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Report on the Solid Waste Management in **ALGERIA**

April 2014



COUNTRY REPORT ON SOLID
WASTE MANAGEMENT IN

ALGERIA



April 2014



This report was last updated in April 2014

Developed with the cooperation of **Mr KEHILA Youcef**

Prepared

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COUNTRY PROFILE on solid waste management situation in ALGERIA

April 2014

BACKGROUND INFORMATION

| | |
|--|--|
| Population: | 37,5 million inhabitants (ONS, 2012) |
| Municipal Solid Waste (MSW) Generation: | ~ 10,3 million tons (2012) |
| Per capita MSW generation | |
| - Urban areas | ~ 0,8 kg / day / capita |
| - Rural areas | ~ 0,6 kg / day / capita |
| MSW generation annual growth: | ~ 3 % |
| Health activities waste generation (DAS) | ~ 30 000 t/year (2011) |
| Generation of industrial waste: | 2 550 000 t/year including ordinary industrial waste |
| Generation of special waste (hazardous) | ~ 330 000 t/year (2011) |
| Generation of green waste | ~130 000 t/year (2012). |
| Generation of waste from markets | ~ 96000 t/year (2012). |
| Generation of demolition waste : | ~ 11 M t/year (2012) |
| Waste tyres: | n/a |
| e-Waste: | n/a |

TECHNICAL PERFORMANCE

Municipal Waste (2012)

| | |
|--|---|
| MSW collection coverage: | |
| - Urban areas | Between 85 and 90% |
| - Rural areas | Between 65 and 70% |
| MSW final destination: | |
| - Composted | ~ 1% |
| - Recycled | ~ 7% |
| - Landfill (technical landfills / controlled landfills) | Between 30% and 40%; |
| - Dumping (raw dumps): | between 60% and 70% |
| Number of Landfills Class 2* achieved / or in progress: | 122 (2012) |
| - Planned | 18 technical landfills in study / or site selection phase. |
| - Under construction | 27 technical landfills are under construction (including 8 that have a significant rate of progress > 50%); |
| - Operational | 62 landfills have been completed and are equipped with operating means (55 in operation); 15 landfills are being launched |
| Number of Controlled Landfills** achieved / or in progress | 146 (2012) |
| - Planned | 38 |
| - Under construction | 47 (controlled landfills are in progress (including 23 with a progress rate > 50%); |
| - Operational | 61 controlled landfills have been completed (33 of which are in operation); |

* Technical Landfill class 2: Intended for a group of communes/100 000 inhabitants, it is composed of several racks, weigh bridge, fencing, etc..

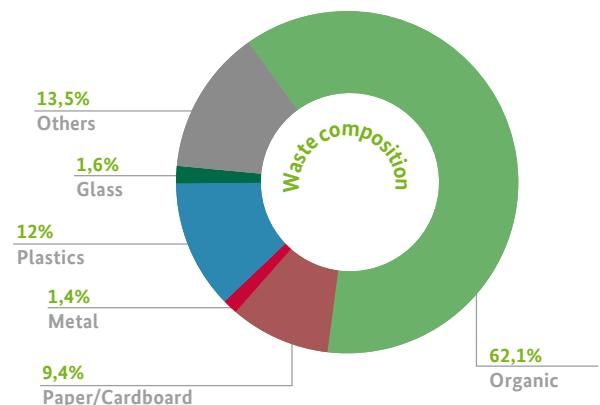
** Controlled Landfill: Intended primarily for an agglomeration of <1000 inhabitants. It consists of a single rack, but also a weighbridge, fencing, etc..

Hazardous and industrial Waste

| | |
|--|---|
| Number of units / centers of industrial waste treatment (physico-chemical treatment) | |
| Center for Technical Landfill | |
| - Planned | The Center of Technical Landfill at Ras El Ma, Wilaya of Sidi Bel Abbes. 2 (the first at Ain Fouris, Bir El Ater, Wilaya of Tebessa and the second at Mezaourou, Wilaya of Tlemcen for the sludge from the leaching process of zinc). |
| - Under construction | |
| - Operational | |
| Treatment Centers of special waste: | - Proposal to construct a treatment plant for hazardous waste (PCBs and other hazardous waste) -. Capacity 5000 tons by 2014 On going research site. - Project in study within the CNTTP for the construction of two stations for the regeneration of waste oils |
| Type of treatment for health care waste : | Incineration, Normalization (sterilization) and landfill |

Policy and planning environment

- Implementation of the National Program of Municipal Waste Management (PROGDEM) since 2002. This program is a reflection of a national environmental policy towards local communities. Several projects have already been developed (municipal master plans, technical landfill sites, sorting, ...);
- National Management Program for Industrial and Special Waste and Waste from health care activities (PNAGDES) since 2006.



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Legal framework

- Law No. 01-19 of 12/12/2001 relating to the management, control and disposal of waste, defines the basic principles that lead to an integrated waste management, from their generation to their disposal;
- Law No. 03-10 of 19/07/2003 on the protection of the environment and sustainable development sets out the general principles of a rational environmental management;
- Law No. 04-20 of 25 December 2004 on the prevention of major risks and disaster management in the context of sustainable development clearly defines the responsibilities of each actor involved in the field of prevention in industrial areas and centers.

Institutional framework

- The Ministry of Regional Planning and Environment (MATE) through its various instruments in particular, the National Waste Agency (NDA), the National Conservatory in Environmental Training (CNFE) and the Environment Directorates of the 48 Wilayas;
- Ministry of the Interior and Local Authorities (MICL) with financial support towards municipalities.

Financial provisions and cost recovery

- Infrastructure funded primarily by the State;
- Management fees partially funded by the junk removal tax, fixed between 500 and 1000 AD / household;
- Cost recovery: Supported by the common background of local authorities (FCCL);
- Average cost of treatment and disposal: between 1500 and 2000 AD (excluding depreciation).

Private sector participation

- The private sector is absent, with the exception of a few collection and transportation companies in some cities like Setif, Oran and some neighborhoods of Algiers.

Options for optimization

- Develop recovery and recycling in addition to the landfill;
- Scheduling to carry four incinerators with a capacity of about 1000 tons / day for the biggest cities namely: Algiers, Oran, Constantine and Annaba.

Roles and skills of local authorities

In accordance with the law 01-19 on the management, control and disposal of waste, municipalities are responsible for:

- Develop and implement municipal plans of municipal waste management as planning instruments;
- Continuously improve the conditions of collection and transportation, and conduct awareness campaigns encouraging users to comply with the waste storage conditions and collection schedules, without omitting the improvement and professionalization of the management capacity.

Climatic change adaptation and mitigation strategies

One of the major concerns for Algeria is the problem of climate change which exacerbates desertification, an issue that Algeria is already suffering for decades. Thus, since the ratification from the United Nations of the Framework Convention on Climate Change in April 1993, Algeria has mainstreamed sustainable development into its development plans, including a view to reducing its emissions of greenhouse gases emissions. Similarly it has adopted measures to improve energy efficiency and a policy of promoting renewable energy. It also strives to make the technology of carbon capture and storage of carbon dioxide (CO₂), a key element of its national policy on climate change.

LIST OF ABBREVIATIONS

| | |
|------------------|--|
| AND | Agence Nationale des Déchets - National Agency for Waste |
| ONS | Office National des Statistiques - National Statistics Office |
| GDMA | Gestion des Déchets Ménagers et Assimilés - Household and Similar Waste Management |
| DMS | Déchets Municipaux Solides - Municipal Solid Waste (MSW) |
| DIB | Déchets Industriels Banals - Ordinary Industrial Waste |
| DIS | Déchets Industriels Spéciaux - Hazardous Industrial Waste |
| DAS | Déchets d'Activités de Soins - Waste from Health Care Activities |
| DASRI | Déchets d'Activités de Soins à Risques Infectieux - Potentially Infectious Medical Waste |
| CET | Centre d'Enfouissement Technique - Technical Landfill Center |
| MATE | Ministère de l'Aménagement du Territoire et de l'Environnement - Ministry of Urban Planning and Environment |
| PIB (PPA) | Produit Intérieur Brut par habitant (en Parité du Pouvoir d'Achat) - Gross Domestic Product per capita (Purchasing Power Parity) |
| PNAE-DD | Plan d'Actions pour l'Environnement et le Développement Durable - Action Plan for the Environment and Sustainable Development |
| RNE 2000 | Rapport National sur l'Etat et l'avenir de l'Environnement - National Report on the State and Future of the Environment |
| PCB | PolyChloroBiphényles - Polychlorinated Biphenyl |
| POP'S | Polluants Organiques Persistants - Persistent Organic Pollutants |
| CNFE | Conservatoire National des Formations en Environnement - National Conservatory for Training on the Environment |
| CNTPP | Centre National des Technologies de Production Plus Propres - National Centre for Cleaner Production Technologies |
| CRSTRA | Centre de Recherche Scientifique et Technique sur les Régions Arides - Center for Scientific and Technical Research on Arid Areas |
| MICL | Ministère de l'Intérieur et des Collectivités Locales - Ministry of the Interior and Local Authorities |
| PROGDEM | Programme National des Gestion des Déchets Municipaux - National Program of Municipal Waste Management |

