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Location:
Bizerte, Gabès and
Sousse Djerba



Company:
ANGeD



Mission:
Waste management



Cost:
TND 400 million

Pipeline of PPP projects in Tunisia

Bizerte-Gabès-Sousse Waste Management

General presentation

Bizerte waste management project

The project consists in the treatment of household and similar waste in the Governorates of Bizerte, Sousse and Gabès. This project includes a Mechano-Biological Treatment (TMB) facility and a landfill. TMB reduces the amount of waste going to landfill and limits the environmental impact of landfilling of non-recovered fractions. The TMB offers several options:

- Option 1: Recover recyclables (plastics, paper, glass, metals, ...),
- Option 2: Recover recyclables (plastics, paper, glass, metals, ...) and a stabilized organic fraction that can be used as an amendment
- Option 3: Recover recyclables (plastics, paper, glass, metals, ...), a stabilized organic fraction that can be used as an amendment, and a fraction with high calorific value allowing the production of a secondary fuel.

The operation of a TMB installation is schematized as follows:

- The incoming waste deposited by the collection bins is the subject of a first mechanical treatment which consists of opening the bags.
- After opening the bags, the waste is directed to a biological treatment which results in waste water loss and degradation of part of the organic fraction.
- At the end of the biological treatment, a mechanical treatment sorts and separates the waste to capture the various fractions according to the recovery objectives - as indicated above. The residual non-recovered fraction is discharged to landfill.

For the choice of materials to be recycled and valued, in the case of Bizerte and Sousse, the strategic study identifies options 2 or 3 as adapted.

The APS study (preliminary design) considered option 2, which therefore provides for the recovery of recyclable materials and a stabilized organic fraction. For the latter, there is no provision for upgrading as an amendment but for use as a covering material for the operation of the landfill.

The infrastructure of the TMB project includes all the existing infrastructure on the landfill site (weighbridge, administrative building, workshop, car wash station and gas station) as well as the infrastructures specific to the installation of the TMB, which are as follows:



- Access road and internal roads
- Additional weighbridge for weighing trucks to the landfill (after the 2nd stabilization stage)
- Administrative building
- Mechanical workshop for loader maintenance
- Garage for loaders
- Reception and unloading hall
- Post-processing and storage hall for recyclables (bales and containers)
- Pavements in the area of biological treatment activity
- Leachate storage pond
- Surface water retention basin
- Laboratory for analyzes to be performed during the TMB process

The residual non-recovered fraction is discharged to landfill. The landfill receives on average 53% of the quantities received on the TMB.

The extension of the existing landfill is designed to take into account the need for water control and leachate management.

The table in annex 1 presents general characteristics of the project.

Project rationale

The Sousse landfill is saturated, its extension was planned by the construction of an inter-bin area between the existing bins 1 and 2. In conjunction to the extension of the landfill, mechanical-biological treatment plant was studied.

The project aims at establishing an integrated waste management system in the Governorates of Bizerte, Sousse and Gabès and to improve the sanitary conditions of the neighbouring populations of the landfill site.

The project will contribute to the protection of the environment: the project is necessary to eradicate the illegal deposits of waste that are a source of contamination.

This concerns groundwater contaminated by untreated leachates. The project therefore will improve the protection of groundwater.

This also applies to the atmosphere contaminated by the fumes from landfill fires and the dust or light waste. The project contributes to reducing the air pollution corresponding to these emissions.

More particularly, the project will modify the characteristics of the waste to be buried, and consequently reduce the environmental impact of the landfill and the resulting nuisances:

- Reduction of the amount of waste to be landfilled: a 50% reduction in the amount of waste thanks to the TMB.
- Reduction of environmental emissions (leachate, biogas, odours, etc.)
- Reduced leachate management issues. The TMB will reduce the amount of leachate, the leachate concentration, the amount of concentrate to be removed, and will use fresh leachates to humidify the TMB windrows.
- Reduction of the amount of biogas

The project will contribute to the development of the circular economy:

- By sorting and recycling recoverable fractions that can either be recycled, converted into secondary fuel or a combination of both.
- Production of a stabilized fraction that will be used as an intermediate discharge cover.

Legal and institutional framework

Institutional structures adapted for the sustainable management of TMBs in Tunisia will have to bring greater efficiency at acceptable costs and encourage the intervention of the private sector in the development, operation and management of these facilities, at least for purely operational aspects.



Current situation of the contracts

Until now, ANGeD has been responsible for the construction and operation of transfer centers and landfill sites, although it should be noted that some municipalities manage their own transfer centers.

From 2005, management contracts for the management of the transfer and disposal of solid waste have been awarded for a period of 5 years (in fact, comparable to simple service contracts); at present, these management contracts are the only real PPP experience in the field of solid waste management in Tunisia.

