mainly in the sorting station
Minimization of impacts on water	The generated wastewater is usually recycled for the keeping of the material humid Leachate is produced from the landfilling of the residues	Some wastewater is generated and needs treatment before disposal Less leachate than option 1 is expected due to the significant stabilization of the residues	Wastewater is generated and needs treatment before disposal Less leachate than option 1 is expected due to the significant stabilization of the residues	The generated wastewater is usually recycled for the keeping of the material humid Leachate is produced from the landfilling of the residues
Employment opportunities	Around to 110 jobs are expected to be created. The jobs include mainly, drivers, workers, technicians, supervisors and handsorters	Around to 120 jobs are expected to be created. The jobs include mainly, drivers, workers, technicians, supervisors and handsorters	Around to 110 jobs are expected to be created. The jobs include mainly, drivers, workers, technicians and supervisors	Around to 120 jobs are expected to be created. The jobs include mainly, drivers, workers, technicians, supervisors and handsorters
Public acceptance	MBT and recycling is generally considered a widely acceptable process and in most cases it achieves public consensus	Problems with the public acceptance might occur in case the potentially produced secondary fuel is utilized	Although MBT is generally acceptable the potential utilization (if the case) of the secondary fuel may raise oppositions	MBT and recycling is generally considered a widely acceptable process and in most cases it achieves public consensus
Waste management costs	The investment costs for the construction of the necessary facilities and purchase of the equipment are above 30m€ (excluding collection equipment) or above 40m€ (including collection equipment), while for the whole lifetime of the system (period 2008 –	The investment costs for the construction of the necessary facilities and purchase of the equipment are around 45m€, on the technology (excluding collection equipment) or above 50m€ (including	The investment costs for the construction of the necessary facilities and purchase of the equipment are around 48m€ (the exact costs depend on the selected technology) (excluding collection equipment) or above 53m€	The investment costs for the construction of the necessary facilities and purchase of the equipment are around 38m€ (excluding collection equipment) or above 44m€ (including collection equipment), while for the whole

	Option 1	Option 2	Option 3	Option 4
	2037, which includes the renovation of the equipment and machinery, etc) the costs are expected to be around 63m€ (excluding collection equipment) or above 56m€ (including collection equipment). Regarding the operation costs these are estimated around 108€/tn. Revenue is expected from the market of recyclables	collection equipment), while for the whole lifetime of the system (period 2008 – 2037, which includes the renovation of the equipment and machinery, etc) the costs are expected to be around 80m€ (excluding collection equipment) or above 90m€ (including collection equipment). Regarding the operation costs these are estimated around 132€/tn. Revenue is expected from the market of recyclables	(including collection equipment), while for the whole lifetime of the system (period 2008 – 2037, which includes the renovation of the equipment and machinery, etc) the costs are expected to be around 85m€ (excluding collection equipment) or above 90m€ (including collection equipment). Regarding the operation costs these are estimated close to Option 2. Revenue is expected from the market of recyclables (less than the other options)	lifetime of the system (period 2008 – 2037, which includes the renovation of the equipment and machinery, etc) the costs are expected to be around 52m€ (excluding collection equipment) or above 60m€ (including collection equipment). Regarding the operation costs these are estimated higher than option 1, since the separate collection of the paper requires additional routes and transportation costs for collection are higher than the other options (mainly from option 1 with which this options presents similar investment costs). Revenue is expected from the market of recyclables (more than the other options, since the collected paper will be clean and easily marketed).
Market for secondary products	Recyclables are usually easy to be absorbed by the market, especially since they derive from selective collection and not from recovery from mixed waste (meaning that they are relatively pure). Especially metals, paper and glass are easily utilized while for plastics this depends on the type. On the other hand CLO is difficulty absorbed. No revenue is expected from the CLO, which in the worst case may result in the landfill.	Recyclables are usually easy to be absorbed by the market, especially since they derive from selective collection and not from recovery from mixed waste (meaning that they are relatively pure). Especially metals, paper and glass are easily utilized while for plastics this depends on the type. On the other hand CLO is difficulty absorbed. This option however has the flexibility to produce secondary fuel instead of CLO. This may	Recyclables are usually easy to be absorbed by the market, especially those deriving from selective collection and not from recovery from mixed waste (meaning that they are relatively pure). The recyclables deriving from the mixed waste are more difficult to be traded, but the market accepts them if they have the required specifications. Especially metals, paper and glass are easily utilized while for plastics this depends on the type. This option however has the flexibility to	Recyclables are usually easy to be absorbed by the market, especially since they derive from selective collection and not from recovery from mixed waste (meaning that they are relatively pure). Especially metals, paper and glass are easily utilized while for plastics this depends on the type. On the other hand CLO is difficulty absorbed. No revenue is expected from the CLO, which in the worst case may result in the landfill.

	Option 1	Option 2	Option 3	Option 4
		facilitate the absorption of this product, though no revenue is expected, at least for the next few years.	produce secondary fuel or CLO. This may facilitate the absorption of this product, though no revenue is expected, at least for the next few years	
Optimum system implementation	Includes a well proven technology, simple, which can be developed progressively. The treatment requires a lot of land and if waste generation increases significantly this may create problems concerning land availability. No real difficulties are expected during the permitting process and the construction or operation phase. However this system depends heavily on dedicated public participation, which if not succeeded may result in problems in terms of MBT.	Includes a well proven technology, simple, which can be developed progressively, in modules. No real difficulties are expected during the permitting process and the construction or operation phase. In case of secondary fuel production, the extensive selective collection of paper and plastics reduces the calorific value of the fuel.	Includes a well proven technology, simple, which can be developed progressively, in modules. No real difficulties are expected during the permitting process and the construction or operation phase	Includes a well proven technology, simple, which can be developed progressively. The treatment requires a lot of land and if waste generation increases significantly this may create problems concerning land availability. No real difficulties are expected during the permitting process and the construction or operation phase. However this system depends heavily on dedicated public participation, which if not succeeded may result in problems in terms of MBT.
Diversion of biodegradable waste	It achieves the necessary levels of diversion for the year 2016, however in order to be certain it has to be based in home composting in rural areas, since it is very close to the maximum allowed quantity. Otherwise it is difficult to reach the targets, unless the participation of the public in the separate collection is maximized. The targets for the year 2016 are difficult to be achieved if the population does not correspond, as estimated, to the system, and a supplementary mixed waste treatment unit should be implemented	It achieves the necessary levels of diversion for the year 2013 and for the year 2016, in order to be sure it would need to be supplemented by home composting in rural areas. Otherwise it is difficult to reach the targets, unless the participation of the public in the separate collection is maximized.	It achieves the necessary levels of diversion for all years and home composting only adds to this good performance	It achieves the necessary levels of diversion for the year 2016, however in order to be certain it has to be based in home composting in rural areas, since it is very close to the maximum allowed quantity. Otherwise it is difficult to reach the targets, unless the participation of the public in the separate collection is maximized. The targets for the year 2016 are difficult to be achieved if the population does not correspond, as estimated, to the system, and a supplementary mixed waste treatment unit

	Option 1	Option 2	Option 3	Option 4
				should be implemented
Recovery of packaging waste	It achieves the targets but depends heavily in public participation. If this is not the case, then the targets cannot be met	It achieves the targets but depends heavily in public participation. If this is not the case, then only the targets for recovery and utilization via production of secondary fuel may be met.	It achieves the targets and it is less dependant on the public participation	It achieves the targets but depends heavily in public participation. If this is not the case, then the targets cannot be met
Overall score	**91.38**	**86.96**	**87.34**	**88.90**

In the evaluation of the overall system the evaluation indicated that the Option 1 is the most favourable one, while the option 4 is the second best, as indicated in Table C-9.

To acquire a more clear view of the option analysis the following table presents the alternatives technological options per waste management stage considered and the mail reasons for the selection of the proposed one.

Table C-10: Options for waste management

Waste management stage	Options examined	Selection	Comments
Waste collect	Type of collection: • 1-bin system • 2-bins system • 4 bins system • 5-bins system	• 1-bin system for mixed waste for approximately 21,900 inhabitants in rural areas • 2-bins system, 1 for the wet and 1 for dry fraction, which will be converted into 4-bins system (for paper, glass, plastic and mixed waste) after 2012, for approximately 60,600 inhabitants in both rural and urban areas • 2 bin system, 1 for the wet and 1 for dry fraction, which will be converted into 3 bin system (for paper collection) for approximately 212,900 inhabitants in both rural and urban areas • 4-bins system (1 for paper, 1 for glass, 1 for plastic, 1 for mixed fraction) for approximately 28,600 inhabitants in urban area, after 2012 • 5-bins system (1 for paper, 1 for glass, 1 for plastic, 1 for metal and 1 for mixed waste) for approximately 1,400 inhabitants in rural areas • After 2013 (e.g. in 2014) and after assessing the success of the selective collection systems described above, these systems may be extended in the rural areas of Caras-Severin County not already covered by the system (zone 2).	There is no possibility of reaching the recycling targets unless a selective collection system is implemented. Therefore the implementation of 1 bin system for mixed waste collection in the whole county is not examined. This is also implied in the relevant regional and national waste management plan It is considered unrealistic to try to implement a system where all fractions will be separated (5-bin system) or even 4-bin systems to inhabitants which are currently being serviced by one or zero bins. This is why such system is only implemented in the areas where they will be developed under Phare projects. The main system will be 2-bin system in order to educate the inhabitants and then extend the system to additional bins The 1-bin system is implemented in small rural areas, generating less than 5,000 t of waste per year, accompanied with bring centre for recyclables recovery The 4-bin system is already under development or operation
	Type of bins used	Mainly 1.1 m^3 EUROBINS	The Eurobin system is locking and is suitable for outdoor, unprotected storage. They are lightweight containers which allows easy manoeuvrability with drainage plugs to enable ease of cleaning, size & design ensure on-site reduced visual impact and with adjustable brakes to secure positioning. Bring system in 1.1 m^3 bins is proposed for fast and efficient

Waste management stage	Options examined	Selection	Comments
			collection
	Type of trucks used	16m^3 in urban areas & 12m^3 in rural areas	Compaction trucks are the economically most suitable vehicles for the proposed collection in the conventional areas and in the low and medium density residential areas. The 16m^3 and 12m^3 vehicle for both for rural and urban areas was selected considering the best available option combining capital and functional cost, daily and future collection needs, transfer stations accessibility, manoeuvrability
Central waste management location	• Brebu • Lupac	Lupac	The advantages of the site are: • Its visual isolation • Good road accessibility • Public acceptance • Sufficient surface • Closeness to the main waste generator • Public ownership
Biodegradable waste treatment	• Sophisticated MBT • Simple MBT	Simple MBT	The advantages are: • Low cost technology • Good environmental performance • Public acceptance
	• Centralized treatment • Decentralized treatment	Mainly centralized with small decentralized facilities	Most waste is generated in zone 1 and this fact imposes centralized facility. Small composting plants are foreseen under Phare programs
Recovery of recyclable material		Simple sorting facility	No need of extensive analysis due to the small quantities and the budget limitation a simple sorting plant based on handpicking will be implemented
Landfill		1 central county landfill compliant with the legislation	This is defined by the regional waste management and the waste management master plan. All residues will be disposed off in the landfill
Old non-compliant landfills	• Environmental clearance • Simple land rehabilitation • Complete land rehabilitation	• Simple rehabilitation for all rural dumpsites (already performed) and complete land rehabilitation of all urban non-compliant landfills	All rehabilitation works will be carried out according to the legislative provisions and the principle of cost efficiency