| | |
|------------------|--|
| PNAGDES | Programme National des Gestion des Déchets Spéciaux - National Program of Special Waste Management |
| PTF | Plate Forme - Platform |
| EPIC | Entreprise Publique à caractère Industriel et Commercial - Industrial and Commercial Public Company |
| APC | Assemblée Populaire Communale - Municipal Assembly |
| ALZINC | Société Algérienne du Zinc - Algerian Zinc company |
| ENOF | Entreprise Nationale des Produits Miniers non Ferreux - National Company of Non-ferrous Mining Products |
| ASMIDAL | Groupe de sociétés algériennes spécialisées dans la production d'engrais, d'ammoniac et d'autres fertilisants. - Group of Algerian companies specialized in the production of fertilizers, ammonia and other chemical fertilizers. |
| ISPAT | Entreprise Mital Steel spécialisée dans la sidérurgie - Mital Steel company specialized in the steel industry |
| NAFTAL | Filiale de la Société Nationale SONATRACH chargé de la Distribution des produits pétroliers sur le marché Algérien - Branch of the National Company Sonatrach responsible for the distribution of petroleum products in the Algerian market |
| SONATRACH | Société Nationale pour la recherche, la production, la Transformation et la Commercialisation des Hydrocarbures - National Company for Research, Production, Processing and Marketing of Hydrocarbons |
| CHU | Centre Hospitalo-Universitaire – University Hospital |
| ECO-JEM | Système National de Reprise, de Recyclage et de Valorisation des Déchets d'Emballage - National System for the Recovery, Recycling and Valorisation of Packaging Waste |
| FCCL | Fond Commun des Collectivités Locales - Common Fund for Local Authorities |
| INC | Incombustibles Non-Classés – Unclassified non-combustibles |
| CNC | Combustibles Non-classés – Unclassified Combustibles |
| PCI | Pouvoir Calorifique Inferieur – Lowercalorific value |
| PCS | Pouvoir Calorifique Supérieur – Gross calorific value |
| SNE | Stratégie Nationale pour l'Environnement – National Environment Strategy |

| | |
|---------------|--|
| SDGDM | Schéma Directeur des Gestion des Déchets Municipaux – Master Plan for the Municipal Waste Management |
| EDIVAL | Etablissement de Développement des Espaces Verts d’Alger – Establishment to Develop Green Spaces in Algiers |

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Y. Kehila

EXECUTIVE SUMMARY

Aware of the challenges that the environment represents for sustainable development over the past ten years, the Algerian State has adopted strategies for environmental conservation in various sectors in the last 12 years. These strategies are based on several axes, including: preservation of the water, land and forests, the protection of sensitive ecosystems (coastline, steppe, Sahara), industrial pollution control, waste management, protection of natural areas and animal species, etc.

The management of urban solid waste is part of the National Environmental Action Plan and Sustainable Development (PNAE-DD) through the adoption of a National Program for Integrated Management of household and similar waste (PROGDEM). It aims for an integrated, phased and progressive management approach of household waste. This program has defined the main directions for the implementation of this management through:

- The reorganization of the municipal administration responsible for waste management;
- Building capacity for the collection and transportation services of the municipality;
- Opening the public service waste management to private investment;
- The implementation of a program of training and technical assistance;
- The implementation of facilities for the collection.

Since 2002 the date of its implementation, PROGDEM is in a state of significant progress which results in:

- The development of 1.223 municipal master plans for the management of household and similar waste on the 1.541 existing communities, that makes a coverage rate of 79.36% of the entire national territory;
- Achievement/ launch of 122 Class 2 Technical Landfill Centers and 146 controlled landfills;
- Launch of a program to rehabilitate 101 unauthorized dumps, especially in municipalities where Technical Landfill Centers are operational;
- Achievement of 32 landfills and 29 sorting centers;
- Achievement of 26 transfer stations (points of changing loadings) for the economy of transportation from the collection points to the waste processing centers located at distances of over 20 km;
- Implementation of 44 public establishments in the Wilayas (EPIC) for the industrial and commercial management of the Technical Landfill Centers;
- Modernization and mechanization of the equipment;
- Building local capacity via training cycles of the technical staff to improve the level of technical services for local communities;
- Strengthening the policy of recycling and recovery of waste at source, by reducing the production, by reusing and recycling. Approximately 50% of household and similar waste will be treated by 2014.

Concerning industrial waste (including ordinary industrial waste), they recorded an annual production of approximately: 2.550.000 tons/ year, of which special waste is about 330.000 tons/ year and waste arising from health care activities with risk of infection (DAS/HCW) approaching 30.000 tons/ year (2011).

For 2014, it is planned:

- To acquire and/ or rehabilitate 348 incinerators for waste from healthcare activities;
- To complete and turn on two Class 1 Technical Landfill Centers for the management of hazardous industrial waste;
- To put into operation a landfill for waste from the ALZINC Ghazaouet (Tlemcen) plant to discharge sludge leachate of zinc. Over 500.000 tons are awaiting processing;
- To carry out a treatment and disposal center for PCBs and other POPs.

For the two years 2012 and 2013, a budget of more than 6 billion dinars was allocated for effective care of special waste, particularly as regards the decontamination of the site where mercury waste is processed (ENOF Azzaba), the disposal of obsolete pesticide stocks, the containment of hazardous waste from the complex of zinc electrolysis of Ghazaouat - Tlemcen, etc..

1. INTRODUCTION

In Algeria, the amount of household and similar waste has substantially increased over the last decades due to rapid population growth, coupled with an uncontrolled urbanization. This phenomenon is accentuated due to lack of resources and adequate facilities.

Meanwhile, the composition of this waste is in the process of moving from an organic profile (food waste) to complex materials (packaging, plastics, end-of-life, etc.) and that pose major risks to the environment and the public health. The method which is practiced for their elimination remains to this day the landfill, because of its low cost compared to other methods such as incineration or composting.

Thus, it is necessary to control this increasingly growing waste stream to:

- Protect the quality of ground water against the infiltration of leachate from landfills;
- Preserve and save land for the storage of waste;
- Reduce odors and greenhouse gases, some of which are toxic.

1.1. SOCIO-ECONOMIC AND POLITICAL SITUATION

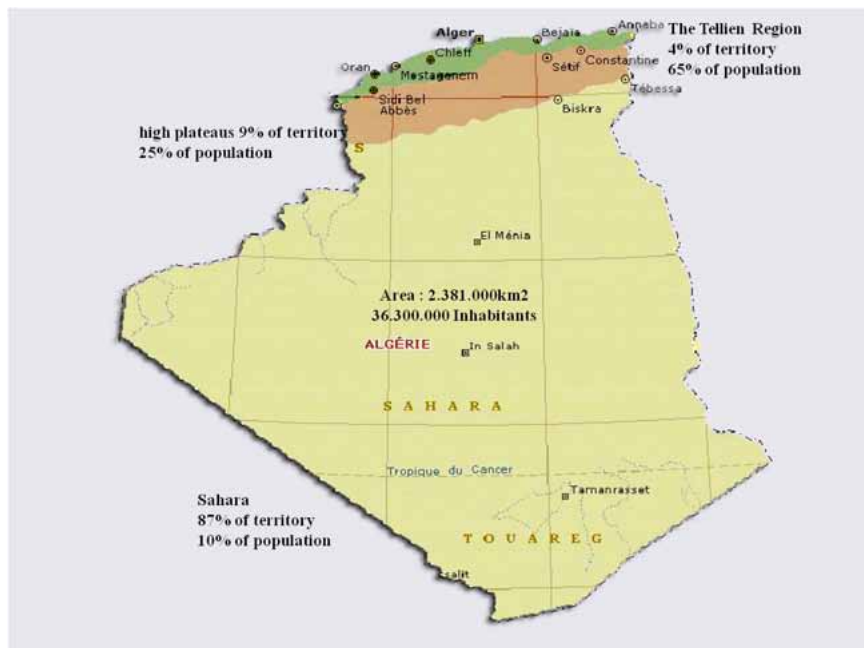
The territory is divided into three separate sets; the Sahara desert represents 87% of the country - the high plateaus 9% - and the North (Tellien Region) only 4% (Fig. 1).

