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The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program

# The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program

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## Abstract:

**The waste valorisation project is considered an innovative and paradigmatic project, as several sectors benefit from it, and it is considered a model for the rest of the provinces as it is not localized, but rather goes beyond province boundaries. In addition to economic and environmental conditions that are capable of providing and creating jobs in line with the principles of sustainable development, strengthening the circular economy, bringing financial returns, and fighting climate variables and global warming, by valuing the largest percentage of waste, to create an optimal civilized environment within the framework of sustainable development, and to eliminate the waste problem that has shed Constantine in the absence of technical burial centres as a result of lack of funding and the opposition of citizens, yet the features of this project have not appeared on the field as a result of the global crisis left by Corona and the suspension of most international projects.**

**keywords: Valorisation, waste, environment, model project, international experiences, Constantine.**

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## Introduction

The issue of waste management is of interest to most countries of the world at present, because of Most human activities generate waste (Brunner and Rechberger, 2014). and this topic has been and is still being discussed within the framework of environmental protection, not only given the harmful effects of waste on public health, the environment, climate change, and the ozone hole but also its economic and social effects and its distortion of the civilized face of cities as well. Indeed, the scope of this topic has expanded and is being discussed today within the framework of innovative city strategies, of which the sustainable management of waste is one of its most

The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program essential characteristics, Appropriate waste management is recognized as an essential prerequisite for sustainable development, contributing to the attainment of the global sustainability goals (Tsai, W.-T, 2021). Algeria has made efforts to control and recover waste through a number of laws, the most important of which is No. 19-01 related to waste management, removal, and control, which is the basic law for waste management, as it included many details related to waste, including its definition and identification of its types, and the most important thing is its determination of the mechanisms and modalities of waste management (law n ° 01 - 19 Article 3, 2001).

and this means; Constantine is suffering from a growing waste problem as a result of the continuous increase, reaching 19,963 tons in 2021 in random public dumps for each of Ain Asmara, Hama Bouziane, Didouche Murad, Ibn Ziyad, and Ain Abeid, so we had to think of a small solution to transform this quantity. The huge waste, valuing it and benefiting from it economically, socially, and environmentally, and the most important thing is to protect against pollution, especially with the failure of the technical landfill centres for each of the following technical demolition centres Bougherb, Al-Daghra, Dawams, and Didush Murad due to the opposition of citizens and the lack of finances, in addition to most of the waste in province is organic at a rate of 53.5%, that is, it is degradable quickly and a large proportion of waste. It is recyclable, so the state, in partnership with Canada, agreed on a project. A project that brings together Algeria, represented by several public authorities and institutions, with a group of Canadian companies, and under the supervision of the United Nations Development Program (PNUD), in the sector of recovery and recycling of household waste, and its recycling. The project will cost 50 million euros and will allow the treatment of 500 to 750 tons of household waste per day in the provinces of Constantine and Setif, and transform it into industrial products and agricultural fertilizers, as well as energy production from residuals and waste.

Therefore, if it is not possible to prevent the waste from forming, it is possible to reduce it at the source, and thus reduce the damage it causes. If waste is formed, it imposes on countries a real bet in two different ways: either the latter ignores the waste produced on its territory, and odours, stagnation, and flies spread, diseases spread and landscapes are distorted, and then forced to spend huge sums and incur significant losses to face environmental, health, tourism, and social deterioration. Or, from the outset, it sets a clear strategy for managing its waste, starting with combating it at the source, passing through the selective collection in preparation for valuation or recycling. But it is not enough to be satisfied by the sorting, Valorization of waste should be taken from the programming and project design (Gauzin-Müller, 2001). and ending with safe final disposal. And, as in the first case, it incurs significant expenses in return for perpetuating its management policy, but it is a justified expenditure in this case, and it can compensate for it by other methods such as waste valuation, and consequently, to preserve raw natural resources, energy, the environment for future generations, and public health that cannot be appreciated. At

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The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program a price, which means that benefiting from waste and creating sustainable development opportunities is better than paying the costs of accumulated degradation.

Unfortunately in Algeria, currently sorting, recycling, treatment and valorization of wastes do not generate the enthusiasm of local communities(AbbaouiM,2012)

The subject of the study is considered a very important nationally, internationally, and authentic topic that has not been previously studied due to the great difficulty in obtaining data, because the state spends exorbitant funds for institutions and studies offices and has not yet done so. The research came under the title “The model project for the waste valorisation of the state of Constantine: Canadian-Algerian partnership in cooperation with the United Nations Development Program”.

The problematic of the is the following:

- What is the importance, objectives, and impact of this project socially, economically, and environmentally on the province of Constantine and the various sectors involved?
- Are the objectives of this project in line with the United Nations Development Program (PNUD) and the national strategy for waste management?

Hypothesis:

In the event of starting work on this project, will this project solve the Constantine crisis, which is the phenomenon of random hollows, the creation of wealth, and work positions in the light of preserving the environment? Especially with the failure of the technical backfill centres for financial reasons and the opposition of citizens.