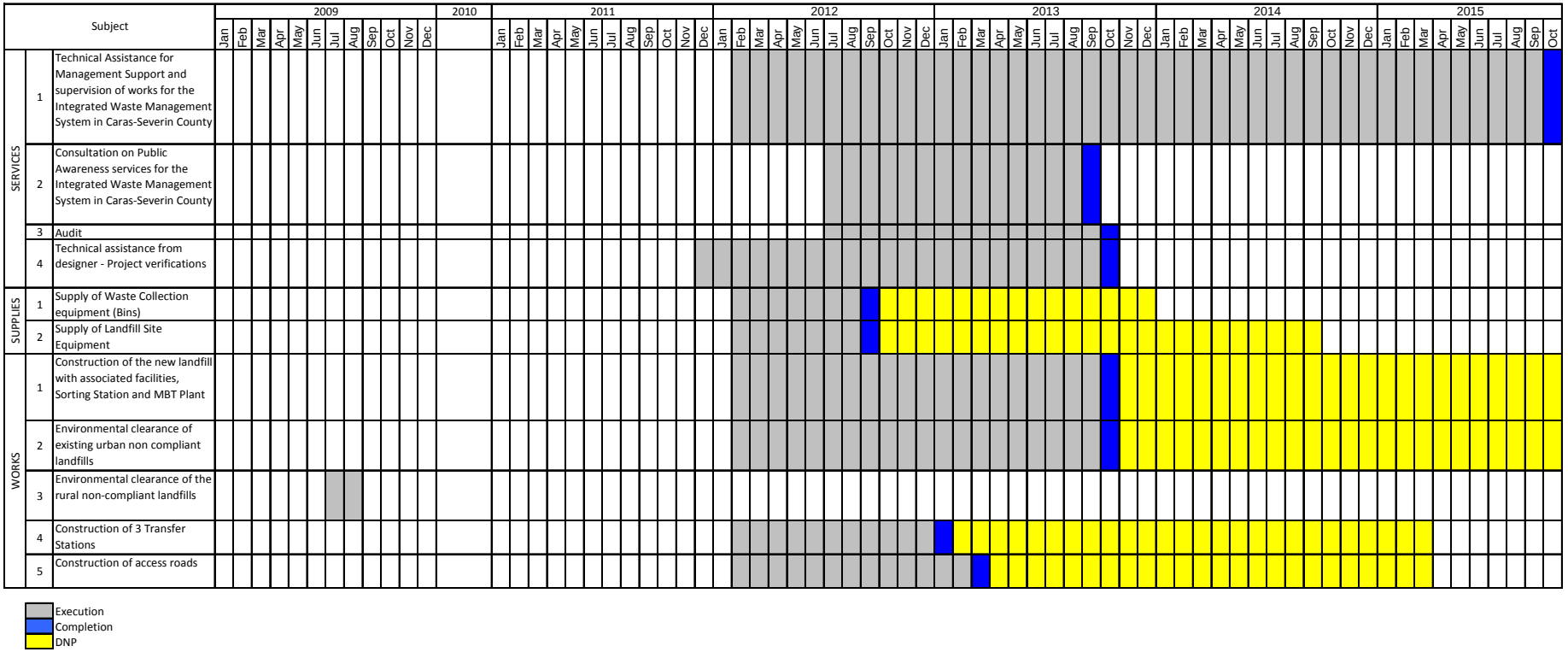
D. TIMETABLE

D.1. Project timetable

	Start date (A)	Completion date (B)
1. Feasibility study:	01/04/2009	11/2011
2. Cost-benefit analysis (including financial analysis):	15/02/2009	11/2011
3. Environmental impact assessment:	23/09/2009	12/2010
4. Design studies:	15/05/2009	10/2011
5. Preparation of Tender documentation:	15/08/2009	10/2011
6. Expected launch of tender procedure(s)	Management support and supervision of works: 12/2011	01/2012
	Public awareness: 04/2012	06/2012
	Annual project audit: 04/2012	06/2012
	Support of the designer during the implementation - Project verification: 12/2011	10/2013
	Supply of bins: 11/2012	11/2012
	Supply of landfill equipment: 12/2011	01/2012
	Construction of the new landfill & access road with associated facilities, Sorting Station & MBT Plant: 12/2011	01/2012
	Construction of the access roads to the new central waste management facility and the transfer stations: 12/2011	01/2012
	Environmental clearance of existing urban non-compliant landfills: 12/2011	01/2012
	Environmental clearance of existing rural non-compliant landfills: 06/2009	06/2009
	Construction of 3 transfer stations: 12/2011	01/2012
7. Land acquisition:	Already available	
8. Construction phase / contract:	01/2012	09/2013
9. Operational phase:	10/2013	10/2034

Following an indicative timetable for the execution of the works is presented:

Table D-1: Project implementation timetable



D.2. Project maturity

D.2.1. Technical (feasibility studies, etc.):

In terms of the technical preparation and maturity of the project the following studies have been completed:

- Master plan for the integrated solid waste management system in Caras-Severin County: October 2008
- Feasibility study for the integrated solid waste management system in Caras-Severin County: November 2011
- Cost benefit analysis: November 2011
- Environmental impact assessment: December 2010
- Application: November 2011
- Tender documents: The following table presents the overview of the tender documents to be prepared, in the framework of the project:

Table D-2: Estimated tenders

TYPE OF CONTRACT		DESCRIPTION	TYPE OF CONTRACT	ESTIMATED DATE OF PUBLICATION	ESTIMATED BUDGET – CONSTANT PRICES
SERVICES	**1**	**Technical Assistance for Management Support and supervision of works for the Integrated Waste Management System in Caras Severin County**	**restricted procedure (GEO no. 34/2006 with the subsequent amendments)**	**11/2011**	1,226,124 €
	3	**Consultation on Public Awareness services for the Integrated Waste Management System in Caras Severin County**	**restricted procedure (GEO no. 34/2006 with the subsequent amendments)**	**04/2012**	300,000 €
	4	**Audit**	**request for quotations (GEO no. 34/2006 with the subsequent amendments)**	**04/2012**	50,000 €
	5	**Technical assistance from designer - Project verifications**	**negotiation (GEO no. 34/2006 with the subsequent amendments)**	**11/2011**	190,000 €
SUPPLIES	**1**	**Supply of Waste Collection equipment (Bins)**	**open procedure (GEO no. 34/2006 with the subsequent amendments)**	**11/2011**	1,800,000 €
	2	**Supply of Landfill Site Equipment**	**open procedure (GEO no. 34/2006 with the subsequent**	**11/2011**	400,000 €

			amendments)		
WORKS	**1**	**Construction of central waste management facility - Landfill &, Sorting Station & MBT Plant**	**open procedure (GEO no. 34/2006 with the subsequent amendments)**	**11/2011**	19,044,967€
	2	**Construction of the access roads to the new central waste management facility and transfer stations**	**request for quotations (GEO no. 34/2006 with the subsequent amendments)**	**11/2011**	1,557,300 €
	3	**Environmental clearance of existing urban non compliance landfills**	**open procedure (GEO no. 34/2006 with the subsequent amendments)**	**10/2011**	8,356,409 €
	4	**Environmental clearance of existing rural non compliance landfills**	**request for quotations (GEO no. 34/2006 with the subsequent amendments)**	**Completed by County Council in 2009**	594,937 €
	5	**Construction of 3 Transfer Stations**	**request for quotations (GEO no. 34/2006 with the subsequent amendments)**	**11/2011**	3,020,096 € (Lot 1: 1,693,096 €, Lot 2: 1,327,000 €) - constant prices
TOTAL VALUE OF THE CONTRACTS;					36,539,833 €

D.2.2. Administrative (authorisations, EIA, land purchase, invitations to tender, etc.):

All available documentation is included in Annex D, including:

- Urban certificates for the facilities in Lupac, Bozovici, Pojejena and Otelu Rosu
- Local decisions on the land availability in Lupac, Bozovici, Pojejena and Otelu Rosu
- Cadastral certificates

Environmental Agreement no 2 was issued on 10th of December 2010. The Natura 2000 Declaration no. 2593, together with the corresponding maps, was issued on 28th of March 2011.

D.2.3. Financial (commitment decisions in respect of national public expenditure, loans requested or granted, etc. - give references):

Through Article 55 of General Regulation no. 1083/2006, the Romanian Government and the concerned County Councils are committed to participate to the financing of the initial investment cost of waste management projects as follows:

- 18% of the so-called “decision amount” (being the part of the eligible cost to be funded by grants) to be financed by the State budget;

- 2% of the same to be financed by the project beneficiary, being the Caras-Severin County Council or the Intercom Deseuri Caras-Severin ADI.

The part of the eligible cost not financed by grants must also be financed by the beneficiary, as well as the non-eligible part of the project.

According to reported information Caras-Severin County Council has not yet made detailed plans for taking up the respective loans required for the latter part of investment; prerequisite for final commitment to the loans is the approval of the feasibility study by the ministry. According to information received at the Caras-Severin County Council, the constitution of a capital fund at the beginning of the project can be envisaged. At present, this Council has no loan debts and they have even the possibility to constitute an investment fund by own resources.

The following table presents the project financing plan in current prices.

Table D-3: Project financing plan, 2012-2013 (Euro)

<table>
<tr><td rowspan="6">1.
Total value of the project
(total cost = eligible + ineligible costs)
53.086.785
100%</td><td rowspan="4">1.1
Eligible cost
40.875.471
76,9974%
of 1</td><td rowspan="3">1.1.1
Funding gap
37.052.360
90,6469%
of 1.1</td><td>1.1.1.1
EC contribution (max. 80%)
29.641.888
80,0% of 1.1.1</td></tr>
<tr><td>1.1.1.2
State Budget contribution (18%)
6.669.425
18,0% of 1.1.1</td></tr>
<tr><td>1.1.1.3
County Council contribution (2%)
741.047
2,0% of 1.1.1</td></tr>
<tr><td colspan="2">1.1.2
Non Funding Gap (County Council Contribution)
3.823.111
9,3531% of 1.1</td></tr>
<tr><td rowspan="2">1.2
Ineligible cost
(other categories than eligible)
12.211.314
23,0026%
of 1</td><td rowspan="2">1.2.1
County Council contribution
12.211.314
100%
of 1.2</td><td>1.2.1.1
VAT
10.118.120
82,8586%
of 1.2</td><td>Reclaimed (County Council)
8.802.764
Non reclaimed (County Counc
1.315.356</td></tr>
<tr><td colspan="2">1.2.1.2
Others (County Council)
2.093.194
17,1414%
of 1.2.1</td></tr>
</table>

The following table presents the financial sources of investment cost per year (in current prices).

Table D-4: Annual financial sources – current prices (Euro)

Source	2012	2013	Total
ERDF	6.303.871	23.338.017	29.641.888
State budget	1.418.371	5.251.054	6.669.425
County Council	2.957.781	3.699.571	6.657.352
TOTAL	**10.680.023**	**32.288.642**	**42.968.665**
VAT (total)	2.481.062	7.637.058	10.118.120
GRAND TOTAL	**13.161.085**	**39.925.700**	**53.086.785**

D.2.4. If the project has already started, indicate the current state of works:

N/A

E. COST-BENEFIT ANALYSIS

E.1. Financial analysis

E.1.1. Short description of methodology and specific assumptions made

General approach

As expressed in the Guidelines for Cost Benefit Analysis (CBA) of the Ministry of Economy and Finance and the Ministry of Environment and Sustainable Development (being hereafter referred to as "CBA Guidelines"), the financial analysis

- estimates the project revenues and costs and their implications in terms of cash-flow;
- defines the project financing structure as well as its financial profitability;
- verifies the sufficiency of the projected cash flow to ensure the adequate operation of the systems and meet all investment and debt service obligations;
- provides the basis for the calculation of the funding gap of the project.