According to the Office for National Statistics (ONS), the number of inhabitants for 2012 is estimated at 37.5 million inhabitants with a population growth rate of about 1.43%. The population is concentrated mainly in the North, which represents about 65% of the overall population. Hence, this region has a very high rate of urbanization and occupation density exceeding 300 inhabitants per km² (density relative to the total area, approximately 14.9 inhabitants per km²).

Table 1: ELEMENTS OF ASSESSMENT

| | |
|---------------------------------------|---|
| Population | ~ 37.500.000 (ONS, June 2012) Growth per year : ~ 1,43% Urban: 65%, Rural: 35% Density North: ~ 300 hab./Km ² Density national: 14,9 hab./Km ² |
| Generation of MSW per capita (US\$) | ~ 15 US\$ |
| Generation of MSW (2012) | ~ 10,3 Million Tons |
| Composition of MSW (%) | Organic : 60 - 65 % Papers: 9 - 10 % Plastic: 11 - 13 % Textile: 10 - 12 % Glass: 1 - 1,5 % Metals: 1 - 2 % Other: 2 - 4 % |
| Composition of MSW per producer (%) | Household and Enterprises: 85 % Industries (non-hazardous): 15 % |
| Generation of MSW per capita (kg/d/h) | Rural: ~0,6 kg/j/h Urban: ~0,8kg/j/h Capital City (Algiers): ~ 0,9 kg/j/h |
| Coverage of the MSW collection | Rural: ~ 65 à 70% Urban: ~ 85 à 90% |
| Waste Processing (%) | Composting: ~1% Recycling: ~7% Burying (Technical and Controlled Landfills): ~ 30 - 35 % Discharge (Gross Landfills): ~ 60-65 % Other (burning, ...) : ~ 5-10 % |
| Growth of MSW | ~ 3 % |
| Healthcare waste (DAS) | 30.000 Tons/an (2011) |
| Industrial waste | 2.547.000 Tons/year, including non-hazardous waste |
| Hazardous waste | 330.000 Tons/year (2011) |
| Green waste | |

Figure 1: MAP OF ALGERIA: DISTRIBUTION OF POPULATION BY REGION



Algeria has 1.541 municipalities including 24 large cities (chief towns of the wilayas), which have more than 100.000 inhabitants and about 300 administrative centers of towns with more than 20.000 inhabitants. For 2012, the GDP per capita was estimated at US\$ 7.268 with a growth rate of about 3% (Source: IMF, Bank of Algeria, Ministry of Finance, November 2013).

1.2. INVENTORIES OF THE WASTE MANAGEMENT

The waste management policy is part of the National Environmental Strategy (SNE) and the National Environmental and Sustainable Development Action Plan (PNAE-DD), which resulted in the promulgation of the law 01-19 on December 12, 2001 on the management, control and disposal of waste, dealing with aspects relating to the management of waste. Its principles are:

- The prevention and reduction of production and harmfulness of waste at the source;
- The organization of the sorting, collection, transport and treatment of waste;
- The recovery of waste by its reuse and recycling;
- An environmentally sound waste treatment;
- Information and public awareness on the risks posed by waste and its impact on health and the environment;
- The establishment of management tools: the Integrated National Program for the Solid Waste Household Management (PROGDEM) and the National Plan for Management of Special Wastes (PNAGDES).

However, the urban waste management in Algeria is far from being efficient. Local authorities still face many difficulties in the collection, transport and treatment of waste, despite the efforts made.

2. NATIONAL POLICIES OF MUNICIPAL SOLID WASTE MANAGEMENT

The National Action Plan for Environment and Sustainable Development (PNAE-DD) set the various environmental programs in the country for 2001-2009. The «National Report on the State and Future of the Environment» (RNE 2000) served as the basis for the development of this plan. Thus, since 2002, the management of municipal solid waste has experienced significant progress through the development and implementation of regulatory measures and support for training and by raising awareness among technical services (local authorities) and waste managers.

2.1. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

In accordance with the law 01-19 on the management, control and disposal of waste, two ministries are directly involved in the management of household and similar waste:

- The Ministry of Planning and Environment (MATE), particularly through its various instruments, the National Waste Agency (AND), the National Conservatory in Environmental Training (CNFE) and environmental Directorates of the 48 wilayas;
- The Ministry of the Interior and Local Authorities (MICL) for financial support towards municipalities.

The MATE, in collaboration with relevant sectors, is responsible for the implementation of the National Program of Municipal Waste Management (PROGDEM). The goals of this program are: (i) the preservation of the public health and the cleanliness of the cities; (ii) the improvement of the life quality of the citizens and the protection of health; (iii) the safe and environmentally sound waste disposal and recovery of recyclable waste; and (iv) the creation of 'green' jobs.

The National Waste Agency (AND), which has the status of an industrial and commercial public company (EPIC), also has a commercial character in the study and research in its relations with third parties, as well as a the role of a public service with the administration and is essentially assisting local authorities in waste management.

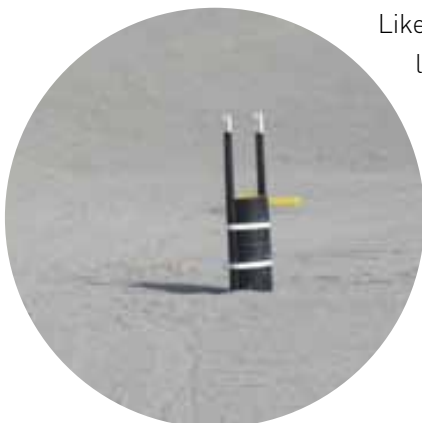
The Ministry of the Interior and local authorities (MICL) provides financial and logistical support to the municipal popular assemblies (APC) through annual subsidies. The amount earmarked for urban waste management is quite significant and may represent up to ¼ of the total budget.

2.2. STRATEGIES, ACTION PLANS AND INITIATIVES

Like other emerging countries, Algeria has gone from illegal dumping to controlled landfills and technical burying centers, reflecting a real awareness for environmental protection and the need for an integrated management of the municipal solid waste.

The program in progress should be achieved by the production of: 122-146 Technical Landfills, 32 controlled landfills, 29 sorting centers - 54 Class 3 Technical Lanfill Centers (for inert waste) - as well as the rehabilitation of 40 unauthorized dumps.

Figure 2: Technical landfill center hamici (tipaza): case & leachate treatment station



In the horizon 2014-2018, it is planned to rehabilitate the largest landfills around the country, while the number of Class 2 Technical Landfills will exceed 300 and will thus contribute to support more than 75% of household and similar waste (Fig. 2).

It should be noted that the PROGDEM provides ultimately the achievement of a Class 2 Technical Landfill for all agglomerations with more than 100.000 inhabitants, and the rehabilitation of all existing landfills.

2.3. PLANNING AND INVESTMENT

The Ministry of the Interior and Local Authorities (MICL) mobilized during the past 10 years significant funding for strengthening the fleet for the removal of municipal waste in favor of a very large number of municipalities. This is a plan and an investment program of urgent priority. Apart from this special operation, the usual procedure is the annual budget planning of the municipal popular assembly (APC), which is prepared by municipal officials and sent to the wilaya, which studies according to its budgets as it is allocated by the government. Financial assistance is provided for up to 30 MDA (over a period of three years) for each EPIC Management of Technical landfill created. The program is in progress (2012) and includes:

Class 2 Technical Burying Center (for household and similar waste) (2012)

- Under construction: 27 (8 Technical landfills with a progress rate →50% and 17 ←50%);
- Being launched: 15;
- In study phase : 16 ;
- In phase of site selection: 02.

Number of controlled landfills (for household and similar waste) (2012)

- Under construction: 47 (23 landfills with a progress rate →50% and 24 ←50%);
- Being launched: 17 ;
- In study phase : 17 ;
- In phase of site selection: 04.

Class 3 Technical landfills (for inert waste) (2012)

- Under construction: 20 (13 Technical landfills with a progress rate →50% and 07 ←50%);
- Being launched: 13 ;
- In study phase: 07 ;
- In phase of site selection: 05.