### **Determination of research objectives**

Elimination of household waste, which constituted an obstacle to the state of Constantine and the inability to control it through waste valuation, especially with the failure of programmed solutions, including backfills, for financial reasons and citizens' opposition.

Giving new and effective solutions to the province as a whole and improving its image as the capital of the East by adopting a global model project, and for the various sectors concerned with waste management and the circular economy.

Explaining the great importance of this project, which is of great economic, commercial, social, and environmental importance, as it provides job opportunities, in addition to its contribution to the elimination of discarded household waste, its re-conversion, recycling, and valorisation, as well as the production of energy, in addition to its role in protecting the environment.

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The gains that the province and Algeria as a whole can achieve by benefiting from theoretical and applied foreign expertise, bringing financial returns, and aligning with the United Nations Development Program.

Mitigating the negative effects of environmental degradation on the various receiving communities, as well as improving the living conditions of the citizen.

## Research method

In this research, we relied on real data selected from the source directly.

## Concepts:

**Waste recovery:** all operations involving the reuse, recycling, or composting of waste (Law n ° 01 - 19 Article 3, 2001) The recovery of waste through its reuse, recycling, and any other action aimed at obtaining from this waste, reusable materials, or energy (Law n ° 01 - 19 Article 2, 2001). The recovery and/or disposal of waste must be carried out under conditions that comply with environmental standards, and without (Law n ° 01 - 19 Article 12, 2001):

- Endanger the health of people, and animals without constituting risks for water resources, soil, or air, nor for fauna and flora.
- Cause inconvenience through noise or odours.
- Damage landscapes and sites of particular interest (Law n ° 01 - 19 Article 3).

The ecological consciousness has driven many countries to explore alternatives to the growing need for energy and the consequent increase in waste production. therefore, the adjustment toward waste recovery and its transformation into energy, by various processes, is necessary (Raissi et al., 2020).

## Waste:

any discarded, rejected, unwanted, surplus, or abandoned matter; discarded, rejected, unwanted, surplus, or abandoned matter intended for recycling, re-processing, recovery, re-use, or purification by a separate operation from that which produced the matter, or for sale, whether of any value or not .

Materials and energy which have no further use and are released to the environment as a means of disposal (Lamb et al., 2012).

Most human activities generate waste (Brunner and Rechberger, 2014). As reported by Amasuomo and Baird (2016), waste is the useless by product of human activities which physically contains the same substance that are available in the useful product (White et al, 1995). Wastes have also been defined as any product or material which is useless to the producer

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The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program (Basu, 2009). Dijkema et al, (2000) mentioned that wastes are materials that people would want to dispose of even when payments are required for their disposal. Although waste is an essential product of human activities, it is also the result of inefficient production processes whose continuous generation is a loss of vital resources (Cheremisinoff, 2003).

“Food waste” include liquid or solid residues of high organic load, which are usually derived during raw (agricultural) materials processing to foodstuff. Food waste is considered as a matter of treatment, minimization & prevention for more than 40 years (Galanakis, 2019).

**Waste management:** Waste management covers a wide range of activities, from its generation to final utilization or landfill. Waste segregation among residents is considered the primary method of waste management and an efficient way to reduce the amount of municipal waste in landfill. However, to make the segregation process economic and environmentally efficient, it must be easy and understandable for the “waste producer” – the consumer (Młoda-Brylewska and Melski, 2022). In this context, Panainte-Lehadus et al., (2022) did a study that focused mostly on how the populace collects solid household waste inside the residential area.

### Waste classifications

Several waste classifications exist in different countries. However, the most used classifications are presented below (Amasuomo and Baird, 2016):

- Physical state
  - Solid waste
  - Liquid waste
  - Gaseous waste
- Source
  - Household/Domestic waste
  - Industrial waste
  - Agricultural waste
  - Commercial waste
  - Demolition and construction waste
  - Mining waste
- Environmental impact
  - Hazardous waste
  - Non-hazardous waste.

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**Household and similar waste:** all waste from households as well as similar waste from industrial, commercial, craft, and other activities which, by their nature and composition, are like household waste(Law n ° 01 - 19 Article 3, 2001).

**Bulky waste:** all waste from households that, due to their bulky nature, cannot be collected under the same conditions as household and similar waste(Law n ° 01 - 19 Article 3, 2001).

The bulky waste stream is a fraction of waste, it contains furniture, appliances, and other items. Previous research was conducted to scope the bulky waste stream, exploit it in terms of recycling and reuse and assess mechanisms and potential for improvement together with constraints (Alexander et al., 2020).

Bulky waste describes those solid waste materials having a large physical dimension (Chung et al., 2018). The US Environmental Protection Agency (2006) defined bulky waste as large items of waste materials, such as appliances, furniture, large auto parts, trees, stumps, and in addition wooden pallets and waste tires might also be classified as bulky waste. England's Controlled Waste Regulations 1992 set out two criteria for bulky waste: exceeded 25 kg in weight and had a dimension larger than 0.75m × 1m (Curran et al., 2007).

