

# **Annual report**

## *Executive Summary*





Valdemingómez Technology Park (VTP), located in the southeastern region of Madrid, is a distinguished technological hub encompassing a range of waste management facilities administered by the City Council of Madrid (Ayuntamiento de Madrid).

Within these state-of-the-art facilities, waste materials undergo various advanced processes, including sorting and resource recovery. These processes also include the production of biogas via anaerobic digestion of organic matter (biomethanation), the upgrading and injection of biomethane into the Spanish gas transport grid, and the production of compost and biostabilized materials.

Non-recoverable fractions are transformed into electricity at Las Lomas treatment plant, or they are sent to Las Dehesas controlled landfill, also situated within the Technology Park enclosure. Biogas obtained by forced degasification of both Valdemingómez operating and non-operating landfills is subjected to energy recovery.

Finally, the digestate resulting from the selectively collected organic matter subjected to anaerobic digestion is sent to the new composting plant “Los Cantiles” to produce high-quality compost.

Valdemingómez Technology Park receives 3 387 tons of waste per day, managed in eight large industrial facilities operating 24/7, every day of the year:

- Two waste sorting and treatment plants: “La Paloma” (nº 8) and “Las Dehesas” (nº 2).
- Two anaerobic digestion plants: “Bio Las Dehesas” (nº 3) and “Bio La Paloma” (nº 8), where the organic fraction of municipal waste is managed to produce biogas.
- A biogas treatment plant (PTB, nº 6), where biogas is upgraded and transformed into biomethane for injection into the national gas grid.
- A waste sorting and energy recovery plant, “Las Lomas” (nº 1), which produces electricity from the waste treatment rejects after sorting and recovery (mixed waste).
- A degasification and energy recovery plant, “La Galiana” (nº 9), managing the biogas obtained from the Valdemingómez non-operating landfill, as well as part of the biogas produced in the anaerobic digestion plants.
- An automated composting facility, “Los Cantiles” (nº 7), in operation since the end of 2024.
- An operating landfill, next to “Las Dehesas” plant (nº 4).

There are also other facilities for municipal offices and environmental education activities (Visitors Centre, nº 5).

Waste management in these facilities is carried out through public service management contracts, one for each waste treatment plant. Due to their environmental relevance, these industrial facilities are subject to numerous internal and external controls and are continuously monitored to ensure compliance with strict environmental standards according to European, national, and regional legislation related to the environment and waste management.

The monitoring and supervision of these facilities are conducted by the City Council of Madrid in collaboration with companies specialized in quality and environmental control, responsible for verifying that these activities comply with contractual terms and current regulatory requirements.



Valdemingómez Technology Park map

## WASTE TREATMENT IN VALDEMINGÓMEZ TECHNOLOGY PARK

Waste treatment has three main objectives:

- Recovery of recyclable materials, which are delivered to authorized recyclers for reuse in the production cycle.
- Energy recovery, which exploits the energy contained in the rejects resulting from treatment, and
- The treatment of organic matter used either for biomethanation to produce biogas or composting to obtain compost or biostabilized material.

### Treated Waste

During 2024, a total of 1,236,114 tons of domestic waste was treated at Valdemingómez Technology Park, 2.5 % more than in 2023, mainly due to the improved socioeconomic situation and to the raise of population in the City of Madrid. Of these, 1,144,647 tons (92.6 %) were managed in the industrial processes developed in the complex's plants, and 91,467 tons (7.4 %) were directly deposited in a landfill due to their non-recoverable nature. Notably, there has been a 15 % reduction in direct landfill disposal compared to 2023.

There were also 63,924 tons of glass (0.25 % less than in 2023) from the city's separate collection managed through the transfer station located in "Las Dehesas" plant. Additionally, there was a 12.7 % increase in the collection of biodegradable garden and park waste (13,136 tons) and a 14.4 % increase in treated bulky waste (45,452 tons) compared to the previous year.

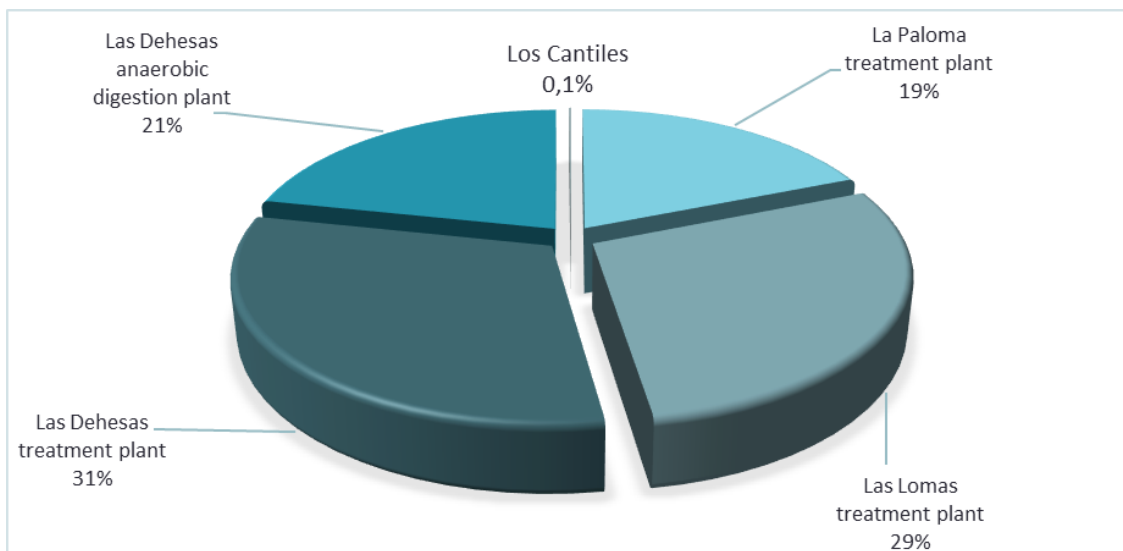
Analysing the 2020-2024 evolution of waste fractions generated in the City of Madrid (excluding waste treated at Valdemingómez Technology Park from other municipalities), there has been a reduction in the mixed waste fraction and an increase in the biowaste and packaging fractions.