Rehabilitation of the unauthorized dumps (2012)

- Being rehabilitated: 17;
- In study phase: 44

Waste collection and sorting facilities (2012):

- **Collection sites** : - in progress : 11 ; - in study phase: 09 ; - not launched : 06
- **Sorting facilities** : - under construction: 07 ; - in study : 07 ; - not launched : 04



Figure 3: Waste disposal Beni Merrad (BLIDA)
Figure 4: Rehabilitated discharge (Djelfa)

In the context of the improvement of the quality of life for citizens, an amount of 100 million dinars was made available for 05 pilot cities, namely, Staoueli (Algiers), Djelfa, Tlemcen, Annaba and Ghardaia, the basic aim is to achieve outreach (awareness) in the direction of households on the selective sorting in some representative areas of the targeted cities.

2.4. MONITORING

The management of municipal and similar waste is primarily the responsibility of the cleaning services of the local authorities (APC). This makes it difficult to control and monitor all stages of collection, transport and disposal of MSW. The establishment of industrial and commercial companies (EPIC) for all wilayas has as main mission to take in charge the waste management. Local authorities will have the essential role to control and monitor the cleanliness of the city.

2.5. FISCAL, FINANCE AND ECONOMICAL STEERING INSTRUMENTS

Despite the efforts made by the government, the involvement of local authorities in the process of waste management is very limited. The recovery rate of the environmental tax for household waste is set between 500 and 1.000 AD/ year.

Waste management is, in our view, a complex operation. Hence, there is a need to reorganize the services which are responsible for municipal solid waste by strengthening the capacity to collect and transport, and to open the sector to private investment and concession. That is to say, we should go towards the professionalism of the sector.

2.6. PRIVATE SECTOR PARTICIPATION POLICY

To face the difficulties encountered by local authorities in waste management, it is necessary to use the franchise system (private sector). It should be noted that the private sector remains very limited. Some collection companies and operators have begun to appear in some cities such as Setif, Oran Bordj El Kiffan, Gué de Constantine (Algiers).

As for recyclable materials, the number of collectors is insufficient compared to the existing deposit. Of the 873 micro-enterprises recorded in 2008 to the AND, only 247 are operating on the ground, and only 7% of recyclable materials are recovered from the existing deposit.

2.7. PUBLIC AWARENESS, EDUCATION AND COMMUNITY PARTICIPATION

NGOs active in the field of raising awareness are supported by the authorities. The National Conservatory of Environmental Training (CNFE) is responsible among other things, to initiate and conduct various awareness actions. To invest in the long term, environmental education will be phased into the cursus of basic and secondary schools. An agreement was signed in 2010 between the Ministries of Environment and Education on environmental education in schools and should cover the entire area of National Education (Primary Schools, Secondary Schools). Some large municipalities begin to implement environmental sections to promote awareness towards the public.

2.8. NATIONAL CAPACITY BUILDING AND TRAINING CAPACITIES

In the framework of the conventions signed between the National Academy of Environmental Training (CNFE) and the wilayas of the high plateaus (special development program for the highlands), the staff of local communities in these areas has benefited from several training sessions for the mastery of waste management in all its diversity. At the end of 2012, more than 5.500 technical staff and officials have received training.

2.9. CAPACITY BUILDING REQUIREMENTS

The value chain of MSW includes in fact four levels, namely: Engineering Studies, logistics and transfer, treatment and recovery, and finally disposal. These require expertise for which Algeria accumulates huge delays. The state has set the challenge of transforming the delay in this field in a plus in order to develop a green economy, which involves a lot of investment for building local capacity.

2.10. NATIONAL INITIATIVE FOR MULTI STAKEHOLDER INVOLVEMENT

Promoting an integrated and sustainable solid waste management at the regional level inevitably involves multi-partner exchanges through the establishment of a network of national experts. The main objectives are:

- Establish a core of knowledge and expertise to provide technical assistance and advisory services for the promotion of integrated MSW management at local level;
- Promote regional exchange of information and experiences relating to the sector of waste;
- Establish the conditions and environment needed for investment in the sector of solid urban waste with the help of regional and international financial institutions.

2.11. CASE STUDIES, BEST PRACTICES, LESSONS LEARNT

- Pilot project entitled «Clean District» launched in July 2010. The goal is to raise awareness and citizen involvement in the field of environmental education and protection of public health. The program is organized around associations that are active mainly in the field of environmental protection.
- Project to establish a system of «selective collection» in five pilot cities, namely: Staouéli (Algiers), Djelfa, Annaba, Tlemcen and Ghardaia. This device provides that instead of throwing everything in the same bin, the «selective sorting» consists in separating the waste for eventual recycling into new products.
- Launch in November 2013 by the General Directorate of National Security in partnership with the Ministry of Regional Planning and Environment, a national competition called «Green Award for a clean neighborhood» to improve the living environment through all cities.

2.12. INITIATIVES AND PERSPECTIVES

- In addition to the Technical Centers (CET), the number of which is constantly increasing, many efforts have been made to develop the recovery and recycling sector, as part of the EcoJem.
- One can also note the programming for the implementation of 4 incinerators, about 1000 t/ day for the largest cities; Algiers, Oran, Constantine and Annaba.

3. HAZARDOUS INDUSTRIAL WASTE MANAGEMENT

The hazardous wastes generated are approximately: 330.000t/ year (2011). The quantities of stored waste waiting for a disposal solution since 2007 are around 2.008.500 tons. Since then, an annual decrease of 10% has been reported. To reduce this large amount of special waste, the government has planned:

- The completion of two technical landfills of class I (final study phase), the first located in the region Tébessa (North-East), and the second in the region of Sidi Bel Abbes (West);
- Implementation of a technical landfill for waste from the plant ALZINC Ghazaouet (Tlemcen) for landfill of more than 500,000 tons of sludge leachate of zinc;
- Programming of making a treatment plant for special and hazardous waste (in the wilaya of Medea (Centre)), with funding from the Global Environment Fund amounting to US\$25 million and a participation of Algeria amounting to US\$13 million.

3.1. LEGAL AND INSTITUTIONAL FRAMEWORK

On the regulatory side, an important legal arsenal has been established to allow Algeria to comply with international commitments, to which Algeria has signed, to ensure the management of environmental issues in the perspective of a sustainable development.

Thus, the main principles of environmental laws in Algeria are enshrined in three laws, namely:

Law No. 01-19 of 12/12/2001 relating to the management, control and disposal of waste, defines the basic principles that lead to an integrated waste management, from their generation to their disposal.

Law No. 03-10 of 19/07/2003 on the protection of the environment and sustainable development, sets out the general principles of a rational environmental management.

Law No. 04-20 of December, 25 2004 on the prevention of major risks and disaster management in the context of sustainable development, clearly defines the responsibilities of each actor involved in the field of prevention in industrial areas and centers.

The main texts are as follows:

- **Executive Decree No. 03-477 of December, 9 2003** on the modalities and procedures for the preparation, publication and revision of the national management plan of hazardous waste;
- **Executive Decree No. 03-478 of December, 9 2003** laying down rules for the management of waste from healthcare activities;
- **Executive Decree No. 06-104 of February, 28 2006** on the nomenclature of waste including hazardous special waste;
- **Executive Decree No. 06-138 of April, 15 2006** regulating the emission into the atmosphere of gases, fumes, vapor, liquid or solid particles, as well as the conditions under which their control is applied;

- **Executive Decree No. 06-141 of April, 19 2006** laying down the limit values for discharges of industrial effluents.

At the **institutional level**, several instruments have been introduced; their mission is to support the modernization of the management of hazardous waste:

- The Ministry of Regional Planning and Environment (MATE) is responsible for the national strategy for solid waste management;
- The National Agency for Waste (AND) created by Executive Decree No. 02-175 of 20/05/2002: It is the instrument of MATE in implementation of the national waste policy. The EPIC status confers a commercial nature in matters of education and research as well as a public service role with the administration and is essentially assistance to local communities. Its mission is to promote activities related to integrated waste management;
- The National Observatory for Environment and Sustainable Development (ONEDD) created by Executive Decree No. 02-115 of 03/04/2002, is responsible for implementing and managing observation networks and measures of pollution, monitoring of natural environments and collecting data from national institutions and specialized agencies related to the environment and sustainable development. Its mission is also to treat environmental data and information to develop information tools, to conduct studies to improve knowledge of environments and pressures on the environment and publish and disseminate environmental information;
- The National Centre for Cleaner Technologies (CNTPP) dated 17/08/2002 created by Executive Decree No. 02-262. It is the institutional and technical instrument for the dissemination of cleaner production techniques in different economic sectors. It provides public service missions in assessing environmental liabilities of the industrial sector. As such, he has contributed to the achievement of environmental audits of some industrial enterprises;
- At the Popular Communal Assemblies (APC), municipalities have a municipal health office that can address the shortcomings in the performance of services (collection and/ or transportation of municipal waste, illegal dumping ...);
- The Department of Environment is empowered to establish offenses. In practice, the direction controls the environmental infrastructure and the industrial activities (but not the collection and transportation of waste, due to lack of resources);
- At national level, there is a police for the urban planning and the Environmental Protection (under the Ministry of the Interior) that can verbalize and punish offenses against the environment. In practice, for reasons of lack of staff, this policy has little effect on the control of solid waste management.