**Valorisation:** any operation whose main result is that waste is used for useful purposes in substitution for other substances, materials, or products that would have been used for a particular purpose, or that waste is prepared to be used for this purpose, including by the waste producer( French environment code, 2014).

Savini (2021) pointed out the circular economy of waste recovery in a study focusing on the financial composition, economic position, and geography of three sectors: waste recycling, incineration, and urban waste reuse.

**Resource recovery:** Process that extracts material or energy from the waste stream (Lamb et al., 2012).

the process of extracting materials or energy from a waste stream through re-use (using the product for the same or a different purpose without further production), recycling or recovering energy from waste (Lamb et al., 2012).

**Biogas :** Recently several countries have given high priority to the development of renewable energies, such as biogas, resulting from the anaerobic digestion of biomass in its various forms: liquid and solid, which represents a considerable green energy source (Hajji and Rhachi, 2016).

### Management of household and similar wastes in Algeria

At a national scale, a study was conducted on the management of household and similar wastes in Algerian cities by Abbaoui and Djemili (2012). The problem of waste management which remains insufficient and difficult for a city that has not consolidated a waste policy. Declaring



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The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program that the various stages of waste's life as well as of chain collection, storage, sorting, recycling, treatment, and valorization are a complex management.

Algeria privilege centers of technical burying as a solution for the management of household and similar wastes. However, the composting choice is an excellent alternative since 70 % of the Algerian trash content is an organic origin. Therefore, **Abbaoui and Djemili (2012)**, suggested that wastes can be valued under three forms:

- Organic valorization for composting or methanation for green wastes (leaves, grasses, flowers, and small wood chips). Compost can be used as a fertilizer and methane as an energy source.
- Valorization of materials for papers, cardboards, glasses, and metals which are recycled in the manufacturing process or reclaimed for use.
- Energy recovery for all types of wastes burned in an incineration plant where energy can be recovered.

#### **Legislation and laws regulating the waste management process in Algeria:**

The legislator tried to develop a national legal strategy aimed at confronting the risks posed by waste to the environment, and we will try to address them successively, starting with laws related to environmental protection and waste disposal and other regulatory decrees aimed at regulating various activities related to waste management.

#### **Laws related to environmental protection and waste management:**

Law No. 03-83 related to the protection of the environment: This law stipulates in Article 90 the obligation to work to ensure the rational disposal of waste on the responsibility of each waste product, whether a natural or legal person, and the need to respect the collection, transport, and storage operations by what is stipulated Legislation, and the necessity of sorting, treating, and recycling recyclable materials ([law n ° 83-03, 1983](#)).

Law 10-03 relates to the protection of the environment within the framework of sustainable development. Algeria is working to keep pace with international conventions by ratifying them and including them in its internal law. Law 10-3 related to the protection of the environment within the framework of sustainable development is considered an embodiment of the 2002 Hohasburg Declaration in South Africa ([Law No. 03-10, 2003](#)).

Law No. 19-01 related to waste management, removal, and control, which is the basic law for waste management, as it included many details related to waste, including its definition and identification of its types, and the most important thing is its determination of the mechanisms and modalities of waste management([law n ° 01 - 19 Article 3, 2001](#)).

#### **Quantities of household waste dumped in 2021 through the various controlled landfills:**

The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program Table 1 shows where waste is dumped (in tons). Constantine produces 199,963 tons in 2021, which is a very large number if we compare it with the rest of the provinces. The municipality of Ain Asmara alone produces approximately 145811 tons, which requires the need to develop solutions.

**Table 1:** Waste dumping places.

Landfills	Municipalities and institutions that throw waste there	Per Tons
Landfill Ain Smara	Public industrial and commercial establishment 'EPIC EPAS' (Ain Smara municipality) EPIC ENOR (Ouled Rahmoune municipility) EGUVAM+ EPCA KHROUB +PROPREC nv (Elkhroub municipality) CONSTANTINE municipality +Private and public establishments	145811
Landfill HAMMA Bouziane	EPIC HAMMA VERT (Hamma Bouziane municipality) + some sectors of the municipality of Constantine + Private and public establishments	25647
Discharge Mourad	Didouche EPIC EGUCDM (didouche mourad municipality) + Private and public establishments	9367 during (July-December)
Disclaimer ZIAD	IBN IBN ZIAD municipality	7142
Landfill BOUGHAREB	EPCA AIN ABID (ain abid municipality) +EPCA IBN BADIS (Ibn Badis municipality)	11996

Source: The researcher + Constantine Landfill Centre.

