

**VALDEMINGÓMEZ
TECHNOLOGY PARK**

2022

Annual report



Valdemingómez Technology Park (*Parque Tecnológico de Valdemingómez, PTV*), located in the South-East of the city of Madrid, is a technology centre made up of different household and commercial waste management facilities controlled by the City Council of Madrid (*Ayuntamiento de Madrid*).

In these facilities, waste undergoes sorting and recovery processes, including biogas production through anaerobic digestion of organic matter (biomethanation), biogas upgrading for injection into the gas grid, and compost/biostabilized material production.

Non-recoverable fractions are transformed into electricity in 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 subject to energy recovery.

Valdemingómez Technology Park receives around 4 000 tons of waste per day, which are managed in eight large industrial facilities operating 24/7, every day of the year:

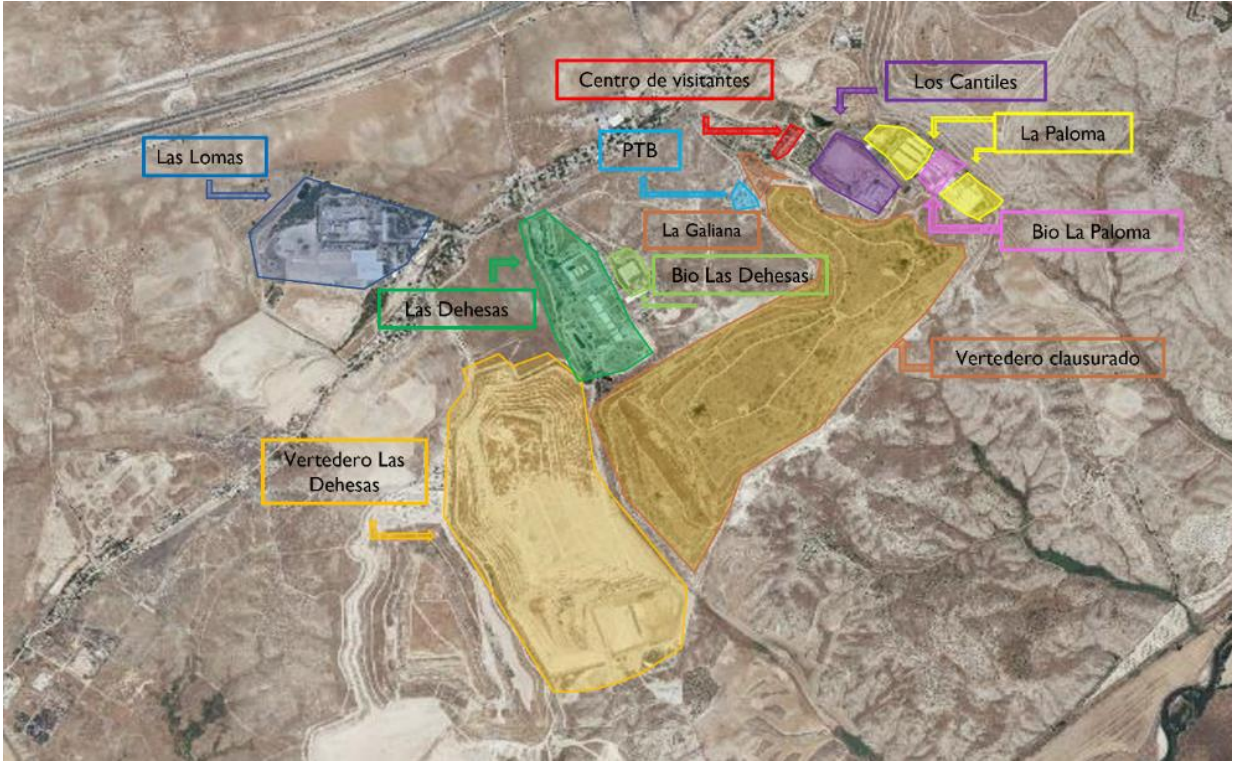
- Two waste sorting and treatment plants (La Paloma and Las Dehesas).
- Two anaerobic digestion plants (Bio La Paloma and Bio Las Dehesas), where the organic fraction of municipal solid waste is managed to produce biogas.
- A biogas treatment plant (PTB), where biogas is upgraded and transformed into biomethane for injection into the national gas grid.
- A waste sorting and energy recovery plant (Las Lomas), which produces electricity from the remaining waste after separation (mixed waste).
- A degasification and energy recovery plant (La Galiana) managing the biogas obtained from Valdemingómez non-operating landfill, as well as part of the biogas produced in the anaerobic digestion plants.
- An operating landfill, next to Las Dehesas plant.

There are also other facilities for municipal offices and environmental education activities (Visitors Centre).

Finally, a new organic matter management facility (Los Cantiles) is under construction. This facility is expected to compost approximately 100,000 tons of organic matter per year through a versatile, modular, and highly automated process.