Calculations are carried out with the model prepared by the Authority for the Coordination of Structural Instruments with assistance from JASPERS (version of April, 2009).

Information, data sources and projections

- Information about the present situation regarding waste collection and disposal was received
  - through the feasibility study (current situation concerning waste management, see excerpts in annex A);
  - through own enquiries at major waste operators in August and October 2009;
  - financial data concerning local authorities were received from Caras-Severin County Council (confirmation about ongoing loans) and Resita Municipality (2008 budget and list of loans held).
- Projections for the future developments of population, waste generation, sanitation services and coverage rate, as well as assumptions on landfilling, transfer stations etc, without and with the project scenarios are those laid down in the feasibility study.
- Investment costs and operation costs are those of the feasibility study.

Incremental approach

The JASPERS assisted calculation model has been adapted to the requirements of the CBA analysis for Caras-Severin. The "incremental method" (i.e. the difference between the "with project" situation and the "without project" situation) has been adopted as requested by the CBA Guidelines.

The "with project" scenario concerns all investments, operation costs and revenues as they will be in the situation where waste management is made compliant with EU regulations. The "without project" scenario (an approximation of keeping the status quo) represents the likely evolution of

waste management if EU regulations are not applied; this projection is characterized by very little waste separation and recycling and waste disposal in dumpsites not being compliant with EU standards.

The project's benefits (financial and economic) are calculated by subtracting the cash flows of the "without project" situation from those of the one "with project".

Main assumptions of the model framework

- The **analysis horizon** has been put to 2033 that is 21 years after the completion of the initial investments. In that year, the central landfill built in 2011 and 2012 will be exhausted and a new one will have to be built, which opens a new project cycle. In the same year, the mechanical equipments, which were replaced in 2023, will also almost have reached their age limit.
- **Interest rates**: those proposed in the calculation model, which seem reasonable, have been adopted, i.e.: financial rate 5.0% p.a. and social rate 5.5% p.a., both in real terms. For the long term loans to be taken for investment costs not covered by grants, a duration of 17 years, including a 2 years grace period, has been assumed, with an interest of 5.5% p.a., with equal repayments in the reimbursement period.
- **Major investments** that are taking place after the initial implementation period 2010-2012 and are not covered by grants need to be financed by loans taken out by the county council. These investments include:
    - Rehabilitation of 1st cell after the end of its lifetime
    - Construction of 2nd cell
- Assumptions regarding **GDP growth** (influencing the household incomes as explained above), inflation rates (required by the model), RON/EUR exchange rates and population growth rates have been utilized as published. They are shown in the tables in Annex E.
- In most towns, **waste services** are carried out by public and private operators.
- **Current tariffs and costs**: all costs and tariffs currently applied in Caras-Severin County (which would also be applied in future to the "no project" scenario) have been consolidated into average figures (in real terms of 2009) as shown in the following table:

Table E-1: Average costs and tariffs for waste collection in the "without project" situation, at 2009 prices

	t collected (2010)	Cost per t collected, EUR/t	Average margin of the operators	Average tariff with-out VAT, EUR/t	= Lei/t	Cost per t collected, Lei/t
Collection from households	67.157	34,39				145,81
Landfilling*		3,44				
Collection from economic units etc.	19.610	30,77				130,46
Landfilling*		3,08				
Collection weighted average		33,57				142,34
Landfilling*		3,36				
Collection + landfilling households		37,83	**19,7%**	45,30	192,05	
Collection + landfilling econ. units		33,85	**7,3%**	36,31	153,93	
Collection + landfilling weight.average		36,93	**17,2%**	43,26	183,44	

* cost about 10% of collection

Calculation of future "with project" tariffs

For the situation "with project", the setting of tariffs had to be done by application of the CBA guidelines and of other instructions, which impose that the monthly expenditure for waste management including 24% VAT shall not exceed 1.8% of the mean net (disposable) household income of the lowest income decile.

The official statistics of the National Institute of Statistics give the following income figures for Caras-Severin County:

Table E-2: Net available income of households in Caras-Severin County, 2006 and 2007

Year	Amount RON/month
2006	1,074.61
2007	1,229.19

Source: Families budget survey 2005, 2006, 2007. National Institute of Statistics

For upgrading these incomes to the period after 2007, again statistics of the National Institute of Statistics (INSSE) have been applied. They come to the monthly net household incomes (including non-monetary income):

	Average Romania	Region West
2007	1,455 Lei	1,457 Lei
2008	1,829 Lei	1,851 Lei

For upgrading these incomes to the period after 2007, the following statistics of the National Institute of Statistics (INS) have been applied:

- National Statistic Institute. Household income Romania 2007-08
- National Statistic Institute. Coordonate ale nivelului de trai în Romania.

- Veniturile si consumul populatiei, în anul 2009
- National Statistic Institute. Veniturile disponible 2007-2009
- National Statistic Institute. Veniturile totale medii lunare pe o gospodarie…

The resulting monthly net household incomes (including non-monetary income) are as follows:

	Average Romania	West Region
2007	1,455.5 Lei	1,456.8 Lei
2008	1,828.5 Lei	1,850.8 Lei
2009	1,983.7 Lei	2,043.5 Lei

The increase for Centre Region from 2007 to 2008 and from 2008 to 2009 of

27.05% and 10.41% respectively

has been used for updating the 2007 income value.

Income statistics by deciles exist only at national level. However, according to reliable information received, the average income per person of the 1st decile is 54% of the overall average income. These 54% have been applied for the 2007 income, and from 2009 on, 85% of the real GDP growth rates given by the CBA Guidelines have been utilized for getting the real incomes of the lowest decile on 2009 basis (for 2008 and 2009, the inflation rate of 7.85% and 5.59% respectively has also been applied). In doing so, the decrease of population has been taken into account.

An average of 3.2 persons per household has been assumed.

The proposed tariff forecast (in constant 2009 terms) foresees

- for households, to introduce in 2012 a tariff corresponding to the limit of 1.8% of the lowest decile's income (214 Lei/t) and to increase it continuously along the affordability limit of 1.8% up to 2028. 214 Lei/t correspond to an average monthly charge per person, including VAT, of about 5.39 Lei (up from 4.07 Lei in 2010); after 2028, the tariff will be equal to the Dynamic Prime Cost (DPC), 342 Lei/t
- for commercial, industrial and institutional consumers, to have a price per tonne going up from about 154 Lei/t in 2009 to 342 Lei/t in 2012, being the DPC of waste management, and staying at that level

The per tonne price for households multiplied with (the waste generation in tonnes (t) per year x the coverage ratio) gives the revenue from households.

A collection ratio of 100% is supposed for that, as the non-paying households are usually counted as non-covered by the service. Thus revenue is equal to receipts. However, the calculation model requires to consider a general average collection percentage in the balance sheet calculations. This percentage has been assumed to be 98% from 2010 to 2013, and 99% in the following years.

Service coverage and annual quantities of waste disposed

Assumptions regarding service coverage and landfilling (being the same in the "without project" situation as in the "with project" situation) are as follows:

Table E-3: Assumed coverage by sanitation service (with and without project), in %

Year	2008	2009	2012	2020
Urban	85.5%	93.1%	97.8%	100%
Rural	63.7%	84.2%	95.7%	100%

The following two tables show in comparison the annual waste quantities to be disposed:

Table E-4: Annual quantities of waste disposed of without project, 2010-2033 (tons)

	2010	2011	2012	2013	2020	2033
Residues from composting (already made small investments from Phare programs)	151	151	151	151	151	151
Residues from sorting	165	165	165	165	165	165
Mixed waste, street sweeping	94,657	99,233	101,306	104,428	107,892	116,511
Total	**94,973**	**99,549**	**101,622**	**104,744**	**108,208**	**116,827**

In the "without project" case shown above, most of the waste disposed would go to dumpsites which are not compliant with EU regulations.

Table E-5: Annual quantities of waste landfilled with the project, 2010-2033 (tons)

	2010	2011	2012	2013	2020	2033
Residues from MBT	0	22,655	23,128	23,834	24,627	26,597
Residues from sorting	0	14,027	14,316	14,749	15,234	16,438
Mixed waste, street sweeping	0	5,757	5,842	5,981	6,217	6,768
Sludge (from wastewater treatment plant)	0	4,244	4,329	4,456	4,608	4,980
Total	**0**	**46,683**	**47,615**	**49,020**	**50,686**	**54,783**

Project costs

Initial project costs in current EUR are presented below:

Table E-6: Initial project costs in Euro (current prices)

Initial project costs	Eligible			Non-eligible		
(current EUR)	2011	2012	2013	2011	2012	2013
General costs						
Composting or MBT plant	0	141.269	0	0	54.493	0
Transfer stations	0	0	0	0	108.986	0
Sorting station	0	0	0	0	54.493	0
Landfill	0	94.179	0	0	54.493	0
Taxes / credits / designs / PIU	0	1.063.841	446.075	0	0	106.062
Total	**0**	**1.299.290**	**446.074,81**	**0**	**272.464**	**106.062**
Civil construction						
Composting or MBT plant	0	290.110	4.690.495	0	0	0
Transfer stations	0	0	1.029.222	0	0	0
Sorting station	0	261.522	2.429.013	0	0	0
Landfill	0	0	5.196.593	0	0	0
Closing down of existing dumpsites	0	5.601.422	4.186.001	0	0	0
Access roads	0	0	0	0	1.697.231	0
Total	**0**	**6.153.054**	**17.531.323**	**0**	**1.697.231**	**0**
Plant and machinery						
Composting or MBT plant	0	0	3.954.552	0	0	0
Transfer stations	0	0	2.333.434	0	0	0
Sorting station	0	0	1.694.969	0	0	0
Landfill	0	0	2.175.798	0	0	0
Closing down of existing dumpsites	0	0	0	0	0	0
Collection equipment and home-composting*	0	0	2.024.515	0	17.438	0
Total	**0**	**0**	**12.183.267**	**0**	**17.438**	**0**
Contingencies						
Composting or MBT plant	0	0	305.739	0	0	0
Transfer stations	0	0	61.148	0	0	0
Sorting station	0	0	244.592	0	0	0
Landfill	0	0	131.031	0	0	0
Closing down of existing dumpsites	0	211.614	131.031	0	0	0
Access Road	0	0	0	0	0	0
Total	**0**	**211.614**	**873.541**	**0**	**0**	**0**
Totals excluding intangibles						
Total composting or MBT plant	0	431.379	8.950.787	0	54.493	0
Total transfer stations	0	0	3.423.804	0	108.986	0
Total sorting station	0	261.522	4.368.573	0	54.493	0
Total landfill	0	0	7.503.422	0	54.493	0
Existing landfills	0	5.907.215	4.317.032	0	0	0
Access Road	0	0	0	0	1.697.231	0
Collection equipment and home-composting*	0	0	2.024.515	0	17.438	0
Taxes / credits / designs / PIU	0	1.063.841	446.075		0	106.062
Total	**0**	**7.663.957**	**31.034.206**	**0**	**1.987.133**	**106.062**
Intangible components						
Technical assistance	0	152.580	157.462			
Publicity	0	98.087	236.193			
Supervision during implementation	0	515.569	532.067			
Grand total	**0**	**8.430.193**	**31.959.929**	**0**	**1.987.133**	**106.062**
			42.483.317			

** Of which 907,500 EUR for collection bins, 840,000 EUR for home composters and 52,500 for other containers (2009 prices)*

A value of 485.349 Euro referring to eligible taxes, should be added and hence the total project cost is 42,968,665 (current prices excl VAT)

Operation and Maintenance Costs

Main elements of the O+M cost calculation are shown in the following table. The conversion rate between Lei (RON) and Euro (EUR) has been fixed to 4.24 RON/EUR, which is the reference rate for the base year 2009.