**The average composition of the household and similar waste of** (National Agency for Algerian Waste,2019). :

Campaigns (seasons) of the province of Constantine, shows (Fig. 01):

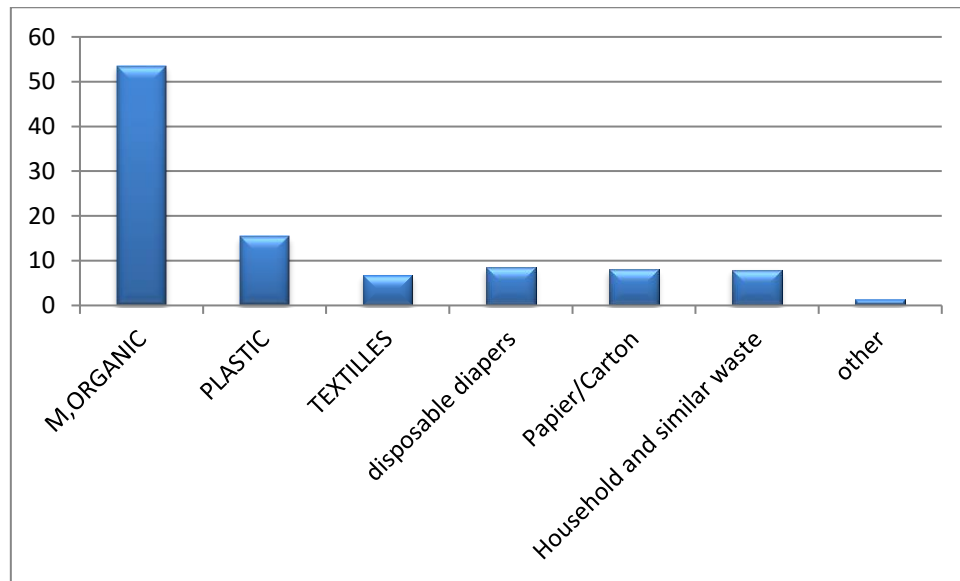
- A preponderance of organic matter with more than 53.5%,
- A significant portion of plastic ~ 15.41%.



The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program - Small portions of disposable diapers with ~ 8.34%, Paper/Cardboard ~ 8.05%, and textiles ~ 6.78%.

- For other waste, “other”, varies between 1.30% and 0.93%. The latter represents less than 7.91% of the quantity of DMA.

According to Fig. 1, It is clear that a large proportion of the waste is organic, can be valorised, and recyclable, and this is a positive thing for the state.



**Figure 1:** Components of household waste for the province of Constantine

#### Statistics of the status of technical landfill centres in Constantine

Table 2 shows the status of the technical landfill centres in the province of Constantine.

**Table 2:** Status of the technical backfill centres in the Wilayat of Constantine

Numbers	Backfill and Site	Technical Centre	Situation and Obstacles and difficulties
01	Technical Backfill Centre Boughreb Municipality of Ibn Badis		It has been used since 2010. Estimated at 78 hectares. It stopped receiving waste on June 15, 2019, due to the opposition of citizens.
02	Backfill Technical Centre Daghra Municipality of Zigoud Youssef		100% achievement, not used. estimated at 30 hectares. It was not used because of the opposition of the citizens.
03	Backfill Technical Centre Dawams, Ain Ebeid		Study in progress from (EPE-URBACO). Lack of finance.

Municipality			SPA)-	estimated at 31	hectares
04	Didush Murad	Technical Backfill Centre, Murad Municipality, the place of the random dump	The study is in progress by the National Waste Agency (AND). estimated at 05 hectares	The procedures for the decision to allocate the field by the State Property Directorate have not been completed. unavailability of finance	

Source: Constantine Environmental Directorate

### The model project for waste valorisation:

#### Brief about the project:

The project, which is expected to be launched soon, is the fruit of a partnership and cooperation between the “Divindus” industrial complex, represented by the Ministry of Industry, the National Agency for Waste (AND), the “Madar” complex on the Algerian side, and a Canadian company complex, represented by O.E.M Sherbook, G.G.L, and Lakson International, and under the supervision of the United Nations Development Program (PNUD), which will take care of the aspect related to the transfer of expertise and knowledge during the implementation and management of the project, noting that the initial cost of the project is estimated at 50 million Euro, all partners will be responsible for the financing process, in what will be hosted by the provinces of Constantine and Setif, to collect and treat between 500 to 750 tons of household waste per day, and recycle it for the benefit of the industrial and agricultural sector.

The idea of the joint Algerian-Canadian project in the household waste recovery and recycling sector started in 2016, and a partnership and cooperation protocol was signed between the partners in 2018, bringing the project to advanced stages, after signing in 2019 all the technical and financial studies related to the project, including Market study, Business Plan, Impact study, Risk study, and today coordination and cooperation with the PNUD, which will take care of the aspect related to with the transfer of expertise and technical accompaniment, the latter appointed an external audit office to assess the strategic management of the institution ( Group of Local Industries Divindus SOPTE, 2022)

The start of embodying this project in the field will be after the final release of the results of this strategic evaluation, and this is after a meeting of all partners during July at the headquarters of the Ministry of Foreign Affairs, and the means and mechanisms to advance the project and enter the production phase as soon as possible were discussed.