These contracts cover the provision of infrastructure operation and management services but **without private sector involvement in the financing of infrastructure**. The design or implementation of the facilities because the investment requirements are minimal and focus on the provision of means of exploitation (vehicles, leachates treatment plants, catchment and flaring gas discharge stations and equipment).

Current situation of cost recovery and tariffs

Resources from the payment of the fee paid by the landfill customers currently allow ANGeD to cover about 20% of the operating costs of the landfill and transfer service. These resources are supplemented by state subsidies (mainly the environmental protection tax).

The current system of financing the landfill of waste (20% borne by municipalities and 80% by the environmental protection tax) would not allow, in the case of a PPP, to ensure the recovery of waste costs. Even the **operating costs could only be partially covered**.

In the case of TMB the valuation of by-products provides a recipe. Under no circumstances can this recipe cover the full cost, or even the simple cost of operating the facility. However, the legal aspect of the ownership of valuation revenues needs to be clarified.

Current legislative framework

Overall, the existing institutional and legal framework in Tunisia is well suited to the implementation of PPP projects and contracts.

In the solid waste management infrastructure public services, Tunisia also benefits from a mixed recovery system for the costs of post-collection of solid waste, fueled in part by royalties paid by landfill customers. partly through a grant from FODEP from the proceeds of the tax for the protection of the environment, which allows to ensure more generally a good level of recovery of operating costs of services (but cannot ensure self-financing).

However, as mentioned above, the performance of the royalty collection system remains insufficient since it currently **covers only around 20% of the operating costs** of the waste transfer and landfill service.

Recent legislative changes have broadened the PPP options that it is theoretically possible to implement in Tunisia to a wide range of contracts including the various types of contract: Service contract, Management contract, Affermage, Concession and Asset Transfer.

On the other hand, in the particular field of solid waste management, the creation decree of ANGeD has not been modified, preventing the agency from granting private persons concessions for the financing, the realization and the management of solid waste exploitation of the works.

In addition, given the weakness of its own resources, particularly financial, the agency would not be able to be the licensing authority able to reassure private operators.

The distribution of roles and actors

Project management, whether it is the current installations on which a TMB or a new complete TMB + discharge facility is added, is provided by the **ANGeD**.



The alternative is private sector investment, but the current cost recovery conditions represent too high a risk for such an alternative. Moreover, as mentioned above, the current legal system would not allow ANGED to make a concession.

Project management assistance (AMO) is a recognized function. Typically this role is assigned to a private consultancy firm with the necessary technical, legal and financial skills, and which is responsible for assisting the Project Owner in the preparation of projects and calls for tenders (technical studies, environmental and social impact studies, consultation and communication support, legal and administrative assembly studies, DCE) in the analysis of tenders, the finalization of contracts, and the supervision of works and operations. This assistance is desirable for a program as important as that envisaged here. This is a private sector intervention.

The **design / planning of installations** is generally divided between the Contracting Authority - or more specifically the AMO - and the builder.

In the case of a complete project management, the project owner will carry out detailed studies of the planned installation. The AMO then plays the role of Project Manager and will carry out project studies (APS and APD) and Project.

In a **design-build (DB) tender**, the contracting authority has a functional program prepared and a solution studied at the APS level, the rest of the design studies will be carried out by the designer of the consortium of the design contract.

In both cases it is a specialized design office. This is a private sector intervention.

The **realization of the installations** is the responsibility of the construction companies (equipment and civil engineering). This is a private sector intervention.

For the exploitation it seemed appropriate to indicate the distinction between Exploitation without Major maintenance renewal (GER) or Exploitation with GER. The client can always reserve the possibility of self-management of the GER. On mechanical or thermal installations such a solution is rarely recommended and remains rather marginal.

There is a range of possibilities for private operator intervention, from a simple service contract based primarily on the provision of means prescribed by a contract, to a global service (including GER) for a price fixed per tonne processed with commitment to the farm's performance in terms of availability, processing capacity, emission compliance, management of recoverable by-products and residues to be eliminated and restoration of the installation in perfect working order at the end of the contract.

As mentioned above, ANGED is currently a facility operator.

But the exploitation can also be entrusted to a specialized private company.

In the latter case it is a private sector intervention.

The operational control of the installations is currently ensured by the ANGED, but may be entrusted to a specialized design office. It is a typical mission of Assistance to Contracting Authority

Facility finance is a primary function. In the current situation, given the uncertainty of cost recovery, this solution appears to represent a level of risk that is difficult for the private sector to accept.