Table E-7: Elements of operation and maintenance costs, other than for waste collection (for 2019)

	Composting plant		Sorting station		Transfer stations**		Landfill	
Cost category (fixed/variable)		Lei(RON)/year		Lei(RON)/year		Lei(RON)/year		Lei(RON)/year
Labour (fixed)		357.132		1.353.781		294.011		322.250
Maintenance (fixed)		397.500		383.190		209.244		320.544
Energy for … (variable)	65.728 t/year composted waste	342.786	34.701 t/year sorted waste	143.448	37.025 t/year transferred waste	32.764	50.481 t/year land-filled waste	252.874
= RON per t	5,22		4,13		0,88		5,01	
Fuel for … t/year (variable	65.728 t/year composted waste	67.004.103	34.701 t/year sorted waste	34.493.000			50.481 t/year landfilled waste	1.640.725
= RON per t	1.019,41		994,01				32,50	
Monitoring (fixed)								402.800
								0
Administrative cost, insurance (fixed)		238.500		238.500		238.500		199.340
Total Lei(RON)/year		68.340.021		36.611.918		774.519		3.138.532
Lei(RON)/t		1039,74		1055,07		20,92		62,17
EUR/t		245,22		248,84		4,93		14,66

** not including transfer costs

Results of financial calculations

Funding Gap Rate and Co-financing Rate

With above assumptions and inputs, the financing gap is calculated in line with EU guideline and Working Document 4 for the Programming Period 2007-2013 and to financing rules set by SOP ENV, Priority Axis 2 (80% EU, 20% national contribution).

The following calculation has been performed:

1) The discounted investment cost (DIC) has been determined in the financial model;

2) The discounted net revenues (DNR) from the project have been estimated in the financial model;

3) To derive the eligible expenditure (EE), the discounted net revenues have been subtracted from the discounted investment costs;

4) The funding gap rate (R) has been determined by dividing the eligible expenditure by the discounted investment cost;

5) The eligible cost (EC) has been determined in the financial model;

6) To derive the decision amount (DA) which is the basis for the calculation of the EU grant, the eligible costs have been multiplied by the funding gap rate

7) To determine the EU grant, the decision amount has been multiplied by the maximum co-financing rate (80%)

The results for Caras-Severin County are shown in the table below; the proposed financing structure has already been presented in section D.2.3 of this application.

Table E-8: CBA model outputs for the co-financing rate (current prices)

Item	Amount EUR'000 or %	EU acronym
Discounted investment cost	32,609.9	DIC
Discounted net revenues	3,050.0	DNR (incremental)
Eligible expenditure	29,559.8	EE = DIC – DNR
Funding gap rate	90.6%	R = EE / DIC
Eligible cost	40,875.5	EC
Decision amount	37,052.4	DA = R x EC
EU grant	29,641.9	Grant = DA x max. co-financing rate, being 80%

E.1.2. Main elements and parameters used in the CBA for financial analysis (in constant EUR)

	Main Elements and Parameters		Value Not discounted	Value Discounted (NPV)
1	Reference period (years)	24		
2	Financial discount rate (%), real	5.0%		
3	Total investment cost (not discounted)		47.573.786	
4	Total **considered** investment cost (in euro, discounted) (*)			32.609.853
5	Residual value (in euro, not discounted)		4.359.411	
6	Residual value (in euro, discounted)			1.351.713
7	Revenues (in euro, discounted)			37.498.661
8	Operating costs (in euro, discounted)			35.800.352
9	Net revenue (in euro, discounted) = (7) - (8) + (6)			3.050.022
10	Eligible expenditure [Art 55 (2)] (in euro, discounted) = (4) - (9)			29.559.831
11	Funding gap rate (%) = (10) / (4)	90,6%		

Note: all monetary values in constant euros
(*) Excluding contingencies

Where VAT is recoverable, the costs and revenues should be based on figures excluding VAT.

E.1.3. Main results of the financial analysis

	Main Elements and Parameters	Project increment without	Project increment with Community

		Community assistance FRR/C		assistance FRR/K	
1	Financial rate of return (%)	-4.8%	(FRR/C)	2.1%	(FRR/K)
2	Net present value (Euro)	-29,559,831	(FNPV/C)	-3,629,696	(FNPV/K)

E.1.4. Revenues generated over its lifetime

a) Do the charges cover the operational costs and depreciation of the project?

The project replaces a system in which mostly private operators collect and dispose of waste in a EU non-compliant way, by one in which waste is collected in a EU-compliant way, sorted for extracting recyclable products, fermented in MBT as far as possible and finally disposed of in a modern, EU compliant landfill, according to which the main waste management targets are fulfilled.

The project takes place in a sector which formerly generated enough revenues for recovering operational costs including depreciation. However, the relatively high amounts which have to be invested in civil works and equipments exceed the financing capacity of the future operators (private and parastatal ones altogether). This funding gap has to be closed by grants, from EU and from the Romanian Government.

Calculations show that revenues with the project recover not only the current operational expenses of the system, but also the maintenance and depreciation costs of aforementioned investments. These revenues consist of tariffs charged to households and "economic units" for the collection and disposal of municipal waste, and of sales of recyclable products (paper, glass, metal, plastic).

Table E-9: Revenues by type of charge, in Thsd EUR

Revenue projection - with project - constant EUR'000	2009	2010	2011	2012	2013	2016	2021	2026	2031	2034
User fees - residential customers	3.412	2.694	3.232	3.456	3.966	4.496	5.595	6.762	7.402	7.543
User fees - economic units	1.230	548	553	888	1.228	1.258	1.288	1.300	1.310	1.315
User fees - other	0	0	0	0	0	0	0	0	0	0
Sale of recyclable materials	0	3	3	3	172	680	699	719	740	753
Sale of compost	0	0	0	0	2	9	9	10	10	10
Sale of energy	0	0	0	0	0	0	0	0	0	0
Other revenues	0	0	0	0	34	135	139	143	148	150
TOTAL REVENUES	**4.642**	**3.245**	**3.788**	**4.347**	**5.401**	**6.578**	**7.731**	**8.934**	**9.610**	**9.771**

The tariffs to households, through which the bulk of revenue is generated, are limited by the ability to pay for the lower income groups. They will be relatively low at the beginning, but will increase in subsequent years, as the income level rises.

The system as a whole recovers all costs, except part of depreciation, over the considered analysis period of 21 years from project completion.

b) Do the charges differ between the various users of the infrastructure?

Charges differ according to the respective costs of services provided. For the "economic units", a tariff per tonne of waste collected equivalent to the calculated Dynamic Prime Cost (DPC) of the system (337 Lei/t) starting in 2013. This tariff, which would allow full cost recovery, remains unchanged from 2013 up to the end of the analysis period in 2034.

For the remaining categories (markets, parks, street sweeping), no payment has been supposed, following current practice.

Tariffs to the households have been calculated as an average for the whole county. However, in practice, the private collection operators will probably differentiate the tariffs between urban and

rural zones (urban zones causing less costs per ton than rural ones, rural zones having lower waste production per capita than urban ones). They will also adjust their tariffs to the prices they have to pay at the different transfer stations, which might differ as a result of different distances to the central landfill.

The average cost and price calculation for urban and rural private customers and for economic units in Caras-Severin County is below.

Excerpts from annual tariff development plan, in constant (2010) Lei/t and Lei/cap/month

Year	2010	2011	2012	2013	2014	2015	2016	2021	2026	2031	2034
Tariffs in Lei/t, excl. VAT											
Projected residential tariff (households)	192.00	192.00	192.00	199.22	206.09	213.58	223.73	271.11	317.50	336.86	336.86
Affordability ratio (in % of lowest decile income)	1.40%	1.61%	1.67%	1.80%	1.80%	1.80%	1.80%	1.80%	1.80%	1.63%	1.48%
Projected non-residential tariff (economic units)	154.00	154.00	245.43	336.86	336.86	336.86	336.86	336.86	336.86	336.86	336.86
Tariffs in Lei/cap/month (residential), incl. VAT											
Average	4.07	4.61	4.84	5.40	5.62	5.86	6.18	7.75	9.41	10.35	10.58
Urban households	5.62	6.24	6.52	7.22	7.51	7.83	8.25	10.35	12.58	13.84	14.14
Rural households	2.06	2.49	2.65	3.04	3.16	3.29	3.47	4.35	5.29	5.81	5.94

c) Are the charges proportional?

i) To the use of the project/real consumption?

Except for the category “markets, parks, street sweeping” (about 4% of total production), which is not charged, charges will be proportional to the real consumption of services by the users. As can be seen in table E-1, calculations refer to the tonne of waste. In practice, tariffs to households will be converted to a flat rate per person per month and those to economic units will be per container of a certain volume. However it is recommended to consider a billing by the weight.

ii) To the pollution generated by users?

Billing referring, directly or indirectly, to the ton of waste, and different costs at different places and for different categories of customers being reflected by the price differentiation, it can be concluded that the “polluter pays” principle is fully applied, except for the communal waste.

Concerning this last point, as the communes will probably have intensive relations with the new waste management unit, the billing of their market waste etc. would not be very efficient and would represent an unnecessary administrative procedure.

E.2. Socio-economic analysis

E.2.1. Provide a short description of methodology (key assumptions made in valuing costs and benefits) and the main findings of the socio-economic analysis:

The economic analysis is performed strictly along the CBA Guidelines, using the model provided for this purpose by JASPERS. No global opportunity value for an environment friendly waste disposal service has been used, in order to avoid double counting with the reduction of disamenities for population already accounted for in the model.

In this analysis, costs for investment and for O&M are valued differently from their financial values. The cost composition and the conversion of financial costs to economic ones is as follows

Table E-10: Conversion of financial to economic costs

Cost category (not considering land acquisition)		Construction	Operation	Conversion Factor
Traded goods	%	35.00%	25.00%	1.00
Non-traded goods	%	10.00%	5.00%	0.90
Skilled Labour	%	20.00%	25.00%	1.00
Unskilled Labour	%	35.00%	40.00%	0.50
Transfer payments	%	0.00%	5.00%	0.00
Total (%)		100%	100%	

On the benefit side, the following items are considered:

a) Resource cost savings, consisting of:

- the recovery of recyclable products (project increments);
- avoided operating costs of landfills;
- the avoided uncontrolled leachate to the extent at which it is not anymore disposed of in an inappropriate way (valued at 1.50 EUR per tonne of waste, being damages or clean-up costs).

b) Reduction of disamenities, odours and direct health risks, valued by means of the reduction of land having a depressed value due to the existence of a nearby landfill (the size of the waste facilities being determinant); the value depression is supposed to be 5% of an average value of 500,000 EUR/ha.

c) The reduction of greenhouse gas emissions (the average price of CO_2 is supposed to be 25 EUR/t in 2010, progressively going up to 45 EUR/t in 2030 and then staying at that level).