Waste management is conducted through indirect management by means of public service management contracts, one for each of the waste treatment plants. Also, because of their environmental relevance, these industrial facilities are subject to numerous internal and external controls and are, therefore, continuously affected by strict environmental standards according to European, national, and autonomic legislation related to environment and waste management.

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



Valdemingómez Technology Park map

WASTE TREATMENT IN VALDEMINGÓMEZ TECHNOLOGY PARK

The main objective of waste treatment is the recovery of recyclable materials, energy recovery and organic matter treatment. Recovered materials are delivered to authorised waste managers for recycling and/or reuse and remarketing. Energy recovery allows to exploit the energy contained in the rejects resulting from the treatment. Finally, the organic matter is used either for biomethanation, to produce biogas, or composting, to obtain compost or biostabilized material.

A. Treated waste

Along 2022, a total of 1,221,588 tons (t) of domestic waste was treated at Valdemingómez Technology Park, 6.44% less than in 2021, due to the socioeconomic situation and to the fact that waste from other municipalities has not been treated in 2022.

Of these, 1,076,520 tons (88%) were treated, and 145,038 tons (12%) were deposited directly in a landfill, because there were non-recoverable fractions, i.e., those which, due to their characteristics, cannot undergo sorting and recovery processes, so they were inevitable rejects. However, it should be noted that there has been a 26% reduction in this fraction with respect to the year 2021.

There are also 63,183 tons of glass (4.6% more than in 2021) from the city's separate collection, which is managed through the transfer station located in Las Dehesas plant.

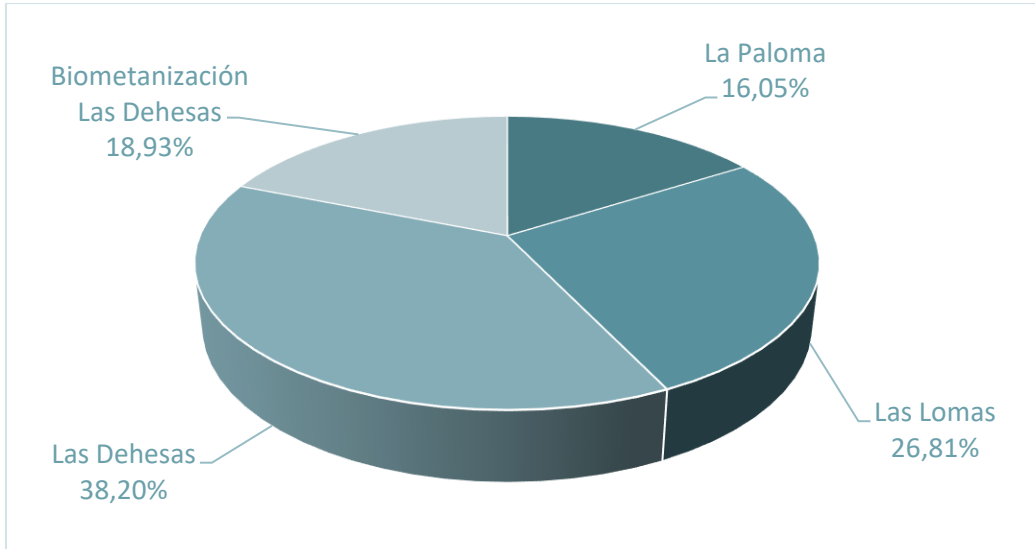
Also, noteworthy is the decrease in the biodegradable garden and park waste collection: 10,241 tons with respect to the previous year due to the consequences of the storm Filomena when an unusually high volume of this fraction was collected in 2021 (35.954 tons).

When analysing the 2018-2022 evolution of the waste fractions generated in the City of Madrid (without considering the waste treated in Valdemingómez Technology Park coming from other municipalities), it can be seen that there has been a reduction of the mixed waste fraction, associated with an increase in biowaste and packaging fractions.