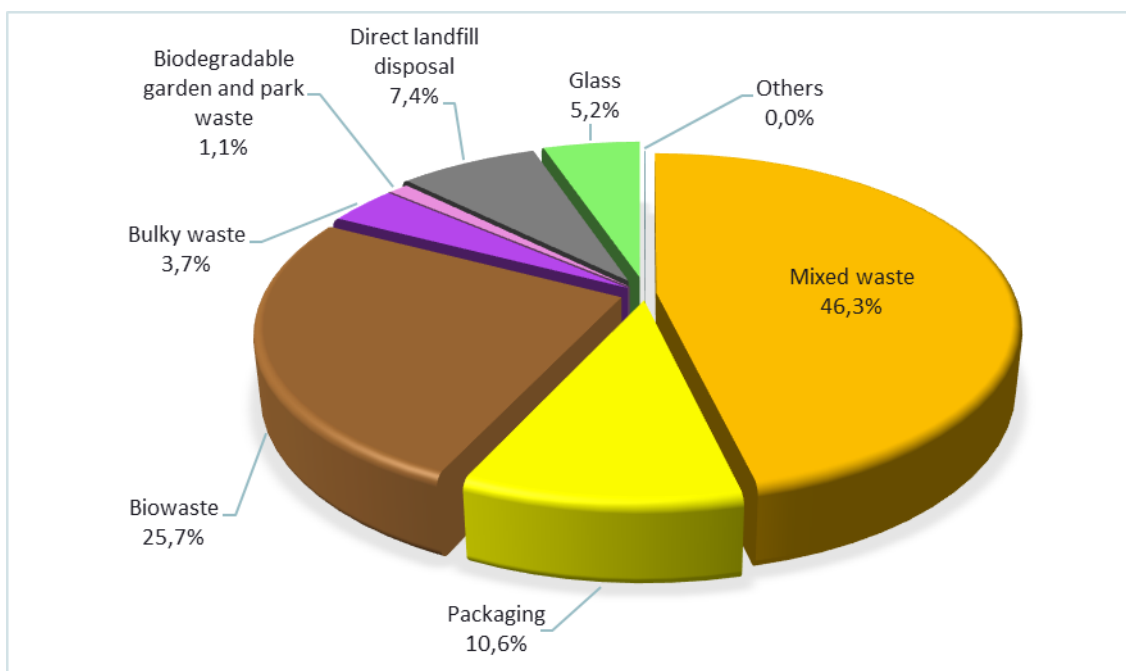
It is remarkably that direct landfill disposal has decreased by approximately 109,878 tons over five years, related to the implementation of various municipal measures in waste collection and treatment. These include operational measures in the different plants of the Technology Park and improvements in new contracts for waste collection, street cleaning, and green area services, allowing for better separation of different fractions at the source before treatment.

WASTE INPUT TO VALDEMINGÓMEZ TECHNOLOGY PARK BY FRACTION AND PLANT IN 2024							
TREATMENT	FRACTION	LA PALOMA	LAS LOMAS	LAS DEHESAS	Anaerobic digestion LAS DEHESAS	LOS CANTILES	TOTAL
MIXED WASTE fraction treatment	Mixed waste bag	132,903	287,505	64,448			
	Cleaning		59,267	2,124			
	Commercial activity	5	4,283	16,805			
	Other		3,127	1,713			
	<b>TOTAL MIXED WASTE</b>	<b>132,908</b>	<b>354,181</b>	<b>85,089</b>			<b>572,179</b>
PACKAGING fraction treatment	Packaging bag	47,528		82,964			
	Cleaning			182			
	Commercial activity			699			
	Other			239			
	<b>TOTAL PACKAGING</b>	<b>47,528</b>		<b>84,084</b>			<b>131,612</b>
BIO-WASTE fraction treatment	Bio-waste	53,481			243,140	132	
	Commercial activity				21,082		
	<b>TOTAL BIOWASTE</b>	<b>53,481</b>			<b>264,222</b>	<b>132</b>	<b>317,835</b>
Bulky waste treatment	Bring-in collection points			12,720			
	Cleaning			31,439			
	Commercial activity			1,094			
	Other			200			
	<b>TOTAL BULKY-WASTE</b>			<b>45,452</b>			<b>45,452</b>
Dead animals	<b>TOTAL DEAD ANIMALS</b>			<b>106</b>			<b>106</b>
Biodegradable garden and park waste	Garden and park waste			9,485	2,898	753	
	<b>TOTAL GARDEN AND PARK WASTE</b>			<b>9,485</b>	<b>2,898</b>	<b>753</b>	<b>13,136</b>
Waste to energy recovery	Private authorized		402				
	<b>TOTAL PRIVATE AUTHORIZED TO RECOVERY</b>		<b>402</b>				<b>402</b>
Direct landfill disposal	Mixed waste			2,059			
	Other			19,893			
	Commercial activity (private authorized)			40,812			
	Commercial activity (big producers)			22,315			
	Garden and park cleaning			6,389			
	Destructions			0			
	<b>TOTAL DIRECT LANDFILL DISPOSAL</b>			<b>91,467</b>			<b>91,467</b>
Glass transfer station	Glass			63,141			
	Commercial activity			783			
	<b>TOTAL GLASS</b>			<b>63,924</b>			<b>63,924</b>
<b>TOTAL ENTRIES</b>		<b>233,917</b>	<b>354,583</b>	<b>379,608</b>	<b>267,121</b>	<b>885</b>	<b>1,236,114</b>