E.2.2. Give details of main economic costs and benefits identified in the analysis together with values assigned to them:

Table E-11: Summary of economic benefits and costs

	Benefit	Unit value (where applicable)	Total value (in euro, discounted)	% of total benefits
1	Resource cost savings		23,548,162	29.44%
2	Reduction of visual disamenities, odours and health risk		2,918,978	3.65%
3	Reduction of greenhouse gas emissions		53,508,065	66.91%
4	[…]		0	0.0%
5	[…]		0	0.0%
6	[…]		0	0.0%
	Cost	**Unit value (where applicable)**	**Total value (in euro, discounted)**	**% of total cost**
1	Traded goods	n.a.	19,276,787	38.35%
2	Non-traded goods	n.a.	4,306,349	8.57%
3	Skilled Labour	n.a.	14,629,403	29.11%
4	Unskilled Labour	n.a.	12,046,578	23.97%
5	Economic value of land	n.a.	0	0.0%

E.2.3. Main indicators of the economic analysis

	Main parameters and indicators	Values
1	Social discount rate (%)	5.5%
2	Economic rate of return (ERR) (%)	16.3%
3	Economic net present value (ENPV) (in Euro)	29,716,088
4	Benefit-cost ratio	1.59

E.2.4. Employment effects of project

Number of jobs directly created:	No (FTE) (A)	Average duration of these jobs (months) (B)
1. During implementation phase	160	23
2. During operational phase	260	252

[NB: indirect jobs created or lost are not sought for public infrastructure investments.]

E.2.5. Identify the main non-quantifiable / non valuable benefits and costs:

The main economic benefits and costs related to the implementation of the project have been quantified and calculated in the economic analysis. Other benefits / costs that are closely connected with the project but cannot be quantified include:

- The general improvement of the living conditions of the citizens as a result of the complete connection to sanitation services alongside the significant improvement of the environmental conditions due to the operation of modern waste management facilities instead of the dangerous existing dumpsites
- The social / economic development of the area, due to the development of a new market, namely the waste management and recycling market as well as due to the construction works that will take place during the next few years
- The creation of new job opportunities (see above) in a period of international economic crisis
- The construction works will generate temporary nuisances such as dust, noise and odours as well as truck traffic in the central waste management facilities. These nuisances will only remain in the period of construction works (1-2 years) and will be mitigated by traffic control as well as measures to avoid dust and odours

E.3. Risk and sensitivity analysis

E.3.1. Short description of methodology and summary results

The sensitivity and risk analyses are both carried out on the basis of the relevant CBA guidelines, including the EC's regulations. The main purpose of the sensitivity and risk analysis is to assess the impact on profitability indicators in case the value of key variables is changed and the likelihood of changes in the key variables that will have impact on the profitability indicators. For this purpose, the first part, sensitivity analysis aims at identifying the key variables and their potential impact of their variation on the profitability indicators. The analysis also determines the "switching values".

A key variable is considered to be one for which a change of 1% in value results in a change of at least 1 percentage point in the base case FRR/K or ERR, or more than 1% in the value of the base case FNPV/K or ENPV.

A switching value is the maximum variation (in percentages) in the key variable that is permitted before the FNPV or ENPV (whichever is relevant for that specific key variable) turns negative.

The second part (risk analysis) aims at estimating the probability of these changes actually taking place, with the results expressed as a estimated mean and standard deviation for those indicators.

The risk assessment is carried out using the Monte Carlo method which is incorporated in the model.

The risk analysis revealed that:

1. there is a low probability that FNPV/K >0;
2. there is a 100.0% probability that ENPV >0.

E.3.2. Sensitivity analysis

Table E-12: Variations tested

	Variable	Range of variation from base case	
		Lower	Upper
1	Project investment cost	-1.00%	1.00%
2	Revenues	-1.00%	1.00%
3	O&M costs	-1.00%	1.00%
4	Economic benefits	-1.00%	1.00%
5	Economic costs (Investment)	-1.00%	1.00%
6	Economic costs (O&M)	-1.00%	1.00%

Table E-13: Results of the identification of the key variables

	Variable tested	Financial rate of return (FRR/K) (base case: 2.6%)	Financial net present value (FNPV/K) variation	Economic rate of return (ERR) (base case: 16.4%)	Economic net present value (ENPV) variation
1	Project investment cost - increase of 1%	-0,18%	8,61%		
2	Project investment cost - decrease of 1%	0,19%	-8,61%		
3	Revenues - increase of 1%	0,31%	-10,33%		
4	Revenues - decrease of 1%	-0,32%	10,33%		
5	O&M costs - increase of 1%	-0,29%	9,86%		
6	O&M costs - decrease of 1%	0,29%	-9,86%		
7	Economic benefits - increase of 1%			0,28%	2,69%
8	Economic benefits - decrease of 1%			-0,28%	-2,69%
9	Economic costs (Investment) - increase			-0,19%	-0,85%
10	Economic costs (Investment) - decrease			0,20%	0,85%
11	Economic costs (O&M) - increase of 1%			-0,08%	-0,84%
12	Economic costs (O&M) - decrease of 1%			0,08%	0,84%

All financial parameters appear as being key variables, however the base net present values are negative.

The switch value analysis gives the following results:

Table E-14: Switching values for key variables

	Critical variable	Switching value	
1	Project investment cost	Maximum increase before FNPV/K turns negative (%)	(Already negative)
2	Revenues	Maximum decrease before FNPV/K turns negative (%)	(Already negative)
3	O&M costs	Maximum increase before FNPV/K turns negative (%)	(Already negative)
4	Economic benefits	Maximum decrease before ENPV turns negative (%)	(Not critical)
5	Economic costs (Investment)	Maximum increase before ENPV turns negative (%)	(Not critical)
6	Economic costs (O&M)	Maximum increase before ENPV turns negative (%)	(Not critical)

It can be calculated at what change of the financial revenues and O&M costs the FNPV/K turns positive: it is at +10.0% for the former and at -10.2% for the latter.
Since no economic parameter is considered a key variable, the economic switching values are not critical.

E.3.3. Risk analysis

Following the CBA guidelines the risk assessment is carried out using the Monte Carlo method which is incorporated in the model.

The following table present values of the main parameters considered.

Table E-15: Assumptions used in risk analysis

	Variable	Range of variation from base case	
		Lower case	Upper case
1	Project investment cost	-15.00%	20.00%
2	Revenues	-30.00%	10.00%
3	O&M costs	-10.00%	30.00%
4	Economic benefits	-10.00%	20.00%
5	Economic costs (Investment)	-10.00%	5.00%
6	Economic costs (O&M)	-5.00%	20.00%

The following table presents the results of the Monte Carlo analysis at above variations of main parameters:

Table E-16: Results of the Monte Carlo analysis (Euro)

	Variable	FNPV/K	ENPV

1	Expected value	-3.630.324	29.715.590
2	Standard deviation	201.510	290.245

Based on the distributions above:

- - There is a 95% probability that FNPV/K is between -4025282,8 and -3235365,4, with a 00% probability of FNPV/K >0;
- - There is a 95% probability that ENPV is between 29,146,710 and 30,284,470, with a 100.0% probability of ENPV >0.

As presented above, the economic profitability remains satisfactory even under unfavourable deviations of the main variables from assumptions. Therefore the project should be implemented considering its socio-economic benefit.

F. ANALYSIS OF THE ENVIRONMENTAL IMPACT

F.1. How does the project:

a) contribute to the objective of environmental sustainability (European climate change policy, halting loss of biodiversity, other …);

The proposed project contributes directly to the achievement of the priority established by the Sixth Environment Action Programme of the EC by ensuring "the sustainable use and management of natural resources and wastes" and indirectly to the other priorities of the 6th EAP (climate change; nature and biodiversity; environment and health and quality of life). Concerning the Integrated Waste Management System for Caras-Severin County, the specific legal provisions as well as the existing planning documents at national, regional and county level are taken into account. The new integrated solid waste management system shall have to provide better services and shall contribute to the improvement of the quality of the environment and health of the population. Also, through the implementation of the project, the following will be achieved:

- implementation of selective collection system for dry recyclables and wet organic fraction
- optimization of waste collection logistics via the development of a network of transfer stations; through this project will be build 3 transfer stations in Pjejena, Otelu Rosu and Bozovici;
- recovery and recycling of the packaging waste and recyclable materials, namely metals, glass, paper and plastic through a sorting station in Lupac;
- treatment of the biodegradable fraction of waste through a MBT (mechano-biological treatment) station in Lupac;
- closure and rehabilitation of the 8 urban non-compliant landfills;
- development of a county sanitary landfill for the disposal of the residues in Lupac.

Regarding the closure of 97 rural non-compliant landfills it was made in accordance with the deadline imposed by the Accesion Treaty, and in accordance with Governmental Decision 349/2005.

The project contribution to the achievement of sustainable development objectives will be significant in the sense that:

- It will prevent the environmental pollution by stopping the waste uncontrolled disposal on soil and so, reducing the water and subsoil pollution with the leachate that comes from the non-compliant landfills;
- It will prevent the annual direct methane emissions into the atmosphere , either by controlled burning and conversion in carbon dioxide, or by bio-oxidation in the recultivation layer, which will accordingly reduce the effect of global warming;
- It will lead to the gradual restoration of biodiversity and landscape, by reintroduction into the natural circuit the areas of current non-compliant landfills.

b) respect the principles of preventive action and that environmental damage should as a priority be rectified at source;

The proposed project complies with the preventive action principles and the fact that the environmental impairment would be identified at the source as a priority, in the sense that states the implementation of the mechanisms necessary to selective collection of domestic waste directly from their generators, followed by sorting, recycling, treatment and immediate disposal.

Concerning the potential impact on the environment generated both during the construction and the operation phase, through the EIA Report a series of prevention and mitigation measures for all the environmental factors are presented.

c) respect the "polluter pays" principle.

The proposed project respects the "polluter pays" principle in the sense the necessary expenditures to run the whole system are borne by waste generators, via the tariffs that have been calculated in the CBA. The tariff will be applied in the average waste generation of the urban and rural households as well as on the waste generated by institutions and economic units.

F.2. Consultation of environmental authorities

Have the environmental authorities likely to be concerned by the project been consulted by reason of their specific responsibilities?

Yes [X] No [ ]

If yes, please give name(s) and address(es) and explain that authority's responsibility:

Prior to obtaining the development consent (building permit), the projects have to enter in the EIA procedure.

According to the Romanian legislation, the authorities likely to be concerned by the project by reason of their specific environmental responsibilities are represented in a Technical Review Committee (in

Romanian "CAT") which is consulted in all the stages of the EIA procedure (i.e. screening, scoping and review of the EIA Report).

TRC consists of representatives of various county authorities, such as: Regional Environmental Protection Agency (REPA) Timisoara, Local Environmental Protection Agency (LEPA) Caras-Severin, Caras-Severin County Council, the National Environmental Guard, City Hall of Resita, Lupac, Bozovici and Pojejena, National Administration of Land Reclamation, the Inspectorate for Emergency Situations, the Territorial Inspectorate of Work, the water company AquaCaras, the Regional Directorate of Roads and Bridges, the Public Health Board, the gas company E-ON Gaz Distributie.

According to the assigned competency, the environmental authority - REPA Timisoara - coordinates the stages of the EIA procedure (i.e. screening, scoping and reviewing of the EIA Report) and, when an EIA is completed the Environmental Agreement is issued. The Environmental agreement represents the "administrative document of the environmental protection competent authority, in order to establish the conditions and measures, as applicable, regarding protection of environment that shall be respected, if decision is taken to proceed with the project.