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The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program Speaking about the project's production capabilities, and the extent of its contribution to the collection and absorption of waste and household waste, our interviewer stated that the company will transfer and recycle between 500 to 750 tons of household waste per day in the provinces of Constantine and Setif, including 100 tons per day of waste (chicken manure) in Setif, which will be converted into agricultural fertilizer

This project, worth 35 million euros (70% for the Algerian side and 30% for the Canadian side), was launched in 2019 and will take probably 18 to 24 months to complete.

The production units will be installed in the provinces of Constantine and Setif, while the marketing units will be in EL Oued and Biskra.

In this regard, more than 500 tons/day of household and similar waste and 100 tons/day of poultry droppings will be treated by Canada technology (Minister of Environment 2022 ).

#### **The objectives of the project:**

The project is considered a model for the combined management of household and similar waste with low emission of greenhouse gases. This project aims at valuing domestic waste and poultry droppings and will allow the production and marketing of organic fertilizers and electricity (for local energy needs), in addition to the inorganic raw material recovered through sorting.

During the signing ceremony, this protocol of agreement falls within the framework of the implementation of the national strategy for the integrated management of waste, which is a source of raw material that can be recycled and valued, to constitute a strong support for the revival of the growth of the national economy and a fertile ground for public-private companies.

The Minister considered that this project, which will be gradually generalized to the rest of the country's provinces, also contributes to accelerating the course of the economic and energy transition, mitigating the negative effects of environmental deterioration on various receiving circles, as well as improving the living conditions of the citizen.

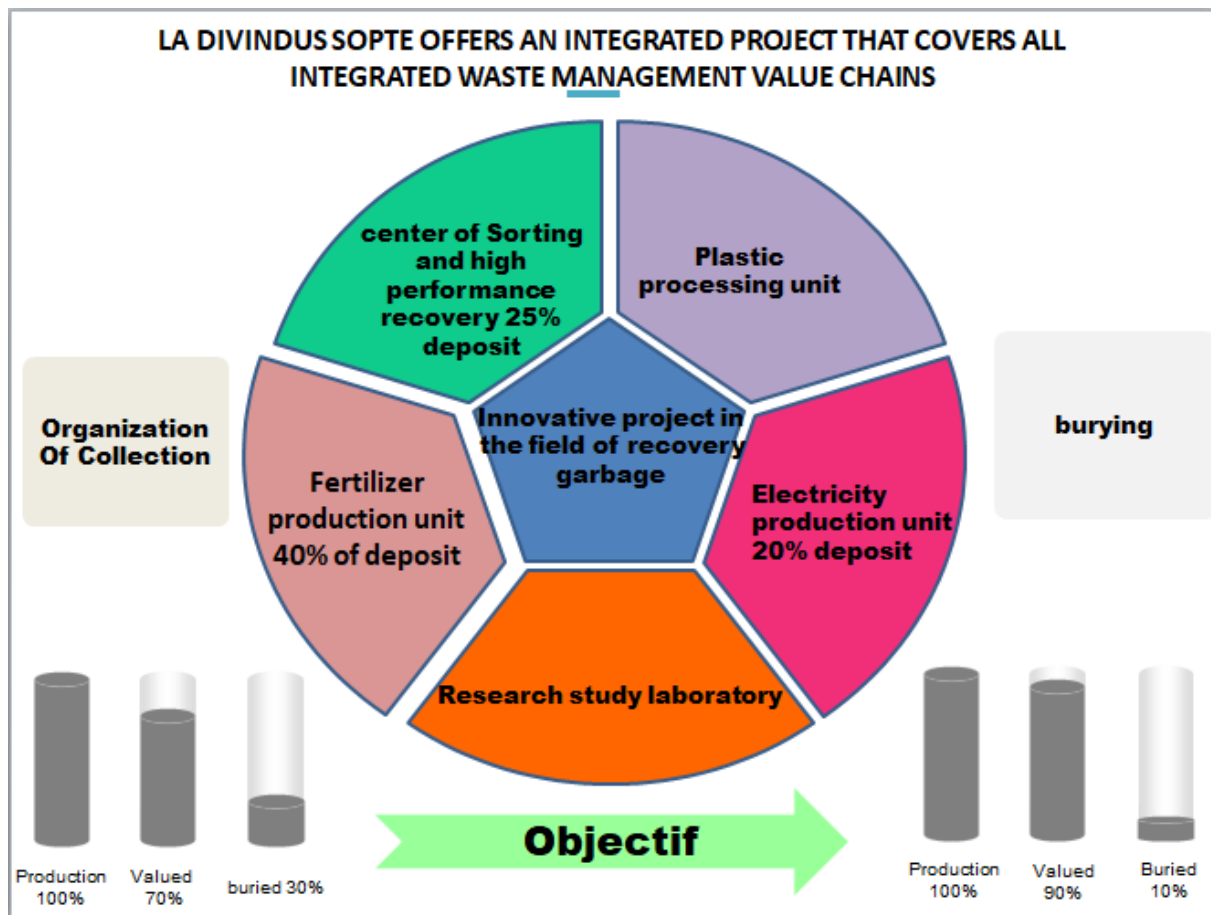
This environmental project will also allow to reduce the need for real estate for technical landfill by 75% and reduce the burden of waste management. In addition to creating wealth and jobs, this sectoral partnership will contribute to reducing the bill for importing chemical fertilizers, which amounted to about \$300 million annually (Minister of Environment 2022).