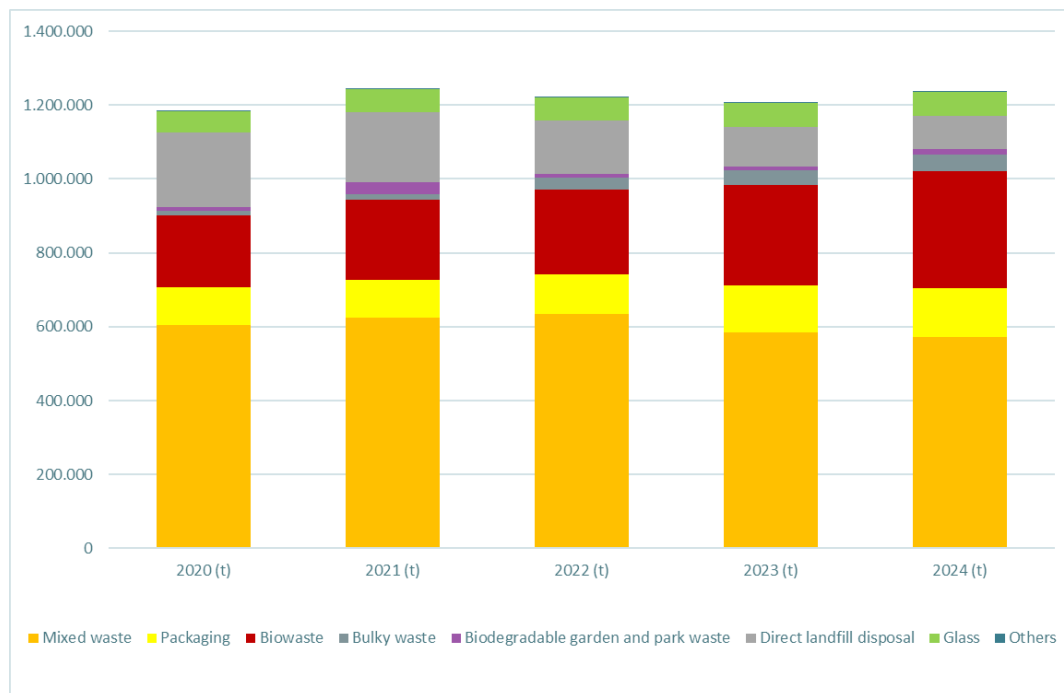
*Treated waste destination in Valdemingómez Technology Park (2024, in tons)*



*Waste input distribution in the Valdemingómez Technology Park, per plant (2024)*



*Waste input distribution in the Valdemingómez Technology Park, per fractions (2024)*



Input flow evolution in the Valdemingómez Technology Park (2020-2024, in tons)

## Developments in Waste Collection and Containerization

From November 1, 2022, collection and transport frequencies were modified for each waste fraction to promote selective collection and ensure compliance with state and EU regulations. The mixed fraction (non-recyclables) ceased to be collected on Sundays and holidays, resulting in mixed waste being collected six days a week in 2023. This change aims to improve separation at the source and minimize waste in the mixed fraction container while encouraging the use of selective collection containers for different fractions (plastics, metals, cartons, biowaste, paper-cardboard, glass, textiles, etc.). The yellow fraction (recyclables) was also extended to include plastics, metals, and cartons (not just packaging), except for bulky waste, which must be managed differently.

## Recovery of Recyclable Materials

Once treated, 75,048 tons of recyclable materials were recovered in 2024, a 2.9 % decrease from 2023, although there was an increase in the recovery of carton (39.6 %), aluminium (38.2 %), and plastic (2.8 %). In contrast, there was a reduction in the recovery of glass (2.2 %) and ferrous scrap recovered in anaerobic digestion plants (23.1 %) due to better source separation by citizens.

RECOVERED RECYCLABLE MATERIALS	YEAR				
	2020	2021	2022	2023	2024
Paper-cardboard (recovered in plant)	10,046	11,416	10,858	9,793	13,675
Glass (recovered in plant)	361	306	223	220	215
Plastics	30,548	31,431	32,403	35,440	36,446
Ferromagnetic	13,772	12,131	11,546	10,836	10,919
Other metals (no packaging)	620	608	662	465	488
Burnt ferrous scrap	5,570	5,254	5,802	12,052	3,961
Aluminium	3,101	2,762	3,015	3,252	4,494
Ferrous scrap recovered (Anaerobic digestion plants)	299	296	349	401	309
Carton	3,522	3,513	3,387	4,831	4,540
<b>TOTAL RECYCLABLE MATERIALS</b>	<b>67,839</b>	<b>67,715</b>	<b>68,246</b>	<b>77,289</b>	<b>75,048</b>