3.2. STRATEGIES AND PLANNING

The policy of management of hazardous waste is part of the National Environmental Strategy (NES) and the National Environmental action plan and Sustainable Development (NEAP-DD).

The National Plan for Management of Special Wastes (PNAGDES), established by Law 01-19 of December 12, 2001 on the management, control and disposal of waste, aims at the management of all hazardous waste in Algeria by: the establishment of waste collection channels, transportation, consolidation, treatment and recovery of waste; and the promotion of businesses and services related to the management of hazardous waste.

The law prohibits any company to abandon, burn, bury or reject hazardous industrial waste (DIS) it produces. Therefore, it must assign this management to specialized companies. Collection of hazardous waste is subject to authorization by decision of the Minister of the Environment.

3.3. FINANCING

The PNAGDES is planned for ten years (2003 - 2013) and recommends during this period to eliminate all stocks of hazardous waste including waste contaminated with PCBs and obsolete pesticides, as well as manufacture. Import and use of these two substances are prohibited, all amounts available in the country are already or will become waste as defined in the law 01/19 on the management, control and disposal of waste. This requires more than € 22.5 million that the Algerian State must pay (report MATE 2006).

3.4. COLLECTION, TREATMENT AND DISPOSAL

In Algeria, the industrial waste management is still not developed technically and organizationally. Industrial units and existing structures struggle indeed to eliminate their hazardous waste and leftovers of hazardous products. This promotes practices such as: the open burning, the mixture of different categories of waste, the unauthorized discharge and other forms of inappropriate storage.

It should also be noted that, over the past five years, the country has experienced a remarkable progress in the prevention and reduction of industrial pollution. Several highly polluting units and industrial complexes are in the process of integrating the requirements of environmental protection in their development projects, and have made investments to reduce industrial pollution; for example:

- The ASMIDAL group (Annaba) specialized in the production, marketing and development of fertilizer, ammonia and derivatives, has stopped the use of two polluting units and provided rehabilitation equipment. The company has implemented a management plan for the environment, which results in the development of an industrial waste storage site, the creation of an environmental laboratory and the establishment of a management system ISO 14001;
- The manufacturing plant of steel, ISPAT, El Hajar (Annaba) installed dust collection systems and set up treatment facilities in liquid effluents;
- the complex of plastic materials in Skikda has established a clean technology based on ion exchange membranes, which helped to eliminate releases of mercury;
- The acquisition by the paint manufacturing unit in Lakhdaria (Bouira) of three dust extractors and a chain of automatic wash for mobile tanks, ensures a wash cycle in a closed circuit and regenerates the solvent, which prevents liquid discharges;
- The complex of zinc electrolysis in Ghazaouet has, among other things, led to the creation of a technical landfill site to receive leaching waste.

On the disposal of PCB, contaminated soil, pesticides and other POPs, on awaiting completion of an appropriate factory, they are exported to more developed countries (in Europe) that have adequate facilities. Several programs are in progress, the goal is the gradual elimination of the existing stock.

3.5. PRIVATE SECTOR INVOLVEMENT

The management of industrial and special waste is still insured by the public sector with the participation of foreign companies. The management of this type of waste requires special attention to avoid exposure to toxic agents, which explains the absence of the private sector.

However, incentive mechanisms are put in place to stimulate the participation of this sector in activities related to waste management in the form of contracts or concessions.

3.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

Disposal of PCB

The feasibility study conducted by the Ministry of Environment and Regional Planning has retained the option to export for disposal of PCB-based products (devices, oil and waste) in licensed facilities in Europe (France, Belgium, ...). The PCB disposal program was identified as a priority. The operation started in 2006 and mainly concerned:

- More than 142 priority sites contaminated with PCBs, and 07 by the Pesticides POP's, more than 390 tons of soil to be treated;
- Discarded units: Among 3042 units located in various places and in various structures throughout the country. Most of them are leaking because of inadequate care;
- Oil barrels: 2.554 tons to support this priority, given the danger and risk of loss of this mass of highly toxic products;
- The overall cost of the operation (removal of PCB + contaminated soil + waste) was estimated at: 20.863.740 €.

Among the lessons learned:

- The need to double the efforts to eliminate PCBs and other POP's in accordance with the guidelines of the Stockholm Convention;
- The need to strengthen institutions and regulations;
- Strengthening National Capacity in accordance with the Stockholm Convention through the exchange of experience with developed countries and neighboring countries.

3.7. INITIATIVES AND PERSPECTIVES

The project to build a plant for the removal of Persistent Organic Pollutants commonly called POP's is part of the implementation of the provisions of the Stockholm Convention on Persistent Organic Products (POP's). The latter aims to reduce and eliminate releases of 12 POP's recognized as the most dangerous and which are a major concern of the world community.

This plant would be located in the new city of Boughzoul (Medea) located at about 200 km south of Algiers, with funding from the Global Environment Fund amounting to US\$25 million and a participation of Algeria amounting to US\$13 million. This plant will be operational starting from 2014.

4. MEDICAL WASTE MANAGEMENT

Shortcomings are still observed to date in the management of medical waste. Indeed, in some hospitals, medical waste is sometimes collected with bare hands or directly routed to landfills and/ or burned in situ or in open burners. However, the management of this type of waste requires greater attention to avoid exposure to infectious agents and toxic substances. The incineration in situ is the most appropriate solution as a mode of treatment, and the trivialization as a mode of pretreatment.

You should know that the Healthcare Waste Management Activity (DAS) is an essential component of the hospital activity; it is part of the chain of care activity. Thus mismanagement of DAS degrades the quality of care and becomes detrimental to the health of citizens. The treatment of DAS is important for the present and for the future, a public health issue and a challenge for the public authorities.

4.1. LEGAL AND INSTITUTIONAL FRAMEWORK

- **Law No. 01-19 of 12/12/2001** relating to the management, control and disposal of waste, defines the basic principles that lead to an integrated waste management, from their generation to their disposal;
- **Law No. 03-10 of 19/07/2003** on the protection of the environment and sustainable development, sets out the general principles of a rational environmental management;
- **Law No. 04-20 of 25/12/2004** on the prevention of major risks and disaster management in the context of sustainable development, clearly defines the responsibilities of each actor involved in the field of prevention in industrial areas and centers.
- **Executive Decree No. 03-478 of 19/12/2003** laying down rules for the management of waste from healthcare activities.

At the institutional level, in addition to the Ministries of Health and Regional Planning and Environment, there is the involvement of several institutions:

- The National Centre for Cleaner Production Technologies (CNTPP);
- The National Observatory of the Environment and Sustainable Development;
- The National Agency for Waste;
- The National Academy of Environmental Training;
- The High Council of the Environment and Sustainable Development.

4.2. STRATEGIES AND PLANNING

The existing treatment facilities of medical waste are too inadequate despite efforts by the government. Indeed, out of 178 incinerators installed, only 131 are operational, with more than 70% which are used as burners without any standard: Much of this waste ends up in landfills. That is to say that it would be appropriate to provide and make available foreign competences, including technical cooperation for the efficient management of hospital waste (organization, sorting, collection circuit, incineration, treatment stations for liquid effluents and rehabilitation).

4.3. FINANCING

After the five-year Growth Support program 2005-2009, which has spent about 386 million € in the environmental sector with more than 50% for the waste management, Algeria embarked on a program covering the period 2010-2014 much more ambitious for the waste management. The area of Regional Planning and the Environment (MATE) has received more than 05 billion euros for this period.

4.4. COLLECTION, TREATMENT AND DISPOSAL

With 13 University Hospital, 173 Hospitals, 21 specialized hospital facilities and more than 5.000 health care centers (polyclinics, health centers, ...), without taking into account the laboratories and private health practitioners, the organization of the management of the disposal operations of the waste from health-care activities in all these structures is the responsibility of the manager of each establishment from their production by preventing related risks to their final treatment, identifying, and securing each category of waste in a chain of elimination (sorting, collection, packaging, transportation and destruction). No less than 30.000 tons of waste from healthcare activities is generated annually in Algeria. It should also be noted that the management of healthcare waste is far from being conducted in accordance with the requirements of environmental protection.