#### **Components of the project and its units (Group of Local Industries Divindus SOPTE, 2022):**

The "innovative" project in the field of waste recovery and valorisation includes a centre for sorting and recovery with the best technologies (25 %), a unit for converting recovered plastic, a unit for producing electricity from recovered waste (20 %), and a fertilizer production unit (40 %). , in addition to a research laboratory, which was specifically established to study and safely treat all recovered waste, in line with the modern technologies used in this field, and to preserve

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The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program the environment and the surroundings. The Fig. 2 illustrates this shows the components of the project.



**Figure 2:** The components of the project, Source: The local industrial complex DIVINDUS SOPTE

Through these components, we can ensure the following:

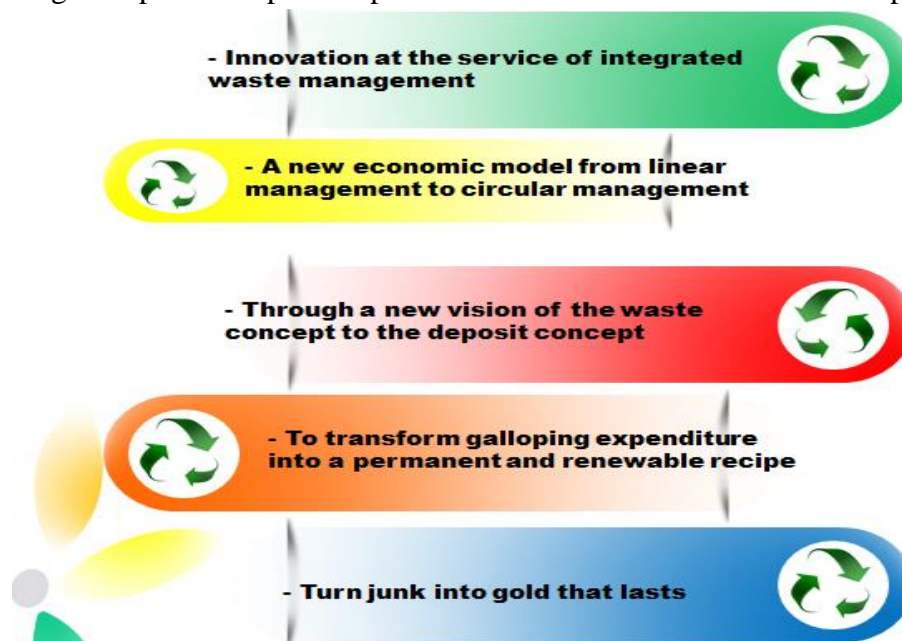


Figure 3: Project Orientations.

Establishment DIVINDUS SOPTE offers an integrated project that covers all the value chains of integrated waste management.



Figure 4: Waste management chain. Source: The local industrial complex DIVINDUS SOPTE.

Project partners for funding and project success:

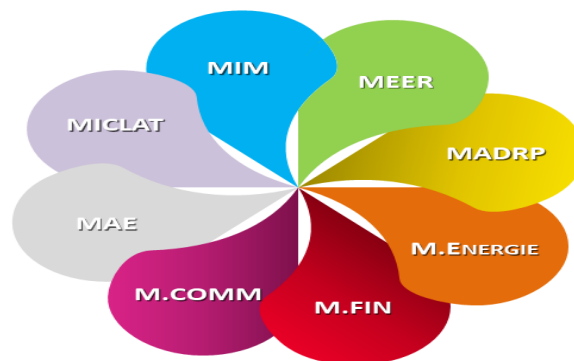
- DIVINDUS SOPTE Establishment, under the supervision of the Ministry of Industry and Mines.
- Foreign Technological Partner and fundraiser on the Canadian side.

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The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program - National Waste Agency, under the supervision of the Ministry of the Environment and Renewable Energies Responsible for ensuring the national waste management strategy in the field.

- HOLDING MADAR (Management and Development of Assets and Resources).
- United Nations Development Programme (UNDP) for expertise and technical assistance.