PPP and concession legal framework

PPP

- Law n° 49-2015 dated 27 November 2015, on Public-Private Partnership Contracts
- Government Decree n°771 dated 20 June 2016, on composition and prerogatives of



the strategic council for Public-Private Partnership Contracts

- Government Decree n°772 dated 20 June 2016, on fixing the conditions and procedures for entrusting Public-Private Partnership Contracts
- Government Decree n°782 dated 20 June 2016, on the modalities for keeping register of the actual dues encumbering the works, facilities and equipment set under Public-Private Partnership Contracts:
- Government Decree n°1104 dated 4 July 2016, on conditions and modalities for fixing the counterpart money to be paid by the public entity to the project company, and fixing the conditions and modalities for transfer and pledging of claims.
- Government Decree n°1185 dated 14 October 2016, on organization and responsibilities of the general Public-Private Partnership Authority.

Concessions

- Law n°2008-23 dated 1st April 2008, on the status of concessions
- Decree n° 2010-1753 dated 19 July 2010, on the conditions and procedures for entrusting concessions.
- Decree n° 2013-4631 dated 18 November 2013, modifying and complementing Decree n° 2010-1753 dated 19 July 2010, on the conditions and procedures of entrusting concessions.
- Decree n° 2013-4630 dated 18 November 2013, on the creation of a Concession follow-up Unit as part of the Presidency of the Government.

Completed technical studies

Bizerte

The APS (preliminary design) study was finalized in May 2018. This study includes the following studies:

- A complementary geotechnical study of the Bizerte landfill + Geotechnical supplement - Piezometers
- A characterization of the household waste of the Governorate of Bizerte for the mechano-biological treatment

Sousse

The APS (preliminary design) study was finalized in November 2018. This study includes the following studies:

- A geotechnical study of the zones 2 and 3 of the landfill of Sousse
- A characterization of the household waste of the Governorate of Sousse for the mechano-biological treatment

Gabès

The APS (preliminary design) study was finalized in November 2018. This study includes the following studies:

- A complementary geotechnical study of the Gabès landfill site + Geotechnical supplement - Piezometers
- A topographic survey was carried out
- A characterization of the household waste of the Gabès Governorate with a view to mechano-biological treatment



Technical studies completed or to be carried out

- Validation of the scope of the project (Waste Management Master Plan for the Governorates of Bizerte, Sousse and Gabès)
- Social and environmental impact study
- Feasibility study including PPP feasibility study
- Preparation of the PPP tender documents for the project

Prospective implementation schedule

- Procurement phase: 2019-2020
- Construction Phase: 2020-2022

- Operation Phase: 2022-2042

Estimated CAPEX, OPEX

The table in Annex 2 presents the estimated costs.

	CAPEX	OPEX
	M TND	M TND/year
Bizerte	137.7	62.1
Sousse	191.5	60.8
Gabès	62.7	26.4

Annex 1: Main characteristics of the projects

	Site	Waste Production	Maximum TMB capacity	Applicable option	TMB surface	Type of bio-treatment	Total lines of mechanical treatment	Landfill burial capacity	Surface of the Discharge
Unit	N/A	kt/year 2022-2041	kt/year	1, 2 or 3	Hectare			k cubic meters	Hectare
Bizerte	Current landfill	167 - 213	266	2 or 3	9.2	Membrane	2		13
Sousse	Current landfill	257 - 447	558	2 ou 3	15	Membrane			
Gabès	Current landfill	86 - 117	117	2 ou 3	6	Membrane		165	7.5



Annex 2: CAPEX, OPEX and Revenue estimates

	TMB	TMB	TMB	TMB	TMB	Landfill	Landfill	Landfill
	CAPEX (20 years)	OPEX (20 years)	Total cost (20 years)	Revenue	Total Net Cost	CAPEX (20 years)	OPEX (20 years)	Total cost (20 years)
Unit	k €	k €/year	€/T	€/T	€/T	k €	k €/year	€/T
Bizerte	43,036	19,404	25,9	1,7	32,5	9,736	6,281	12,5
Sousse	59,853	19,007	20,8	1,6	24,7	N/A	N/A	N/A
Gabès	19,526	8,260	24,5	2,0	32,7	2088	7,329	10,6

	TMB	TMB	TMB	TMB	TMB	Landfill	Landfill	Landfill
	CAPEX (20 years)	OPEX (20 years)	Total cost (20 years)	Revenue	Total Net Cost	CAPEX (20 years)	OPEX (20 years)	Total cost (20 years)
Unit	k TND	k TND/year	TND/T	TND/T	TND/T	k TND	k TND/year	TND/T
Bizerte	137,715	62,093	82,8	5,3	104,1	31,155	20,099	40,1
Sousse	191,530	60,822	66,7	5,0	79,1	N/A	N/A	N/A
Gabès	62,483	26,432	78,4	6,4	104,7	6,680	23,452	33,8

Exchange rate EUR/TND: 3.2