*Recovered materials in Valdemingómez Technology Park (2020-2024, in tons)*

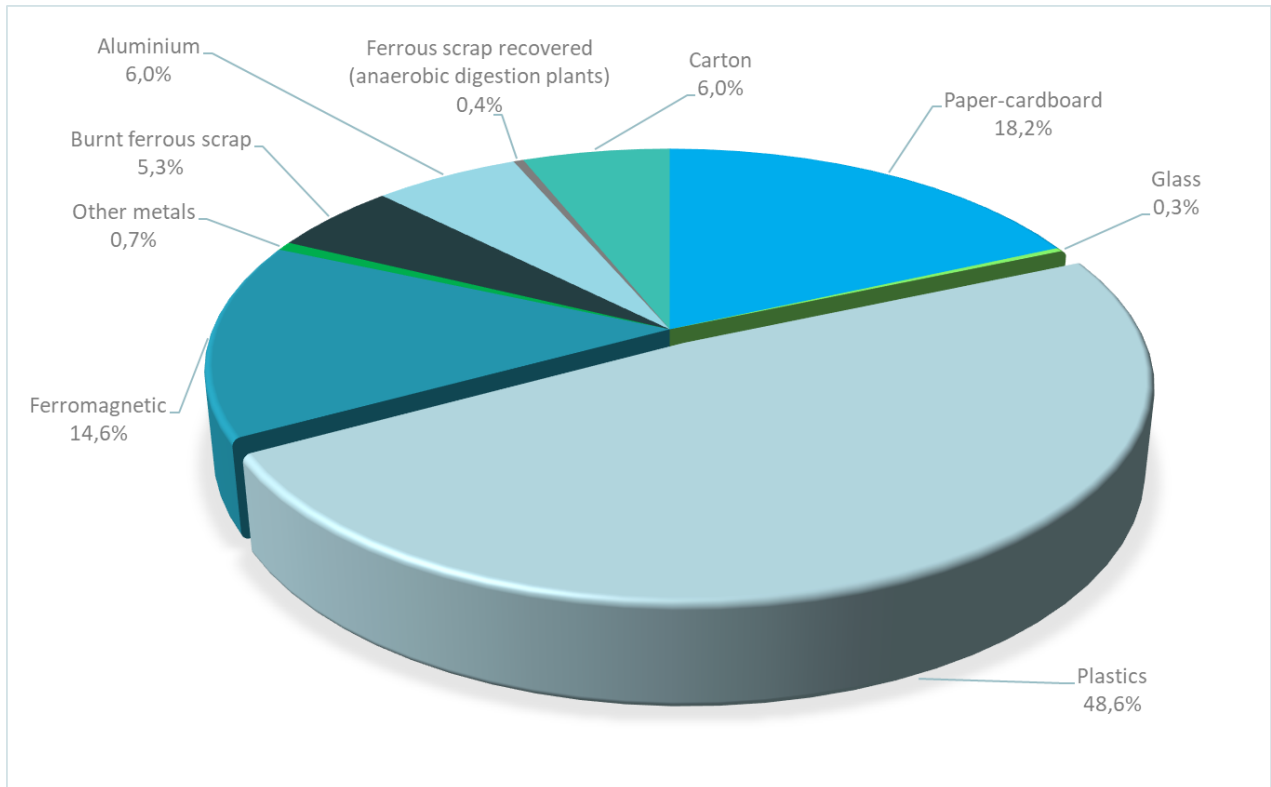
From the organic matter in household waste, two types of materials are obtained: compost (from selective collection at source, OFSC<sup>1</sup>) and biostabilized material (from other fractions). These materials can be used as soil structuring agents or fertilizers due to their physicochemical characteristics. In 2024, the management of organic matter resulted in 7,219 tons of biostabilized material and compost, with 3,743 tons coming from separately collected organic matter.

OTHER RECOVERED MATERIALS	YEAR				
	2020	2021	2022	2023	2024
Biostabilized material	5,740	6,734	6,630	6,114	3,476
Compost from separately collected organic matter	7,052	6,674	6,192	4,556	3,743
<b>TOTAL OTHER MATERIALS</b>	<b>12,792</b>	<b>13,409</b>	<b>12,822</b>	<b>10,670</b>	<b>7,219</b>

*Recovered products from organic matter (2020-2024, in tons)*

<sup>1</sup> OFSC: Organic Fraction from Selective Collection





Recovery percentage for each material with respect to total recovery (2024)



Recovered materials in the Valdemingómez Technology Park, in tons (2020-2024, in tons)

## Waste Energy Recovery

In 2024, energy recovery from the separation and classification process rejects, as well as the biogas generated from both operating and non-operating landfills, provided 244,557 MWh of electricity, enough to supply approximately 76,424 households for one year (average annual consumption per household of 3.2 MWh). Of the total electricity generated, 64,552 MWh (26.4 %) was used for self-consumption within the facilities, and the remaining 180,005 MWh (73.6 %) was exported to the electricity grid.