**Spinoffs and benefits of the various ministries involved:**



**Table 02:** The benefits and advantages according to the concerned ministries (Group of Local Industries Divindus SOPTE, 2022):

Ministries concerned	Spinoffs and benefits
Ministry of Energy and Mines	<ul style="list-style-type: none"> <li>• Creation of wealth and employment</li> <li>• The development of new local industries by promoting the circular economy</li> </ul>
Ministry of the Interior, Local Authorities and Regional Planning	<ul style="list-style-type: none"> <li>• Make waste a permanent source of revenue</li> <li>• Reduction of expenditure relating to waste management</li> </ul>
Ministry of Foreign Affairs	<ul style="list-style-type: none"> <li>• Compliance with international commitments in terms of sustainable development and climate change</li> </ul>
Department of Commerce	<ul style="list-style-type: none"> <li>• Reduced fertilizer import bill, 75% of current fertilizer needs come from imports</li> <li>• Reduction of the import bill for raw materials, in particular plastic and aluminium</li> </ul>
Minister of the Environment	<ul style="list-style-type: none"> <li>• Reducing the quantities of waste</li> <li>• The reduction of land requirements necessary for the realization of the CET</li> </ul>
Ministry of Agriculture and Rural Development	<ul style="list-style-type: none"> <li>• Respond to national organic fertilizer needs</li> <li>• Food Safety</li> </ul>

Ministry of Energy Transition and Renewable Energies • According to UNDP experts, a gain in natural gas = \$1,300,000/year

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Ministry of Finance • Reduction in the need for the land base: Project requires 10 Ha to process 750 T/D=500,000 M3

- Reduction of investment in lost endowment for the creation and closing of traps (\$4 M = 2.3 ha = 300,000 m3)
- Reduction of funding necessary for the creation and management of EPICs.

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Source: The researcher, The Local Industrial Complex DIVINDUS SOPTE.

The role of the province, in general, remains very important in:

- Ensure a better living environment for the citizen.
- Lay the foundations for a circular economy.

**Advantages of the project:** It is divided into three sections (Group of Local Industries Divindus SOPTE, 2022):

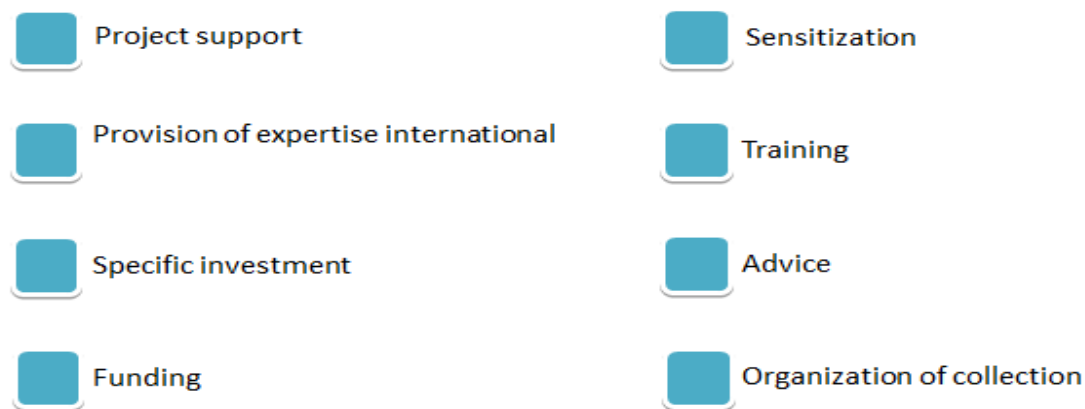
The project is of great economic, commercial, and environmental importance, as it will create significant job opportunities (direct and indirect) for the benefit of the residents of these areas, in addition to its contribution to containing significant quantities of various types of discarded household waste, and re-converting and recycling them into raw materials such as plastic, cardboard, and agriculture fertilizers, as well as energy production, is one of the most important pillars of various industries, in addition to its pivotal role in protecting the environment and keeping the ocean clean.

**Synergy with the United Nations Development Program** (Group of Local Industries Divindus SOPTE, 2022):

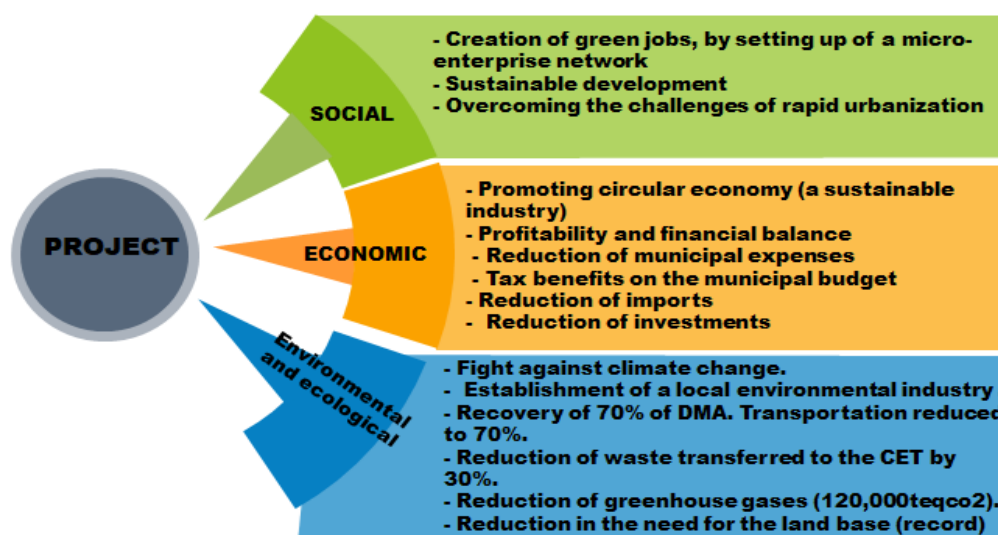
It has several advantages, including



### SYNERGY WITH (UNDP) The United Nations Development Program



### PROJECT BENEFITS



### Main results and discussion

Through this project, the importance at the local and global levels becomes clear through:

- Globally by benefiting from foreign expertise and bringing financial returns and in line with the United Nations Development Program (PNUD). And locally, through several aspects, including:

On the social level, creating environmentally friendly jobs in line with the principles of sustainable development.