The coordination of the EIA procedure as well as the issuance of the required ENVIRONMENTAL AGREEMENT for the project "Integrated Waste Management System in Caras-Severin County" is within the competence of Timisoara Regional Environmental Protection Agency, headquartered in Timisoara 1 Amurgului St. (www. arpmv5.ro).

REPA Timisoara is also the competent authority for issuing the Natura 2000 Declaration.

The the "Apele Romane" National Administration and the Water Basin Administration Banat are the competent authorities for the issuance of water permits for the "Integrated Waste Management System in Caras County" project.

If no, please give reasons:

N/A

F.3. Environmental Impact Assessment

F.3.1. DEVELOPMENT CONSENT[5]

F.3.1.1. Has development consent already been given to this project?

Yes ☐ No ☒

Development consent is represented by the Construction Permit, which was not yet issued for this project. According to the EIA legislation (GD 445/2009), the development consent is defined as "decision of the competent authority / authorities that gives the developer the right to proceed with the project". This takes the form of a construction permit in case of waste management projects.

[5] The decision of the competent (national) authority or authorities which entitles the developer to proceed with the project. In cases where the project submitted is part of a wider operation, the development consent should refer only to the project submitted to the Commission. In cases where more than one development consent decisions are required, please repeat the information as many times as necessary.

The mentioned GD defines the Environmental Agreement as "the administrative act issued by the competent environmental protection authority, establishing the conditions and, depending on the case, the environmental protection measures, that have to be observed in case of implementation of a project". The Environmental agreement is annexed to the development consent and it is part of it.

F.3.1.2. If yes, on which date

N/A

F.3.1.3. If no, when was the formal request for the development consent introduced:

For Lupac IWMC – estimated in 02/2012

For Bozovici transfer station – estimated in 03/2012

For Otelu Rosu transfer station – estimated in 03/2012

For Pojejena transfer station – estimated in 03/2012

For the clearance of the urban noncompliant landfills – estimated in 03/2012.

F.3.1.4 By which date is the final decision expected?

For Lupac IWMC – 03/2012

For Bozovici transfer station – 04/2012

For Otelu Rosu transfer station – 04/2012

For Pojejena transfer station – 04/2012

For the clearance of the urban noncompliant landfills – 04/2012

F.3.1.5. Specify the competent authority or authorities, which has given or will give the development consent.

Caras-Severin County Council (with the agreement of the local city halls of Lupac, Otelu Rosu, Bozovici and Pojejena localities)

F.3.2. APPLICATION OF COUNCIL DIRECTIVE 85/337/EEC ON ENVIRONMENTAL IMPACT ASSESSMENT (EIA)6

F.3.2.1. Is the project a class of development covered by:

☐ Annex I to that Directive (go to question F3.2.2)

X Annex II to that Directive (go to question F.3.2.3)

☐ Neither of the two annexes (go to question F.3.3)

F.3.2.2. When covered by Annex I to that Directive, include the following documents:

a) the information referred to in Article 9(1) of that Directive;

b) the non-technical summary7 of the Environmental Impact Study carried out for the project;

[6] OJ L 175, 5.7.1985, p. 40.

c) information on consultations with environmental authorities, the public concerned and, if applicable, with other Member States.

F.3.2.3. When covered by Annex II to that Directive, has an Environmental Impact Assessment been carried out for this project?

Yes [X]

in which case, include the necessary documents listed under point F3.2.2

a) the information referred to in Article 9(1) of that Directive;

In accordance with Article 9 (1) of the EIA Directive: "When a decision to grant or refuse development consent has been taken, the competent authority or authorities shall inform the public thereof in accordance with the appropriate procedures and shall make available to the public the following information:

- the content of the decision and any conditions attached thereto,
- having examined the concerns and opinions expressed by the public concerned, the main reasons and considerations on which the decision is based, including information about the public participation process,
- a description, where necessary, of the main measures to avoid, reduce and, if possible, offset the major adverse effects."

According to national EIA legislation, this information is comprised in the Environmental Agreement and the Final Decision (these documents can be found in Annex F of the Application Form).

According to article 21(1) of the GD 445/2009 which transposes Article 9(1) of the EIA Directive, the relevant information shall be provided starting with the decision to grant or refuse the Environmental Agreement which has been taken by the environmental competent authority.

The information referred to Article 9(1) of the EIA Directive is presented as obligation of environmental authority responsible for issuing the environmental agreement and also of public administration authorities responsible for issuing the development consent as follows:

i. The decision to grant the environmental agreement for the Caras-Severin IWMS was taken by REPA Timisoara. This decision contains the reasons on which the decision is based and also the information on public consultation process.

The decision to grant the Environmental Agreement and the content of the decision were available for public awareness, including the reasons and the conditions attached to the issued agreement.

The public was informed about the content of the decision to grant the Environmental Agreement and the content of the Environmental Agreement through announcements, as presented at point c) from section F.3.2.3.

[7] Prepared under Article 5(3) of Directive 85/337/EEC.

The Environmental Agreement comprises all the mitigation measures and conditions to prevent and reduce the environmental impact.

The decision to grant the development consents (building permits) will be taken by the competent public administration authority (according to F.3.1.5.), which will make available to the public the information referred to in Article 9 (1) of the EIA Directive.

b) the non-technical summary of the Environmental Impact Study carried out for the project;

The Non-technical Summary of the Environmental Impact Assessment Report is presented in Annex H.

c) information on consultations with environmental authorities, the public concerned and, if applicable, with other Member States.

Environmental authorities and other authorities likely to be concerned with the project (by reason of their specific environmental responsibilities) are represented in a Technical Review Committee (CAT in Romanian) and consulted in all stages of the EIA procedure. The TRC representatives are presented in section F.2.

Consultations with the environmental authorities, other authorities and the public were held during the EIA procedure, in different stages, as required by the EIA legislation.

The Summary of EIA Procedure which represents all the steps which were carried out regarding the issuance of the Environmental Agreement is presented in the Annex G.

During the EIA procedure, the public was informed through public announcements/debates, in compliance with the stages of the procedure.

The public was first informed about the Environmental Agreement request through an announcement posted on Caras-Severin County Council's website on 23rd of September 2009 and published in the local newspaper "Jurnalul de Caras-Severin" on 24th of September 2009. The announcement was published also in the local newspaper "Ziua" on 6th of October 2009. REPA Timisoara posted the announcement on the website on 5th of October 2010.

On 14th of October 2009 the TRC for the Screening Phase was held. The public was informed about the Screening Decision through an announcement posted on REPA Timisoara's website on 21st of October 2009. The announcement was posted on the County Council website on 27th of October 2009 and published in the local newspaper "Ziua" on 25th of October 2009. The public had access to the information on each headquarter of the City Halls of Caransebes (the announcement was posted on 7th of November 2009), Oravita (29th of October 2009), Anina (28th of October 2009), Moldova Noua (28th of October), Baile Herculena (29th of October 2009), Otelu Rosu (28th of October 2009), Resita (29th of October 2009), Bocsa (29th October 2009), Bozovici (28th of October 2009), Pojejena (3rd of November 2009), Lupac (26th of November 2009).

The public debates were announced for 11th of May 2010 in Lupac and Resita, 12th of May 2010 in Bozovici, 13th of May 2010 in Pojejena and 14th of May 2010 in Otelu Rosu. The announcements

regarding the public debates were published in the local newspaper "Ziua de Vest" on 25th of March 201, postet on County Council's website on 25th of March 2010. The announcement was posted also at the Caras-Severin County Council headquarter in 25th of March 2010 and on the City Hall of: Caransebes on 30th of March 2010, Resita on 26th of March 2010, Lupac on 26th of March 2010, Bozovici on 26th of March 2010, Otelu Rosu on 26th of March 2010, Anina on 26th of March 2010, Pojejena on 25th of March 2010 and Oravita on 25th of March 2010.

All public debates were held, except the one from Lupac. The public debate from 11th of May 2010 in Lupac could not be held. After that a petition signed by 306 residents from Lupac, which did not want the construction of the landfill in the area, was brought to REPA Timisoara. REPA Timisoara answered to the petition in 02.06.2010.

On 20th of May 2010 REPA Timisoara informs the beneficiary about another public debate on 21st of June 2010 in Lupac. The announcement was posted in "Ziua de Vest" newspaper on 22nd of May 2010, on REPA's website on 21st of May 2010 and on the County Council's website on 27th of May 2010.

Again, the public debate from 21st of June 2010 could not be held and therefore, REPA informs the National Environmental Protection Agency, the Ministry of Environment and Forests and IB – SOP Environment Timisoara about this situation.

Following the response from the NEPA, REPA Timisoara informed the Beneficiary about another public debate on 5th of August 2010 in Lupac. The announcement was posted in "Jurnal de Caras Severin" newspaper on 15th of July 2010, on REPA's website on 21st of May 2010 and on the County Council's website on 15th of July 2010.

The public refused to participate to this public debate.

REPA Timisoara proposed to the County Council to find another location for the compliant landfill. The County Council complained to REPA Timisoara and NEPA. The complaint was solved amiable by organising another public debate on 14th of October 2010. The announcement was posted in "Jurnal de Caras Severin" newspaper on 4th of October 2010 and on the County Council's website on 1st of October 2010.

The public from Lupac and the villages around Lupac participated. Their questions during the debate were about the environmental protection, and naturally the human health protection, during operation and post-closure phase. All the people that had questions during the debate received a letter from the County Council with all the answers. The letter was posted on REPA Timisoara website on 27th of January 2011. Also, after the public debate held on 14th of October 2010, news about the importance of this project, were broadcasted on the local radio. Talk shows were organised with the project manager and the manager of ADI INTERCOM Waste, in order to make the public understand the importance of the project implementation.

Even if the public information was done properly, no resident from Lupac appeared to the County Council headquarter to consult the documentations. During the live talk shows, no resident from Lupac asked any question.

On 25th of November 2010 the TRC for the quality of EIA Report analysis was held. The Final Decision no. 737 from 26th of November 2010 was sent forward to County Council. On 30th of November 2010 REPA Timisoara informs the Beneficiary about the Final Decision. The public was informed through announcements at the City Hall of Lupac and Resita on 2nd of December 2010 and also on County Council's website on 2nd of December 2010. The announcement was also posted on REPA's website and County Council's website on 30th of December 2010 and published in "Postul Mare" newspaper and "Jurnal de Caras Severin" mewspaper on 2nd of December 2010.

No comments were received from the public.

The initial Environmental Agreement was issued on 29th of December 2010.

The Notification for the Environmental Agreement revision was made on 19th of October 2011.

On 27th of October 2011 the TRC for the revision of the Environmental Agreement was held. The public was informed about the revision of the Environmental Agreement through an announcement posted on REPA Timisoara's website on 31st of October 2011 and to the own premises on 01st of November 2011. The announcement of county council was posted on the website (01st of November 2011) and in the local newspaper "Jurnalul" and the premises of Lupac Hall on 02nd of November 2011.

No comments were received from the public.

The revised Environmental Agreement was issued on 17th of November 2011.

No ☐

in which case, explain the reasons and give the thresholds, criteria or case by case examination carried out to reach the conclusion that the project has no significant environmental effects:

TEXT BOX

F.3.3. APPLICATION OF THE STRATEGIC ENVIRONMENTAL ASSESSMENT DIRECTIVE 2001/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL8 (SEA-Directive)

F.3.3.1. Does the project result from a plan or programme falling within the scope of the SEA Directive?