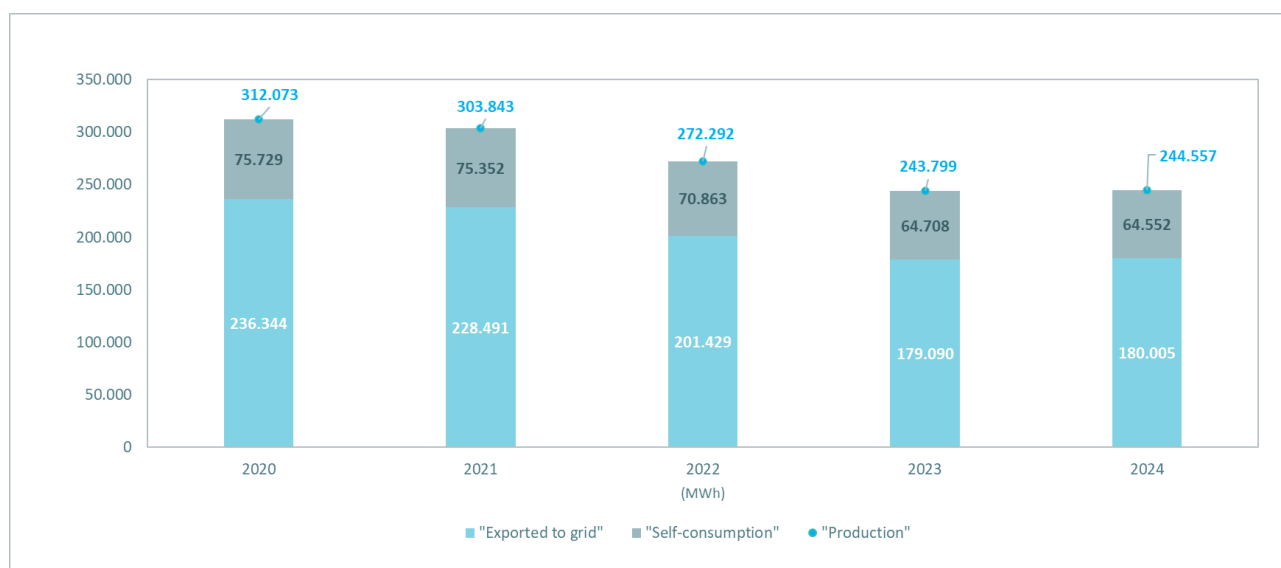
The biogas treatment plant injected 14,569,785 Nm<sup>3</sup> of biomethane into the gas grid, equivalent to 156,821 MWh of thermal energy, 0.7 % more than in 2023. This amount of biomethane could supply more than 30,767 households (average annual gas consumption per household of 5.097 MWh) or 483 buses of the Municipal Transport Company (Empresa Municipal de Transportes).

ENERGY BALANCE OF THE VALDEMINGÓMEZ TECHNOLOGY PARK	YEAR				
	2020	2021	2022	2023	2024
Electrical energy produced (MWh)	312,073	303,843	272,292	243,799	244,557
Thermal energy produced (MWh)	103,476	98,333	139,651	155,673	156,821

*Biogas production in the Valdemingómez Technology Park (2020-2024)*

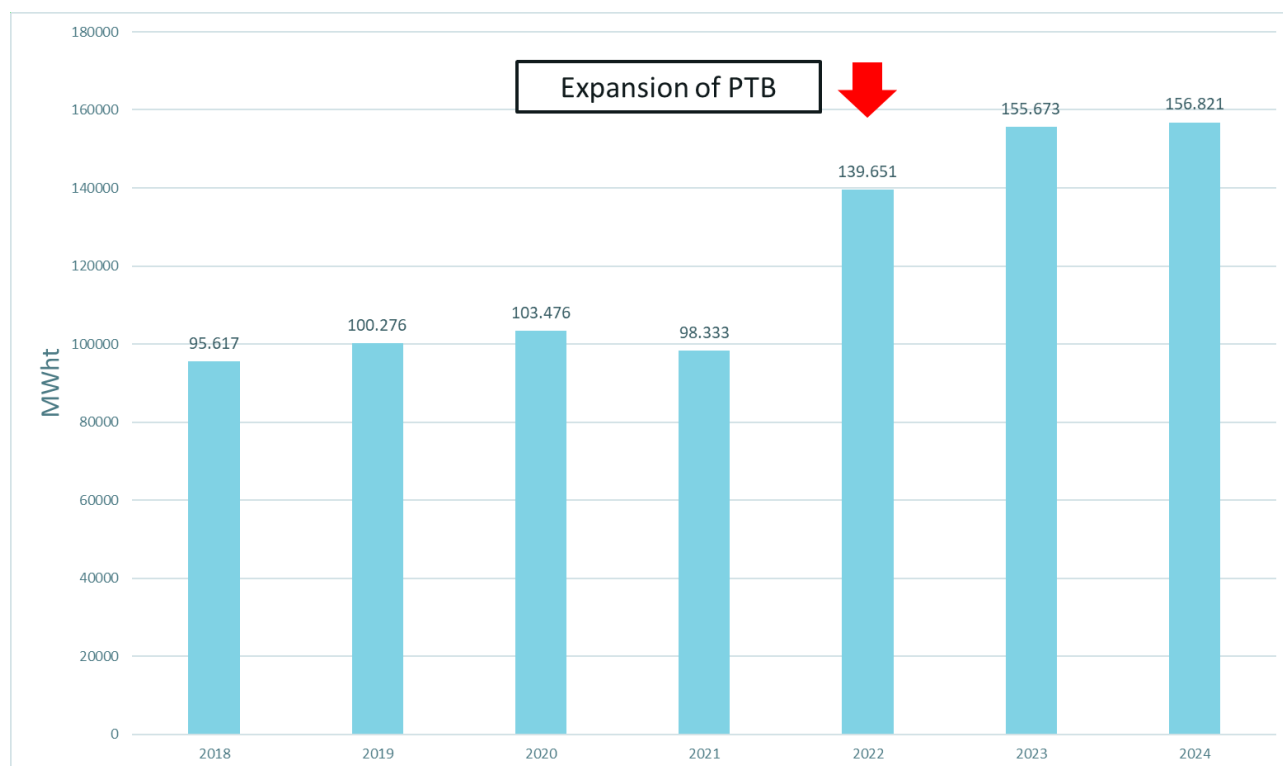
The waste management activities at Valdemingómez Technology Park contribute to the Circular Economy by reintroducing materials into the market and providing numerous environmental benefits, including:

- Saving natural resources through material recovery.
- Reducing the volume of waste sent to landfills by producing electricity and biogas.
- Reducing greenhouse gas emissions by substituting emissions from other energy sources (e.g., fossil fuels) with renewable energy/biomethane.



*Production and destination of the electrical energy in the Valdemingómez Technology Park (2020-2024, in MWh)*

In 2024, biomethane injected into the grid has been the highest in the historical series, due to the expansion of the capacity of the biogas treatment plant that was carried out in the year 2022.



Energy injected into the gas grid (2018-2024, in MWh)

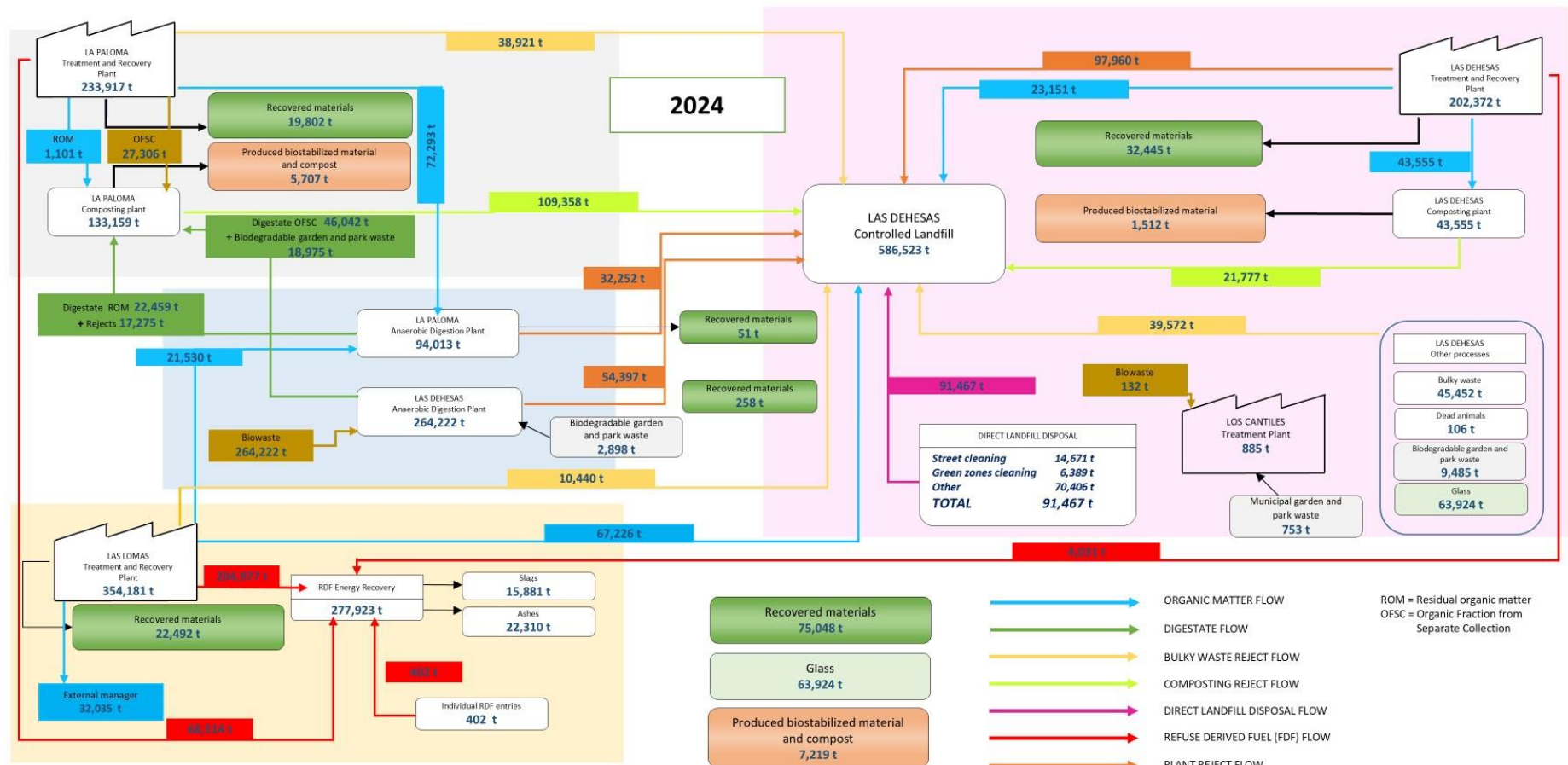
### Tons of avoided emissions

Thanks to the replacement of fossil fuels by biomethane and electricity generated from waste in the VTP, an estimated emission saving of 120,468 tons of CO<sub>2</sub> equivalent has been achieved in 2024:

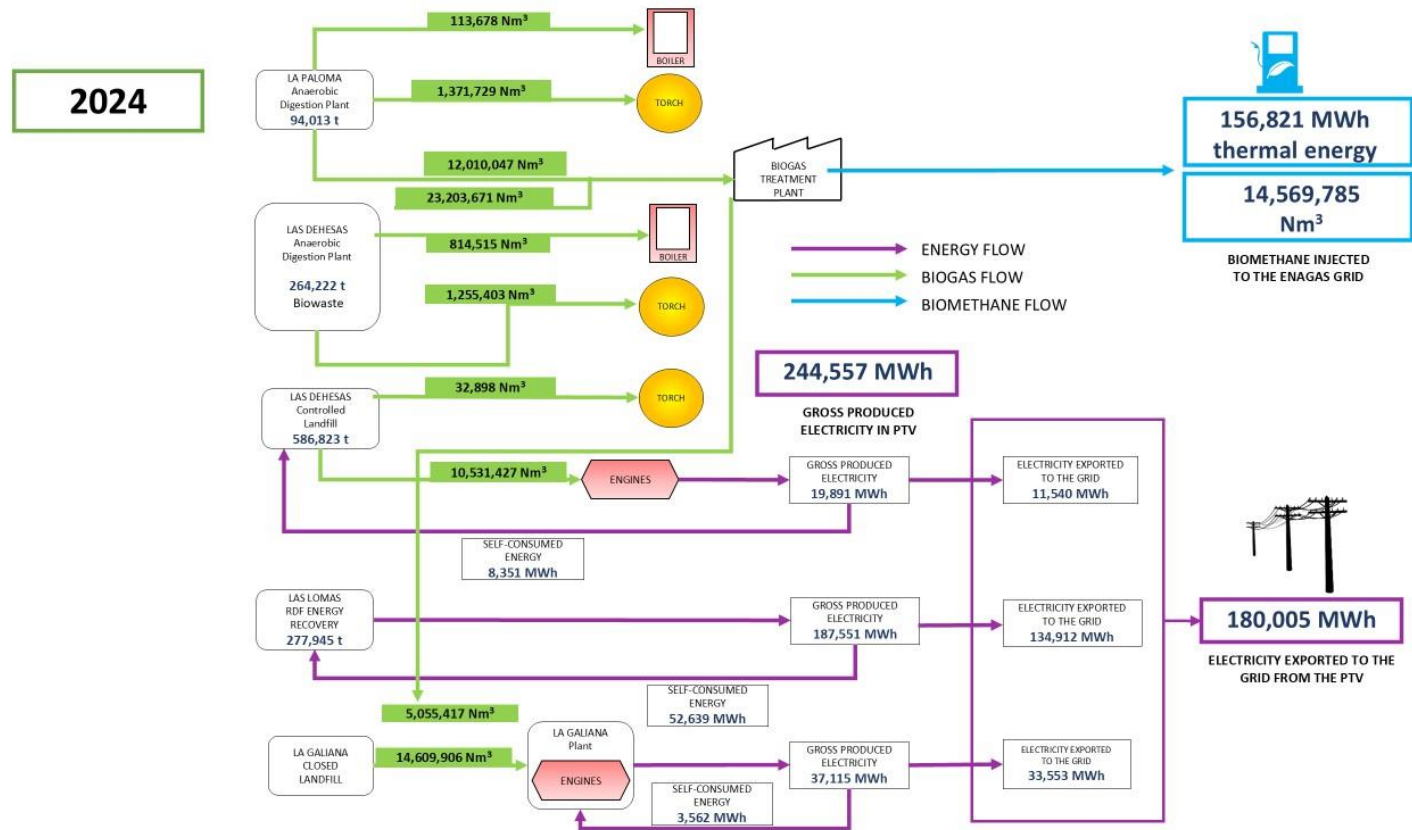
- 80,949 tons of CO<sub>2</sub> equivalent according to electrical energy produced from renewable sources generated in the VTP, and
- 39,519 tons of CO<sub>2</sub> equivalent according to biomethane produced from renewable sources injected to the grid.

	MWh/year	t/ CO <sub>2</sub> avoided	Remarks
Electrical energy produced	244,557	80,949	CO <sub>2</sub> avoided (conversion factor 0.331 kg CO <sub>2</sub> /kWh)
Thermal energy, biomethane injected to the grid	156,821	39,519	CO <sub>2</sub> avoided (conversion factor 0.252 kg CO <sub>2</sub> /kWh)
<b>TOTAL</b>		<b>120,468</b>	

Tons of avoided emissions (2024)



*Main material flows of the Valdemingómez Technology Park (2024, in tons)*



Main biogas and energy flows of the Valdemingómez Technology Park (2024)

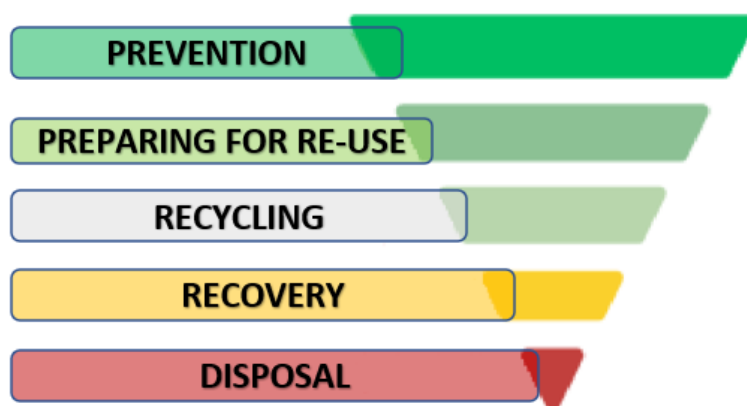




*Main work lines of the Valdemingómez Technology Park for Circular Economy (2024)*

### Compliance with Recycling and Landfill Targets in the City of Madrid

The waste hierarchy defines the order of priorities in national and European waste management legislation: (a) prevention; (b) preparation for reuse; (c) recycling; (d) other types of recovery (e.g., energy recovery); and (e) disposal. The goal is to maximize resource utilization and move towards a circular economic model that prolongs resource use in the production cycle.