The internal organization of the healthcare waste industry remains fully implement: sorting at source, equipment translation and transportation, containers, development of platforms (TFP) for grouping health-care activity waste, and planning industrial TFP treatment. In general, upgrading the hospital waste management requires large budgets, both in investment and operation.

4.5. PRIVATE SECTOR INVOLVEMENT

The non-diffused sector (public and private hospitals) has established a sorting of infectious waste at source and collection and treatment channels in accordance with the regulations, the diffused sector (small and medium producers) is in the process of organization, given its fragmentation and the small size of the deposits. The private sector is struggling to engage in this sector, given its specificity, which requires special arrangements.

4.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

Hospital waste management in the hospital Bachir Mentouri in Kouba under the Algerian-Belgian Technical Cooperation

Amount of the aid: 575.000 €. The operation consisted of the treatment of medical waste and an installation of an incinerator. The latter was commissioned on December 20, 2011 for a capacity of destruction of about 70 kg/h with a cycle time of 8 hours a day or more processing 550 kg/day. The unit runs on natural gas. The incinerator also has a stainless steel chimney with a height of 28m which allows treatment of advanced smoke and collection of recyclable waste.

Other partnership projects with Belgium are provided for the acquisition of seven incinerators for the treatment of waste from healthcare activities. This partnership is part of the strategy outlined by the State for the treatment and disposal of hazardous waste through a national plan.

4.7. INITIATIVES AND PERSPECTIVES

Taking better account of environmental requirements is reflected in numerous provisions to find the right balance between respect for the environment and economic development. In this perspective, 250 contracts of environmental performance with the ambition to prepare the industry sector to adopt environmental management practices based on internationally recognized standard criteria have been signed with industrial groups in the steel, chemical, pharmacy, manufacturing, food, etc.

The system in place has enabled the creation of 2.000 green jobs (delegates for the environment) in industrial enterprises and the improvement of the environment and the quality through the introduction of ISO 9000 and 14000, more than 100 companies are certified either ISO 14000 or in the process of certification.

Precisely, a first operation in the framework of environmental performance for the co-incineration of expired medicines stored was signed on November 28, 2013, between the company Lafarge, the National Union of Pharmacists (Snapo) and the Ministry of Regional Planning and Environment (MATE). This should eventually eliminate not less than 1.500 tons of obsolete drugs stock in about 9.000 existing pharmacies in Algeria.

5. GREEN AND AGRICULTURAL WASTE

These are wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing as well as from the preparation and processing of food. The lack of statistics does not allow for identifying the annual flow of waste. It is also estimated an annual production of green waste (mainly tree pruning and grass clippings) about 130.000 tons, and waste from markets 96.000 tons. Pesticides currently in stock (obsolete) are estimated at approximately 2.660 tons (MATE 2012).

5.1. LEGAL AND INSTITUTIONAL FRAMEWORK

Apart from green and organic waste, management of risk exposure and the use of chemicals in agriculture is based on the registration and control by the Government services, in accordance with legislation and regulations in place including:

- **Law No. 85-05 of 16/02/85**, as amended and supplemented, relating to the protection and promotion of health;
- **Law No. 87-17 of 01/08/87** on plant protection, including Title IV;
- **Law No. 01-19 of 12/12/2001** relating to the management, control and disposal of waste, defines the basic principles that lead to an integrated waste management, from their generation to their disposal;
- **Law No. 03-10 of 19/07/2003** on the protection of the environment and sustainable development, sets out the general principles of a rational environmental management;
- **Law No. 08-16 of 3/8/2008** on agricultural orientation;
- **Law No. 09-03 of 25/02/09** relating to consumer protection and fraud prevention;
- **Executive Decree No. 95-405 of 2/12/1995** on the control of pesticides for agricultural use, as amended and supplemented by Executive Decree No. 99-156 of 20 /07/1999;
- **Executive Decree No. 06-104 of 28/02/2006** on the nomenclature of waste (Annex III), it classifies wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing as well, as those resulting from the preparation and processing of food.

5.2. STRATEGIES AND PLANNING

In terms of rational management of chemicals, Algeria has set the priority to develop and generalize the sustainable productive agricultural practices, removing toxic pesticides and developing less polluting natural solutions and alternative methods based primarily on biological control.

5.3. FINANCING

Green waste and waste from markets generally follow the chain of household and similar waste. For plant protection products in stock, the PNAGDES recommends to eliminate all the stocks of hazardous

waste, including waste contaminated with PCBs and obsolete pesticides, during the period 2003 -2013. According to the report MATE 2006, the amount allocated to this transaction exceeds € 22.5 million and that the Algerian State must support.

5.4. COLLECTION, TREATMENT AND ELIMINATION

Green waste and waste from markets are generally collected by the cleaning services, landfill remains the preferred destination. The most appropriate way for the removal of plant protection products could be the Co-incineration under agreements with the cement plant owners.

5.5. PRIVATE SECTOR INVOLVEMENT

Apart from the pesticides that require care and special treatment, green waste and waste from markets are generally supported by the cleaning services. The private sector is almost missing except for the transport of agricultural waste (green waste and waste from fruits and vegetables) to landfills.

5.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

The Center for Scientific and Technical Research on Arid Areas (CRSTRA) launched in 2006 an experimental station dedicated to Bio-resources in southern Algeria where researchers are striving to develop benchmarks of biological control and bio-fertilization for the sustainability of agro-systems.

5.7. INITIATIVES AND PERSPECTIVES

The growing food needs of the population raise the crucial issue for sustainable reproduction of natural resources. In semi-arid areas, cropping systems result in a continued decline in the rate of organic matter in the soil, which results in a significant decrease in soil fertility. One of the means would be to mobilize urban composts and sludge from wastewater treatment plants.

6. PACKAGING WASTE

Today, nobody can deny the significant role of the treatment and recycling of industrial waste in the evolution of the growth of economic activity and employment. However, the idea of turning waste into a real resource does not raise much interest from investors in Algeria, although the pool is huge and constantly growing. Indeed, the approximately 3.5 million tons of recyclable household waste (between 30 and 40%) of the amount produced annually, only 7% are operated by Algerian recovery channels including paper, cardboard, plastic and some metals.

6.1. LEGAL AND INSTITUTIONAL FRAMEWORK

- **Law No. 01-19 of 12/12/2001** relating to the management, control and disposal of waste, defines the basic principles that lead to an integrated waste management, from their generation to their disposal.
- **Law No. 03-10 of 19/07/2003** on the protection of the environment and sustainable development, sets out the general principles of a rational environmental management.
- **Executive Decree No. 02-372 of November, 11 2002** on packaging waste
- **Executive Decree No. 04-199 of July, 19 2004** laying down the procedures for the creation, organization, operation and financing of the public system of treatment for packaging waste «Eco-Jem.»

6.2. STRATEGIES AND PLANNING

According to the Ministry of Spatial Planning and the Environment (MATE), the recycling market is estimated at 23 billion dinars (about 230 million euros). It should encourage more operators to embark on the promising field of waste management, which is still a virgin area that companies can easily exploit at their scale and in accordance with their technical capabilities.

In this vision, policy makers aspire to establish a real industry for recovery and recycling of waste through the development of several sectors such as plastics, paper and cardboard, metals, glass, wood, used tires, batteries, oils, etc.

6.3. FINANCING

The state relies heavily on the development of an industry for recovery and recycling. It is at the heart the National Program of Municipal Waste Management (PROGDEM), which is the main frame of reference in terms of management and recycling of household waste. Two types of channels have been identified: the «classic» (plastics, paper, metals, textiles, glass, wood and organic matter) and the «complex» (used tires, used oil, batteries oils and other waste electrical and electronic equipment).

6.4. COLLECTION, TREATMENT AND DISPOSAL

In Algeria, the management of urban solid waste is still undeveloped, in a technical and organizational point of view. The lack of sorting at source, promotes to throw anything to the landfill. Packaging waste including paper & cardboard and plastic, represent a significant fraction of municipal solid waste (between 20% and 30%), more than 1.2 million tons of plastic and almost as much paper & cardboard.

During the past five years, the country has experienced a breakthrough in recovery. Several companies operate in the recycling of paper, plastics and some metals, but they are insufficient. The amount of waste from recycled paper and cardboard has not exceeded 100 000 tonnes in 2012 with a projection of 120 000 tonnes for 2013. According to the projection of the MATE, by 2022, 50% of waste paper & cardboard will be collected, about 450 000 tons.