No ☐

in which case please provide a short explanation:

TEXT BOX

8 OJ L 197, 21.7.2001, p. 30.

Yes [X]

in which case, in order to appreciate if wider potential cumulative effects of the project have been addressed, please provide either an internet link to or an electronic copy of the non-technical summary9 of the Environmental Report carried out for the plan or programme.

The present project is part of the SOP Environment that falls under the SEA procedure, which was carried out accordingly. The SEA procedure for SOP ENV (that can be found at the following internet address: http://www.mmediu.ro/vechi/proiecte_europene/alte_documente.htm) started on 08th of August 2006. A public hearing was organized on 17th of January 2007 with the aim of discussing both the draft SOP and the Environmental Report. Following the SEA procedure, the Environmental Licence was issued on 28th of January 2008.

The project also results from the Regional Waste Management Plan (RWMP) - Region 5. The Regional Waste Management Plan was subject to the SEA procedure in accordance with EU Directive 2001/42/EC and adopted by the Romanian GD 1076 (2004). A SEA Working Group was established in June 2006, comprising representatives of relevant authorities - Timisoara REPA and LEPA, the technical departments of the Ministry of Environment and NGOs, and external consultants. The Environmental Report was finalised in September 2006. The public debate was organised in Timisoara in October 2006. The comments made by the public and relevant stakeholders during consultation process were taken into account in the final RWMP.

The Environmental Licence was issued on November 2006. The NTS of the SEA Report can be found at http://www.arpmv5.ro/pages/doc/RAPORT%20DE%20MEDIU%20SEA%20PRGD%20Timisoara.pdf.

Based on the RWMP, the Caras Severin County Waste Management Plan (CWMP) was prepared as required by current legislation. The CWMP was also subject to the SEA Procedure. REPA Timisoara decided that the CWMP does not need an environmental assessment and will be adopted without an **Environmental Licence.** The Decision is published on the REPA Timisoara website: http://www.arpmv5.ro/joomla/index.php?Itemid=32&id=5&option=com_content&task=section.

F.4. Assessment of effects on NATURA 2000 Sites

F.4.1. Is the project likely to have significant negative effects on sites included or intended to be included in the NATURA 2000 network?

Yes [ ]

in which case

1) Please provide a summary of the conclusions of the appropriate assessment carried out according to Article 6(3) of Council Directive 92/43/EEC10.

9 Prepared under Annex I (j) to Directive 2001/42/EC.

10 OJ L 206, 22.7.1992, p. 7.

TEXT BOX

2) In case, compensation measures were deemed necessary according to Article 6 (4), please provide a copy of the form "Information on projects likely to have significant negative effect on NATURA 2000 sites, as notified to the Commission (DG Environment) under Directive 92/43/EEC11".

No [X]

in which case attach a completed Appendix I declaration filled in by the relevant authority.

The declaration and the corresponding map are presented in Appendix I.

F.5. Additional environmental integration measures

Does the project envisage, apart from Environmental Impact Assessment, any additional environmental integration measures (e.g. environmental audit, environmental management, specific environmental monitoring)?

Yes [X] No [ ]

If yes, specify

Integrated Environmental Permitting

The landfill and the simple MBT plant in Lupac are subject to the provisions of the IPPC Directive IED 2010/75/EC and to an integrated permitting procedure including a detailed assessment of proposed techniques and performances will be applied accordingly.

For the landfill, the project considered both the requirements of the IPPC and the Landfill Directive.

Thus, when designing the landfill at Lupac, all the provisions of Directive 1999/31/EC, as well as of the Romanian Technical Norm on Waste Landfill approved by MO 757/2004 have been taken into consideration. The bottom lining system will consist of different layers for different purposes which ensure long term protection:

- A geological barrier constructed as a built-in compacted clay layer and a geosynthetic clay liner (GCL) with a total thickness of at least 0,50 m and a total permeability of 10^{-9} m/s;
- Geosynthetic liner – polymer membrane with a thickness of at least 2 mm.
- Geotextiles are used for protection of the polymer liner. The weight of the geotextile shall be ≥ 1,200 g/m^2. This layer will be completed by a sand layer of at least 0,10 m.
- Drainage layer with a thickness of 0,50 m and a permeability of at least 10^{-3} m/s;

[11] Document 99/7 rev. 2 adopted by the Habitats Committee (established under Directive 92/43/EEC) at its meeting on 4 October 1999.

The design of the landfill envisages the collection of rain water, leachate and other types of waste water resulting from the sites and their treatment prior to their discharge into the emissary, in accordance with the provisions of Annex 1 of Directive 1999/31/EC.

The leachate collection system consists of main pipes along the bottom of the landfill in distance not more than 40 m between them and collection wells at the lowest end of each pipe. The leachate is then transferred by gravity to the leachate collection tank for further treatment in the Waste Water Treatment Plant,

A system to collect the landfill gas produced in the landfill will be installed. The envisaged gas collection system consists of:

- Collection wells;
- Biogas transfer piping network;
- Biogas collection stations;
- Biogas discharge main pipe (perimetric biogas pipe);
- Condensate traps system;
- Flare unit.

The surface sealing system for the Lupac landfill to be installed at the top of each landfill cell will consist of the following components:

- Support layer of minimum 0.50 m thickness with k >1x10-4 m/s;
- Gas drainage layer made of granular or artificial materials having minimum 0.50 m thickness with k >1x10-4;
- Compacted clay liner of minimum 0.50 m thickness, with k<5x10-9 m/s or other equivalent barrier;
- Rainwater drainage layer made of granular materials of minimum 0.30 m thick and k > 1x10-3 m/s or of artificial materials;
- Separation geotextile 400 gr/m^2;
- Soil cover layer of minimum 1 m thickness, from which the upper 0.15 m is supposed to be enriched topsoil.

For the simple MBT plant, the next phase of detailed design and implementation of the project that will be performed according to the 2016 diversion from landfilling of the biodegradable waste (40.892 tons), together with the integrated permitting procedure, will take into account all applicable recommendations regarding the best available techniques, as contained in the applicable reference documents (BREF). Horizontal BREF(s) shall be taken into account, in particular those related to: “Waste Treatment Industries”, "Emissions from storage", "General Principles of Monitoring" and "Economic and cross-media effects".

Regarding the BAT adopted for this MBT, we mention:

- The MBT will have sufficient staff available with the requisite qualifications at all times, that will lead to a good housekeeping and maintenance of the station;
- The integrated waste management system implies also a selective collection, which will ensure the required quality of the waste treated in the MBT facility;
- The bio-stabilization process runs within closed spaces, in order to limit the emissions in air;
- The anaerobic conditions are avoided during treatment process, by using an air circuit;
- The biocells are closed and have doors that can be opened and closed fast, in order to limit the emissions in air; it is recommended to fill the biocells from the beginning so the doors stay closed during the treatment process.
- The waste water is treated in the leachate treatment plant on the site. To reduce the water use, the water used in the treatment process is recirculated in the biocells, to maintain the humidity inside the waste.
- The rainwater is collected from the concrete platform, separately from the waste waters. The rainwater will be pre-treated in an oil separator before being discharged into the natural environment.
- All the surfaces used for waste treatment are cemented; therefore the soil pollution risk is eliminated.

Environmental monitoring

An environmental monitoring system will be introduced to control the environmental impact of the Integrated Waste Management System in Caras-Severin County. Specific environmental monitoring will be conducted after the closure of non-compliant landfills.

Monitoring of the environment for the landfill will be conducted in accordance with the requirements set out in the EC Landfill Directive 1999/31/EC, as amended.

The Environmental Impact Assessment Study, the Environmental Agreement, and the Water management Permit set out how to monitor the environmental factors as a result of the project, for the following:

- construction phase for all investments;
- facility operation phase (landfill, mechanical-biological treatment facility, transfer station and MBT plant);
- post-closure monitoring of Lupac landfill;
- post-closure monitoring of all non-compliant landfills which will be included within the project.

The local councils of the cities/communes where non compliant landfills will be closed will enforce and control the implementation status of the post-closure monitoring measures provided for the non compliant landfills for a period of 30 years, in accordance with the legal provisions in force.

During the project implementation, LEPA/REPA, NARW and the Environmental Guard will monitor the achievement of the permit's conditions and requirements, related to the prevention of negative environmental impacts.

For unforeseen situations, the competent authority for the environmental protection is to be notified by the Beneficiary.

F.6. Cost of measures taken for correcting negative environmental impacts

If included in total cost, estimate proportion of cost of measures taken to reduce and/or to compensate for negative environmental impacts

% 1.87

Explain briefly:

The percentage above represents the costs of measures undertaken in the project to reduce and/or to compensate for negative environmental impacts, not required by legislation in force. These are the following measures:

- To diminish the visual impact, also the impact on the atmosphere, for each site at which new investments will be carried out (central landfill at Lupac and three transfer stations in Pojejena, Otelu Rosu and Bozovici), it is proposed through the project to install vegetal curtains (shelter belts) and to set up green areas;
- To reduce the impact on the atmosphere of the simple MBT plant during mechanical-biological treatment at Lupac, it is proposed through the project that the MBT will be provided with a bio filter where the collected air will be treated. A de-dusting biofilter will be installed also for the sorting station;
- Oil separators will be provided in order to treat the rain waters from the concrete platforms and to prevent the pollution of the surface and underground waters.
- For each non-compliant landfill, the final layer will be enriched topsoil, in order to integrate the areas into the landscape.
- An Environmental Management Plan will be implemented for the operation for the landfill and the other facilities from Lupac.

F.7. In case of projects in the areas of water, waste water and solid waste:

The proposed project contributes to the fulfilment of the commitments of Romania as described in the Accession Treaty and is in line with the Sectoral Operational Programme for Environment (SOP-

ENV). The overall objective of the SOP is to protect and improve the living standards in Romania, focusing in particular on meeting the Environment Acquis.

The integrated waste management system in Caras-Severin County complies with the provisions of the Waste Framework Directive. Also, the investments proposed through the project are in accordance with the provisions of Directive 1999/31/EC on landfill of waste. The new landfill to be developed in Lupac was designed totally in compliance with the provisions of the Directive, as well as of the national norm on landfills.

When designing the integrated system, the targets for the diversion of municipal biodegradable waste from landfill were taken into account:

- reduction of the quantity of municipal biodegradable waste landfilled to 75% (11,611 tons) of the total quantity, generated in 1995, in 2010;
- reduction of the quantity of municipal biodegradable waste landfilled to 50% (30,760 tons) of the total quantity, generated in 1995, in 2013.
- reduction of the quantity of municipal biodegradable waste landfilled to 35% (40,892 tons) of the total quantity, generated in 1995, in 2016.

The investments which ensure the achievement of these targets are presented in section B.4.2 (a), Component 2 – simple MBT plant.

The targets for packaging waste for the Integrated Waste Management System in Caras-Severin County are presented in the table below:

	Targets for recycling/recovery (2013)		**Performance of the proposed project (2013)**	
Paper + cardboard	60 %	4,831 tons	86%	6,300 tons
Plastic	22.5 %	2,015 tons	68%	6,080 tons
Glass	60 %	2,915 tons	96%	4,650 tons
Metal	50 %	1,004 tons	97%	1,952 tons
Wood	15 %	403 tons	Will be achieved via direct recycling of the wood generated in institutions / commerce	
Total recycling	55 %	14,929 tons	70%	18,982 tons
Total recovery	60 %	16,286 tons	88%	23,900 tons

After the project will be implemented, all the population in Caras-Severin County will be connected to collection services, as shown in the table below:

Indicator	**Unit**	**Before Project**	**After Project**

			(2013)
Percent of population connected to collection services in total and in urban, rural areas **(Core Indicator)**	%	Total: 89% Urban: 93.1% Rural: 84.2%	Total: 100% Urban: 100% Rural: 100%
Percent of population connected to separate collection services in total and in urban, rural areas **(Core Indicator)**	%	Total: 17% Urban: 9 % Rural: 20%	Total: 82% Urban: 100% Rural: 70%

One of the project components is represented by the closure of all non-compliant landfills in the county. The closures totally comply with the provisions of the Directive on landfill of waste.