European and national legislation set ambitious waste management targets: by 2035, 65 % of municipal waste must be recycled and only a maximum of 10 % of this waste can be disposed in landfill.

The following intermediate objectives has been established:

TARGETS	YEAR			
	2020	2025	2030	2035
Municipal waste management for recycling and reuse (%)	50	55	60	65
Municipal waste direct disposal in landfill (%)		<40	<20	<10

The city of Madrid has fulfilled the following objectives in 2024:


DOMESTIC AND COMMERCIAL WASTE MANAGED IN THE PTV		DOMESTIC WASTE MANAGED BY THE CITY COUNCIL OF MADRID		DOMESTIC WASTE MANAGED BY THE CITY COUNCIL OF MADRID AND COMMERCIAL WASTE MANAGED BY PRIVATE MANAGERS	
% PREPARING FOR RE-USE AND THE RECYCLING	30%	% PREPARING FOR RE-USE AND THE RECYCLING	36%	% PREPARING FOR RE-USE AND THE RECYCLING	52%
% ENERGY RECOVERY	22%	% ENERGY RECOVERY	20%	% ENERGY RECOVERY	15%
% LANDFILL DISPOSAL	47%	% LANDFILL DISPOSAL	43%	% LANDFILL DISPOSAL	33%

Calculations are made based on the black box model, i.e. the total amount of waste managed annually is divided into 3 categories: waste that has been disposed in landfill (Las Dehesas), waste that has been sent to energy recovery (Las Lomas plant) and managed waste for recycling and reuse.


## Traceability of the Final Treatment of Domestic Waste at Valdemingómez Technology Park

Based on production data for the year 2024, which includes plant balances and information on the processes applied to each waste fraction managed by the Madrid City Council, the treatment and ultimate recovery of various waste types, categorized by fractions, are outlined below:


**Mixed Waste Fraction (non-recyclables):** non-selective mixing of municipal waste (LER 20 03 01).

	<u>15%</u>	Management for recycling and reuse. Treatment in separation and sorting plants. R12. Exchange of wastes for submission to any of the operations numbered R1 to R11.
	<u>44%</u>	Reject energy recovery in Las Lomas plant. R0101. Main use as fuel in waste incineration facilities (combustion).
	<u>41%</u>	Deposit in landfill of non-valuable fraction: D0502. Deposit in non-hazardous waste landfills.

**Separately Collected Organic Fraction:** organic biowaste (LER 20 01 08).

	<u>47%</u>	Deposit in landfill of non-valuable fraction: D0502. Deposit in non-hazardous waste landfills.
	<u>49%</u>	Management for recycling and reuse. Management in the anaerobic digestion plant Las Dehesas. <ul style="list-style-type: none"><li>• R12. Exchange of wastes for submission to any of the operations numbered R1 to R11.</li><li>• R0302. Anaerobic digestion. Treatment of digestate at the composting plant (La Paloma)</li><li>• R0301 Composting.</li></ul>
	<u>4%</u>	Energy recovery.

**Plastics, Metals and Carton Fraction:** yellow container (LER 15 01 06).

	<u>38%</u>	Deposit in landfill of non-valuable fraction: D0502. Deposit in non-hazardous waste landfills.
	<u>10%</u>	Energy recovery.
	<u>52%</u>	Management for recycling and reuse. Treatment in separation and sorting plants (yellow bag). R12. Exchange of wastes for submission to any of the operations numbered R1 to R11. (including pretreatment for recovery).

**Separately Collected Glass** (LER 15 01 07).

	<b><u>100%</u></b>	Management for recycling and reuse. Storage in glass transfer plant (Las Dehesas). R1301. Waste storage, in the scope of collection.
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**Biodegradable Garden and Park Waste:** (LER 20 02 01).

<b><u>100%</u></b>	Management for recycling and reuse. Biowaste management (Las Dehesas). R12. Exchange of wastes for submission to any of the operations numbered R1 to R11 (including pretreatment for recovery).
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**Bulky Waste** (LER 20 03 07).

<b><u>100%</u></b>	Deposit in landfill. D13. Blending or mixing prior to submission to any of the operations numbered D1 to D12
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## ENVIRONMENTAL EDUCATION

The Environmental Education program conducted at the Valdemingómez Technology Park provides a comprehensive view of the industrial processes currently employed in waste management. This unique facility, both technically and educationally, is dedicated to fostering environmental awareness among citizens through training and informative activities centred on waste management and treatment and recycling.

Programmed activities cater to various demographic groups, offering tailored visits. These visits offer insights into the technical, economic, and human resources required daily to ensure that the waste generated by a large city like Madrid undergoes the necessary treatment in accordance with environmental protection and legislation.

For more information on these visits and educational resources, please visit [www.madrid.es/valdemingomez](http://www.madrid.es/valdemingomez) .