6.5. PRIVATE SECTOR PARTICIPATION

The private sector involvement remains very limited despite the financial and fiscal measures to encourage the emergence and development of the activities of recovery and recycling of waste. Of the 873 micro-enterprises identified by the AND in 2008, only 247 are operating on the ground, which shows a significant deficit compared to the existing deposit.

6.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

- Commissioning of the first point of collection of waste paper and cardboard on a surface of 500 m²) in the Commune of Kouba (Algiers) in order to recycle them by the public company Tonic industry. This space has been given to 10 micro-enterprises.
- Case of good practice, Tonic Industries is a company that passed from the private sector in the public sector in April 2011 This company is positioned as a major player in the paper industry by its direct contribution in finite packaging products.. Tonic Industry has a recycling unit of waste paper and cardboard collected by its own means and through a wide network covering the national territory. It is a leader in this field with the recovery and processing of more than 80 000 tons / year. This means that the success of a business depends mainly on its management and not on its affiliation (public or private).

6.7. INITIATIVES AND PERSPECTIVES

As an economic imperative, recovery and recycling of waste is an important component of PROGDEM which helps to reduce the amount of landfilled waste, to recover a large fraction of secondary raw materials and contributes to the creation of green jobs.

Among the beneficial initiatives, Henkel Algeria plans to launch a pilot project for the collection of packaging waste entitled «Eco-Jem», starting in September 2013. Specifically, waste cardboard will be collected at the end of each day and will be routed to the collection points for Tonic Industry. The company wants through this action, educate distributors and retailers to participate in the improvement of life in Algeria.

7. CONSTRUCTION AND DEMOLITION WASTE

The annual production of inert waste essentially from the domain of Civil Engineering (Construction & Demolition Waste) represents about 11 million tons (2012). The latter may be a profitable recoverable deposit, it is important to derive maximum benefit in finding effective alternatives, sustainable and economically profitable.

7.1. LEGAL AND INSTITUTIONAL FRAMEWORK

Legislative Framework

- **Law No. 01-19 of 12/12/2001** relating to the management, control and disposal of waste, defines the basic principles that lead to an integrated waste management, from their generation to their disposal;
- **Law No. 03-10 of 19/07/2003** on the protection of the environment and sustainable development sets out the general principles of a sound environmental management;
- **Law No. 04-20 of December, 25 2004**, on the prevention of major risks and disaster management in the context of sustainable development, clearly defines the responsibilities of each actor involved in the field of prevention in industrial areas and centers.

Institutional Framework

- Ministry of Regional Planning and Environment (MATE) through its various instruments in particular, the National Waste Agency (AND), the National Conservatory in Environmental Training (CNFE) and the Directorates for the Environment of the 48 Wilayas;
- Department of Interior and Local Authorities (MICL) for financial support towards municipalities;
- Ministry of Housing and Urban Planning;
- Ministry for Public Works.

7.2. STRATEGIES AND PLANNING

As part of the implementation of the National Management Program for Municipal and similar Waste (PROGDEM) since 2002, it is scheduled to achieve at least one class 3 technical landfill center at each head town of the wilayas. 54 centers are in progress / or launching phase 06 of which are operational.

7.3. FINANCING

- Infrastructures financed exclusively by the State;
- Cost of the inert waste management included in the tax for the collection of household waste, set between 500 and 1000 AD;
- Cost recovery: Supported by the common background of local authorities (FCCL).

7.4. COLLECTION, TREATMENT AND DISPOSAL

In general, the collection and transportation of construction and demolition waste are the responsibility of the individuals. Rubbish dumps are available to producers of such waste for the sum of about 1000 AD per truck of about 2.5 tons. However, the insufficient number of landfills and the incivility of some people have encouraged the creation of anarchic deposits along roads, banks of wadis and nearby green areas.

7.5. PRIVATE SECTOR INVOLVEMENT

The private sector participates informally mainly in the collection and transportation of inert waste (construction and demolition). Class 3 operational Technical centers are managed by the EPIC responsible for the management of the technical Centers of the Wilayas.

7.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

With regard to major projects launched across the country, the amount of inert waste generated is constantly growing; it was estimated at about 11 million tons in 2012. Hence, as a consequence of the lack of appropriate spaces, anarchic deposits were formed. Thus, the realization of technical landfill centers for this type of waste (CET class 3) allows a rational waste management and recovery in the construction industry.

7.7. INITIATIVES AND PERSPECTIVES

It is expected, achieving at least one Class 3 Technical landfill by wilaya. There are currently 54 operations for Class 3 technical centers registered for achieving, among which 09 technical centers are completed, six (06) are in operation.

8. WASTE TYRES

Used tires are bulky, polluting and non-biodegradable waste. Storage operations and collection is difficult because of their large volume making difficult and expensive their storage and transportation. The amount of used tires is constantly growing. It was evaluated in 2009 (Trouzine and Al) to more than 1 million units per year, i.e. about 26,000 t / year and a stock of about 5 million units (130,000 tons).

According to the executive decree No. 6-104 of February, 28 2006 on the classification of waste (Annex III), the scrap tires are classified as hazardous waste (class S) under the code 16.1.1 without any criterion of dangerousness.

8.1. LEGAL AND INSTITUTIONAL FRAMEWORK

Legal Framework:

- **Law No. 01-19 of 12/12/2001** relating to the management, control and disposal of waste, defines the basic principles that lead to an integrated waste management, from their generation to their disposal;
- **Law No. 03-10 of 19/07/2003** on the protection of the environment and sustainable development sets out the general principles of a rational environmental management;
- **Law No. 04-20 of December, 25 2004** on the prevention of major risks and disaster management in the context of sustainable development, clearly defines the responsibilities of each actor involved in the field of prevention in industrial areas and centers.

Institutional Framework:

- Ministry of Regional Planning and Environment (MATE) through its various instruments in particular, the National Waste Agency (AND), the National Conservatory in Environmental Training (CNFE) and the Directorates for the Environment of the 48 Wilayas;
- Department of Interior and Local Authorities (MICL) for financial support towards municipalities;
- Ministry of Industry and Investment;
- Ministry of Commerce.

8.2. STRATEGIES AND PLANNING

Decision makers aspire to establish a recovery and recycling industry of waste through the development of several sectors. Used tires find their place in the chain of valuation, either in the soil reinforcement or as a source of energy, especially in the cement industry.

8.3. FINANCING

The state relies heavily on the development of an industry for recovery and recycling. It is at the heart of the National Program of Municipal Waste Management (PROGDEM), which is the main frame of reference in terms of management and recycling of household waste. Two types of channels have been identified: the «classic» (plastics, paper, metals, textiles, glass, wood and organic matter) and «complex» (used tires, used oil, batteries oils and other waste from electrical and electronic equipment).

8.4. COLLECTION, TREATMENT AND DISPOSAL

Collection and transportation of used tires still find difficulties on the ground because of their bulky volume. However, many small businesses are being put in place to support this type of waste.

Concerning their disposal, waste tires can be used as a high quality fuel in cement plants because of their high calorific value.

8.5. PRIVATE SECTOR INVOLVEMENT

The private sector is the only active player in the field of recycling of used tires. Small businesses are being implemented. Used tires are first stored before being transported to treatment sites (cement plants, export ...).

8.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

At this stage, no project on the tire industry has been materialized.

8.7. INITIATIVES AND PERSPECTIVES

Fuel production from used tires could be a beneficial alternative to the cement industry which is rapidly expanding in Algeria. This would progressively remove existing stock in conditions that respect the environment.

9. OIL AND LUBRICANTS WASTE

Waste oils are defined as mineral or synthetic oils unfit after use to the job they were intended. They are not biodegradable and are classified as hazardous waste. Their discharge into the environment can cause a significant deterioration of the natural environment, which can be translated as pollution of water, soil and the atmosphere.

Annual production of waste oils is estimated at about 110 000 tons of which 70% are generated by vehicles.

9.1. LEGAL AND INSTITUTIONAL FRAMEWORK

Legislative Framework

- **Executive Decree No. 93-161 of 10 July 1993** regulating the discharge of oils and lubricants into the environment;
- **Executive Decree No. 04-88 of 22 March 2004** on the regulation of the activity of treatment and regeneration of waste oils;
- **Executive Decree No. 6-104 of 28 February 2006** on the nomenclature of waste;
- **Executive Decree No. 13-176 of 30 April 2013** laying down the conditions for the exercise of manufacturing, storage and wholesale distribution of lubricants and regeneration of waste oils.