G. JUSTIFICATION FOR THE PUBLIC CONTRIBUTION

G.1. Competition

Does this project involve State Aids?

Yes ☐ No ☒

If yes, please give in the table below the amount of aid, and, for approved aid the state aid number and the reference of the approval letter, for block-exempted aid the respective registry number, and for pending notified aid the state aid number12.

Sources of aid (local, regional, national and Community):	Amount of aid euro	State Aid number/ registry number for block-exempted aid	Reference of approval letter
Approved aid schemes, approved ad hoc aid, or aid falling under a block exemption regulation: …….. ……..			
Aid foreseen under pending notifications (ad hoc aid or schemes) : …….. ……..			
Aid for which a notification is outstanding (ad hoc aid or schemes) …….. ……..			
Total aid granted:			
Total cost of the investment project			

12 This application does not replace notification to the Commission under Article 88(3) of the EC Treaty. A positive decision by the Commission on the major project under Regulation (EC) No 1083/2006 does not constitute state aid approval.

G.2. Impact of Community assistance on project implementation

For each affirmative answer, give details:

Will Community assistance:

a) accelerate implementation of the project?

Yes [X] No [ ]

b) be essential to implementation of the project?

Yes [X] No [ ]

a) The Community Assistance definitely accelerates the implementation of this project that brings a key contribution to the Accession Treaty of Romania in the field of environment. The amount of the funds needed from the Community is considerable (29,641,888 Euro representing 72.5 % of the total eligible cost), funds that cannot be easily attracted from other sources. Without the EU funds, the works could only be performed in longer time, in more phases, but the compliance with the Accession Treaty obligations might be compromised.

b) The EU financial assistance is essential for Caras-Severin County in order to comply in time with the relevant environmental acquis (list the Relevant Directives). The EU grant is also essential because of the estimated contribution of this project to the regional development having in view the opportunity for further investments (by providing basic public services in the region).

H. FINANCING PLAN

H.1. Cost breakdown (current prices)

	Euro	TOTAL PROJECT COSTS (A)	INELIGIBLE COSTS[1] (B)	ELIGIBLE COSTS (C)=(A)-(B)
1	Planning/design fees	1,050,159	106,062	944,097
2	Land purchase	0	0	0
3	Building and construction	25,712,042	1,697,231	24,014,811
4	Plant and machinery	12,473,169	289,901	12,183,267
5	Contingencies[2]	1,085,155	0	1,085,155
6	Price adjustment (if applicable)[3]	0	0	0
7	Technical assistance	584,702	0	584,702
8	Publicity	334,280	0	334,280
9	Supervision during construction implementation	1,243,810	0	1,243,810
10	**Sub-total**	**42,483,317**	**2,093,195**	**40,390,122**

11	VAT	10,603,468	10,118,120	485,349
12	**TOTAL**[4]	**53,086,785**	**12,211,314**	**40,875,471**

(1) Ineligible costs comprise (i) expenditure outside the eligibility period, (ii) expenditure ineligible under national rules (Article 56(4) of Regulation (EC) No 1083/2006), (iii) other expenditure not presented for co-financing. NB: The starting date for eligibility of expenditure is the date of receipt of the draft operational programme by the Commission or 1 January 2007, whichever is the earlier.

(2) Contingencies should not exceed 10% of total investment cost net of contingencies. These contingencies may be included in the total eligible costs used to calculate the planned contribution of the funds – Section H2.

(3) A price adjustment may be included, where relevant, to cover expected inflation where the eligible cost values are in constant prices.

(4) Total cost must include all costs incurred for the project, from planning to supervision and must include VAT even if VAT is considered non eligible.

H.2. Total planned resources and planned contribution from the Funds

H.2.1. Community contribution calculation

		Value
1.	Eligible cost (in euro, not discounted) (Section H.1.12(C))	40.875.471
2.	Funding gap rate (%), if applicable = (E.1.2.11)	90,6%
3.	Decision amount, i.e. the "amount to which the co-financing rate for the priority axis applies" (Article 41(2)) = (1)*(2). If H.2.1.2 not applicable, the decision amount must respect the maximum public contribution according to state aid rules	37.052.360
4.	Co-financing rate of the priority axis (%)	80,0%
5.	Community contribution (in euro) = (3)*(4)	29.641.888

H.2.2. Sources of co-financing

In the light of the results of the financing gap calculation (where relevant) the total investment costs of the project shall be met from the following sources:

Source of total investment costs (Euro)								
	Eligible cost			40,875,471	Ineligible cost			12,211,314
Total investment cost [H.1.12.(A)]	Community assistance [H.2.1.5] (80% of b+c+d)	Contribution State budget (18,0% of b+c+d)	Contribution County Council (2,0% of b+c+d)	County Council	Cost 2010-2012: County Council	Ineligible other: equity contribution	VAT reclaimed	VAT non reclaimed: own financing
a) = b) through i)	b)	c)	d)	e)	f)	g)	h)	i)
53,086,785	29,641,888	6,669,425	741,047	3,823,111	2,093,194	0	8,802,764	1,315,356

H.2.3. Expenditure already certified

Have expenditure for this major project been already certified?

Yes ☐ No ☒ X

If yes, state the amount: ……. EUR.

H.3. Annual financing plan of Community contribution

The Community contribution (H.2.1.5) shall be presented below in terms of the share of annual programme commitment.

(in Euro)	2010	2011	2012	2013	2014	2015
[ERDF]	0	0	6.303.871	23.338.017	0	0

I. COMPATIBILITY WITH COMMUNITY POLICIES AND LAW

With regard to Article 9 (5) of Regulation (EC) No 1083/2006 provide the following information:

I.1. Other Community financing sources

I.1.1. Has an application been made for assistance from any other Community source (TEN-T Budget, LIFE+, R&D Framework Programme, other source of Community finance) for this project?

Yes ☐ No ☒ **X**

If yes, please give details (financial instrument concerned, reference Nos, dates, amounts requested, amounts granted, etc.):

TEXT BOX

I.1.2. Is this project complementary to any project already financed or to be financed by the ERDF, ESF, Cohesion Fund, TEN-T Budget, other source of Community finance?

Yes [ ] No [X]

If yes, give details (provide precise details, reference Nos, dates, amounts requested, amounts granted, etc.):

TEXT BOX

I.1.3. Has an application been made for loan or equity support from EIB / EIF for this project?

Yes [ ] No [X]

If yes, please give details (financial instrument concerned, reference Nos, dates, amounts requested, amounts granted, etc.):

TEXT BOX

I.1.4. Has an application been made for assistance from any other Community source (including ERDF, ESF, Cohesion Fund, EIB, EIF, other sources of Community finance) for an earlier phase of this project (including feasibility and preparatory phases)?

Yes [X] No [ ]

An application for ISPA/PHARE assistance has been made for the preparation of this CF/ERDF application and supporting documents (feasibility studies, environmental studies, tender documents, etc.). This is under the ISPA Measure 2005 RO 16 P PA 001 – 05 and the project under the title: **'Technical Assistance for project preparation in the environment sector – Romania' under EuropeAid/123053/D/DV/RO**

I.2. Is the project subject to a legal procedure for non-compliance with Community legislation?

Yes [ ] No [X]

If yes, please give details:

TEXT BOX

I.3. Publicity measures

All publicity activities within the Project will be implemented in compliance with the provisions of EU Regulation no 1159/2000. The measures will include:

- Erection of **billboards** according to established standard (under § 6.1 of the above mentioned Regulation). Billboards will be placed on all project sites;
- After finalization of works, the billboards will be removed not later than six months after completion of the work and replaced by permanent **commemorative plaques** for infrastructures accessible to the general public;
- **Posters** will be displayed on the premises of bodies implementing or benefiting from the Project (County councils, local councils, regional and local environmental agencies, employment agencies, vocational training centres, chambers of commerce and industry, development agencies, etc.;
- All **notifications of aid** to beneficiaries sent by the competent authorities shall mention the fact of part-financing by the European Union and may state the amount or percentage of the assistance funded by the Community instrument concerned;
- All **publications** (such as **booklets, leaflets and newsletters**) concerning the Project will contain a clear indication on the title page of the European Union's participation and, where appropriate, that of the Fund concerned as well as the Community emblem if the national or regional emblem is also used;
- Information will be also available by **electronic means (e.g. websites) and by audio-visual material (presentations, CD-ROMs, etc.)** with due regard to new technologies which permit the rapid and efficient distribution of information and facilitate a dialogue with the general public;
- In all events such as **conferences, seminars, fairs and exhibitions** in connection with the Project Implementation it will be clearly stated that make the Community contribution to these assistance packages explicit by displaying the European flag in meeting rooms and using the Community emblem on documents.

The details of the campaigns have still to be designed. The measures directed to the general public will include, but not be limited to campaigns in print, radio and TV media.

During the project implementation, the progress reports of the project will include copies of the communication material produced and evidence of the information events carried out in the period of time reported.

Publicity measures will be implemented in order to raise public awareness and acceptance among the population. The measures aim at:

- Increasing the beneficiaries' awareness of the Community assistance
- Increasing the beneficiaries' awareness of the value of the improved DH/waste services
- Increasing the beneficiaries' willingness to pay adequate fees for the improved services
- Inform the public about the project measures, cost and benefits in order to ensure project acceptance through transparency.

The total budget estimated for the implementation of publicity measures is 300,000 Euro (in constant prices).

The main part of the publicity measures shall be implemented during the years 2011 and 2012.

I.4. Involvement of JASPERS in project preparation

I.4.1. Has JASPERS technical assistance contributed to any part of the preparation of this project?

Yes ☐ No ☒

I.4.2. Describe the elements of the project where JASPERS had an input (e.g. environmental compliance, procurement, review of technical description).

I.4.3. What were the principal conclusions and recommendations of the JASPERS contribution and were these taken into account in the finalisation of the project?

I.5. Public procurement

In cases where contracts have been advertised in the Official Journal of the European Union, give reference.

Contract	Date	Reference
…	…	…

J. ENDORSEMENT OF COMPETENT NATIONAL AUTHORITY

I confirm that the information presented in this form is accurate and correct.

NAME:

SIGNATURE:

ORGANISATION:

(MANAGING AUTHORITY)

DATE:

APPENDIX I

DECLARATION BY AUTHORITY RESPONSIBLE FOR MONITORING NATURA 2000 SITES

Responsible Authority _____

Having examined the project application _____

Which is to be located at _____

Declares that the project is not likely to have significant effects on a *NATURA 2000* site on the following grounds:

TEXT BOX

Therefore an appropriate assessment required by Article 6 (3) was not deemed necessary.

A map at scale of 1:100.000 (or the nearest possible scale) is attached, indicating the location of the project as well as the *NATURA 2000* sites concerned, if any.

Date (dd/mm/yyyy): _____

Signed: _____

Name: _____

Position: _____

Organisation: _____
(Authority responsible for monitoring *NATURA 2000* sites)

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