On the economic level, strengthening the circular economy, which results in reducing expenditures and making use of raw materials.

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On the environmental and ecological level, combating climate change because of environmental pollution by valorising 70 % of solid waste and it is like, which results in the reduction of pollution and gases that cause global warming.

Several sectors also benefit from this project, as it is a model project that benefits several sectors, including:

Ministry of Energy and Mines: Creating wealth and employment by developing local industries and promoting a circular economy.

Ministry of the Interior, Local Authorities, and Regional Planning: by making waste a permanent source of income and reducing expenses.

Ministry of Foreign Affairs: Compliance with international obligations regarding sustainable development and climate change.

Ministry of Commerce: Reducing the bill for importing fertilizers and raw materials.

Ministry of Environment: Reducing the quantities of waste in addition to reducing the land requirements needed to achieve CETs.

Ministry of Agriculture: By responding to the national needs of organic fertilizers in addition to food safety.

Ministry of Energy Transition and Renewable Energies: According to UNDP experts, boosting gains in natural gas to 1,300,000 dollars/year.

Ministry of Finance: Reducing the need for a land base for the completion of burial centres, as the 750 tons treatment project requires 10 hectares.

It also reduces the funding required for the establishment and management of public facilities for the industrial and economic prospects of EPIC.

The role of the province, in general, remains very important by ensuring a better living framework for the citizen in addition to establishing a circular economy.

The objectives of this project are consistent with the PNUD, where the province and the country as a whole benefit from the aspect related to the transfer of expertise, the necessary knowledge, and technical accompaniment, as it appointed an external audit office to assess the strategic management of the project and an economic study with regard to enhancing the gains of natural gas with several advantages, including putting international experts at disposal, private investment, financing, organizing the collection of waste, awareness, and consulting.

This program also came in accordance with the national strategy for waste management, which clarified several laws to preserve the environment and green management of waste, including Law

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The province is still waiting and in need of these projects, which are considered a qualitative and major leap in the field of environmental preservation.

## Conclusion

In this article, we discussed the great importance of this model project, which is a quantum leap for waste valorisation and environmental preservation in the context of sustainable development, which has extensive experience in the field of waste management, which the state can benefit from through three levels:

- Locally at the state level by creating environmentally friendly jobs and promoting a circular economy that results in the provision of raw materials and not importing them.
- Nationally, through the benefit of several ministries, including the Ministry of Environment, the Ministry of Foreign Affairs, the Minister of Trade, the Ministry of Agriculture, and the Ministry of Finance.
- At the international level, by benefiting from foreign expertise and bringing financial returns and in line with the PNUD, where the state and the country as a whole benefit from the aspect related to the transfer of expertise and necessary knowledge and technical accompaniment, where he appointed an external audit office to assess the strategic management of the project and an economic study in concerning the enhancement of natural gas gains with several advantages, including placing international experts at the disposal of private investment, financing, forming a waste collection organization, awareness, and consulting. The objectives of this project are consistent with PNUD.

The role of the province, in general, remains very important by ensuring a better living framework for the citizen in addition to establishing a circular economy.

This program also came in accordance with the national strategy for waste management, which outlined several laws to preserve the environment and green management of waste, which help and support this project, among them Law No. 83-03 on environmental protection, and Law No. 03-10 on environmental protection in the framework of sustainable development, embodying the Johannesburg Declaration 2002b South Africa, Law No. 01-19 represented as it included many details related to waste starting from its definition to determining the mechanisms and how to manage it.

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The model project for the waste valorisation of the region of Constantine (West Algeria): A Canadian-Algerian partnership in cooperation with the United Nations Development Program Constantine, which is considered the capital of the East, is still waiting and in need of these projects, which are considered a qualitative and major leap in the field of environmental preservation, especially with the emergence in recent years of a large number of random dumps and the inability to manage and control them, which has irritated citizens and officials, especially with the ineffectiveness of burial centres and the landfill of waste and its lack of success for reasons, including the dissatisfaction of citizens and the lack of a financial cover for financing. Waiting for this green project that will achieve a clean and sustainable environment and a green circular economy.

### Summary of requirements

The author has nothing to declare:

The author has no financial or other related financial interests to disclose.

The author has no conflict of interest advertising related to the content of this article.

The author certifies that they have no affiliations with or involvement in any organization or entity that has any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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