Institutional Framework:

- Ministry of Industry and Investment;
- Ministry of Physical Planning and Environment (MATE) through its various instruments in particular, the National Centre for Cleaner Technologies (CNTPP), the National Waste Agency (NDA);
- Ministry of Commerce;
- The 48 Directorates of Environment of Wilayas.

9.2. STRATEGIES AND PLANNING

International regulations on waste oils, in transboundary movement, become more and more drastic. The Basel Convention imposes strict regulations and administrative procedures to ensure safe movement from one country to another. Thus, the ability to export waste oil becomes increasingly difficult and uncertain.

9.3. FINANCING

The collection, storage and processing is a complex operation, which explains the lack of investment in this area.

Currently, only NAFTAL Group, a subsidiary of the public company Sonatrach is investing in this area, particularly in the collection and transportation of waste oils.

9.4. COLLECTION, TREATMENT AND DISPOSAL

There is no professional structure in Algeria organized, licensed and dedicated specifically for the collection. The only operator in this field is the NAFTAL group, where 14 000 tons of waste oils are collected by the company NAFTAL a part of which is intended for recycling abroad.

9.5. PRIVATE SECTOR INVOLVEMENT

Since the establishment in 2004 of a decree that allows the opening of the market for operators who want to invest in the niche of the recovery and regeneration of these oils, only one application was filed at the Department of Energy.

9.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

At this stage, no project on the sector of waste oil has been materialized.

9.7. INITIATIVES AND PERSPECTIVES

The amount of waste oils recovered by NAFTAL group remains relatively low compared to the amount produced, add to that, a stock of more than 69000 tons waiting for care. These oils can be subject to a regeneration project in Algeria. A project is under study in the CNTTP to achieve 2 units of regeneration of waste oils. Similarly, in the short term, opportunities for production of fuels from these oils are also interesting especially in the cement industry. Lafarge holder of several cement plants in Algeria is the applicant.

10. E-WASTE

Electronic waste is growing strongly in Algeria in close correlation with the explosion of production and consumption on very short duty cycles, for the information and communication technology (ICT). This massive presence of new computer products, second-hand and electronic waste in Algeria is supported by strong growth in the use of IT. Thus, there are an estimated 8000 tonnes of computer equipment and 5,000 tons of equipment related to telephones imported in 2010 (UN Comtrade). The lifetime of such equipment varies between 2 and 5 years. According to the Ministry of Spatial Planning and Environment (MATE), the amount of e-waste is estimated at about 18,000 t / year.

10.1. LEGAL AND INSTITUTIONAL FRAMEWORK

Legal Framework

Algeria does not have specific legislation on electronic waste. However, they are subject to laws relating to hazardous waste (special waste) regulations. Transboundary transport of waste obeys the Basel Convention. Laws and texts are as follows:

- **Law No. 01-19 of 12/12/2001** relating to the management, control and disposal of waste, defines the basic principles that lead to an integrated waste management, from their generation to their disposal;
- **Law No. 03-10 of 19/07/2003** on the protection of the environment and sustainable development, sets out the general principles of a rational environmental management;
- **Law No. 04-20 of December, 25 2004** on the prevention of major risks and disaster management in the context of sustainable development, clearly defines the responsibilities of each actor involved in the field of prevention in industrial areas and centers;
- **Executive Decree No. 03-477 of December, 9 2003** on the modalities and procedures for the preparation, publication and revision of the national management of hazardous waste;
- **Executive Decree No. 06-104 of February, 28 2006** on the nomenclature of waste including hazardous special waste;
- **Executive Decree No. 06-138 of April, 15 2006** regulating the emission into the atmosphere of gases, fumes, vapor, liquid or solid particles, and the conditions in which the control is exerted.

Institutional Framework

- Ministry of Regional Planning and Environment (MATE) through its various instruments in particular, the National Waste Agency (AND), the National Observatory for Environment and Sustainable Development (ONEDD) the National Centre for cleaner Technologies (CNTPP) and 48 Directorates for the Environment of the Wilayas;
- Ministry of Industry and Investment ;
- Ministry of Commerce.

10.2. STRATEGIES AND PLANNING

The artisanal management of e-waste represents a risk to the environment and health of thousands of workers in the informal economy and the population in general. However, an organization of the industry is a real opportunity, as electronic waste is real mine of secondary raw materials with high added value.

10.3. FINANCING

Despite the importance of the existing deposit which exceeds 10 000 tons, no investment is planned for the treatment of these wastes.

10.4. COLLECTION, TREATMENT AND DISPOSAL

As there are no adapted facilities for the storage, remediation, recycling and recovery, these wastes are supported by the informal sector, inadequately equipped and trained to handle them in good conditions.

10.5. PRIVATE SECTOR INVOLVEMENT

These wastes are supported mainly by the informal sector, which is in search of valuable materials (copper, components, etc...).

10.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

At this stage, no project on the sector has been materialized in a formal way.

10.7. INITIATIVES AND PERSPECTIVES

The AND will examine this sector during 2014.

11. INTERNATIONAL FINANCIAL ASSISTANCE PROGRAMS

In Algeria, cooperation, international aid and international loans relating to waste management are minimal and do not exceed 2% compared to the state investment. The few projects and programs focus on strengthening national capacities for training and expertise. However, we can mention a few projects in this context:

- Realization of a master plan of Urban Waste Management at the head of the wilaya of Mascara, 2010 (Belgian Cooperation Agency) ;
- Creation of an incinerator for medical waste at the hospital Kouba, Algiers - December 2011 (Belgian Cooperation Agency);
- For the two years 2011 and 2012, a training program was initiated by the direction of the German Cooperation (GIZ) within the five pilot cities. Eight (08) modules are programmed, they are mainly:
- Operation of the technical centers – Outreach and Communication – Optimization of the collection and transportation.

12. INTERNATIONAL TECHNICAL ASSISTANCE PROGRAMS

In the context of promoting an integrated and sustainable management of urban solid waste in the Maghreb countries, the EU program / CIUDAD (EU, 2011), we consider:

- To support the activities for organizing waste streams, city of Setif;
- To promote the sustained participation of the private sector, city of Setif;
- The Capacity building of the National Waste Agency (AND);
- The Rehabilitation of some raw landfills.

13. NEEDS ASSESSMENT FOR CAPACITY DEVELOPMENT UNTIL 2015

For the quinquennium 2010 - 2014, the need for technical assistance and support for capacity building are expressed mainly in the form of training and national and international expertise. Several areas are invested in this context, for example: - the rehabilitation of wild dumps - the Clean Development Mechanism - Technical assistance ...

Some agreements with foreign partners and international institutions, period 2010 - 2014:

- Contract for assistance in the field of Solid Waste Management (SWM) and rehabilitation of wild dumps. Partner: World Bank;
- Support agreement in the field of the Clean Development Mechanism (CDM). Partner: World Bank;
- National and international expertise to the development of a short-term contract monitoring unit in the wilaya of Algiers. Partner GIZ;
- Technical assistance for a master plan of solid waste management at the Urban Community of Mascara. Partner: CTB (Belgian Cooperation Agency);
- Partnership Framework Document France - Algeria - DCP (2007-2012): Rehabilitation of wild dumps, database on waste and Technical burying centers.

14. CONCLUSION AND RECOMMENDATION FOR SWEEP-NET ASSISTANCE

A sustainable development in the context of the integrated management of urban solid waste (GDSU), is necessarily based on a strategy for the harmonization of the cycle generation / consumption for the preservation of the environment and the public health.

This country report on Solid Waste Management in Algeria marks the achievements and advances made in this area. It sheds light on the concrete measures taken to implement the policies and programs as well as the major challenges.

The Algerian policy across the implemented regulations, defines the basic principles for an environmentally sound waste management through:

- The prevention and reduction of production and harmfulness of waste at source;
- The organization of the sorting, collection, transportation and disposal of waste;
- Rehabilitation of wild dumps and restitution to the urban landscape in favor of healthier activities.

This clearly depends, in our view, to: - the optimization of existing services; - the strengthening of national and local capacities; - the encouragement of the private sector to actively participate; - but more importantly, the awareness of citizens to reduce waste.

The regional network to exchange information and expertise in the waste sector «Sweep-Net» can play a significant role in the sustainable and integrated solid waste management at the regional level (Maghreb and Mashraq) by promoting regional exchange of information and sharing of experiences between countries.

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The regional solid waste exchange of information
and expertise network in Mashreq and Maghreb countries

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