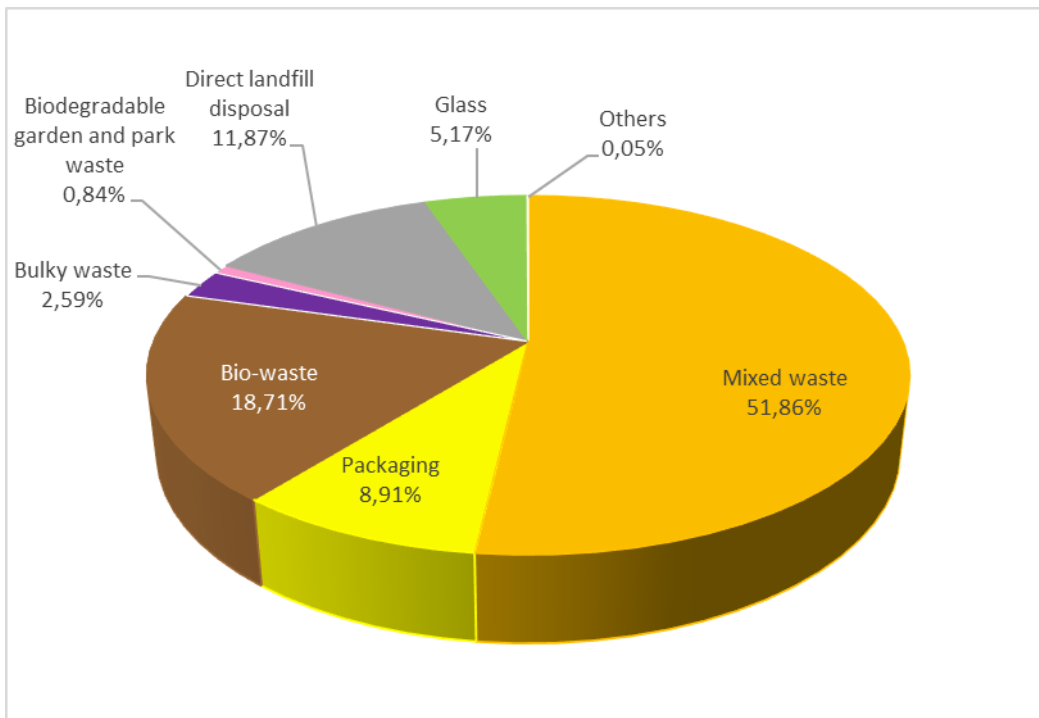
It is also worth noting the decrease in direct landfill disposal, with a reduction in the region of 100,000 tons in five years. Such outcome is related to the implementation of different municipal measures in waste collection and treatment: operational measures in the different plants of the Technology Park (provision of pits for the unloading of all types of box vehicles with lifting arms) and improvements in the new contracts for waste collection, street cleaning and green areas services, allowing a better separation at source of the different fractions prior to their treatment.

WASTE INPUT TO VALDEMINGÓMEZ TECHNOLOGY PARK BY FRACTION AND PLANT IN 2022						
TREATMENT	FRACTION	LA PALOMA	LAS LOMAS	LAS DEHESAS	Anaerobic digestion LAS DEHESAS	TOTAL
MIXED WASTE fraction treatment	Mixed waste bag	152 426.74	294 185.42	137 654.76		584 266.92
	Cleaning		25 492.86	1 018.88		26 511.74
	Commercial activity		7 272.23	12 510.32		19 782.55
	Other municipalities					
	Other	2 671.32		293.38		2 964.70
	TOTAL MIXED WASTE	155 098.06	326 950.51	151 477.34	0.00	633 525.91
PACKAGING fraction treatment	Packaging bag	41 021.48	3.78	66 909.70		107 934.96
	Cleaning			236.38		236.38
	Commercial activity			619.70		619.70
	Other			16.78		16.78
	TOTAL PACKAGING	41 021.48	3.78	67 782.56	0.00	108 807.82
BIO-WASTE fraction treatment	Bio-waste bag		51.38		202 244.04	202 295.42
	Commercial activity				26 251.74	26 251.74
	TOTAL BIO-WASTE	0.00	51.38	0.00	228 495.78	228 547.16
Bulky waste treatment	Bring-in collection points			30 645.04		30 645.04
	Furniture processing					
	Cleaning		8.50	79.14		87.64
	Commercial activity			842.78		842.78
	Other municipalities					
	Other			3.86		3.86
	TOTAL BULKY-WASTE	0.00	8.50	31 570.82	0.00	31 579.32
Dead animals	TOTAL DEAD ANIMALS	0.00	0.00	98.92	0.00	98.92
Biodegradable garden and park waste	Yard waste			7 523.22	2 717.82	10 241.04
	Other municipalities					
	TOTAL YARD WASTE	0.00	0.00	7 523.22	2 717.82	10 241.04
Waste to energy recovery	Individuals		534.10			534.10
	TOTAL INDIVIDUALS RECOVERY		534.10		0.00	534.10
Direct landfill disposal	Mixed waste			7 076.70		7 076.70
	Packaging					
	Dead animals					
	Bulky waste			103.66		103.66
	Glass (clinical)			148.04		148.04
	Cleaning			85 650.67		85 650.67
	Commercial activity			52 059.50		52 059.50
	Other municipalities					
TOTAL DIRECT DISPOSAL	0.00	0.00	145 038.57	0.00	145 038.57	
Glass transfer station	Glass			62 537.52		62 537.52
	Commercial activity			645.44		645.44
	TOTAL GLASS	0.00	0.00	63 182.96	0.00	63 182.96
	Waste from Electrical and Electronic Equipment (WEEE)			2.96		2.96
TOTAL ENTRIES		196 119.54	327 548.27	466 677.35	231 213.60	1 221 558.76

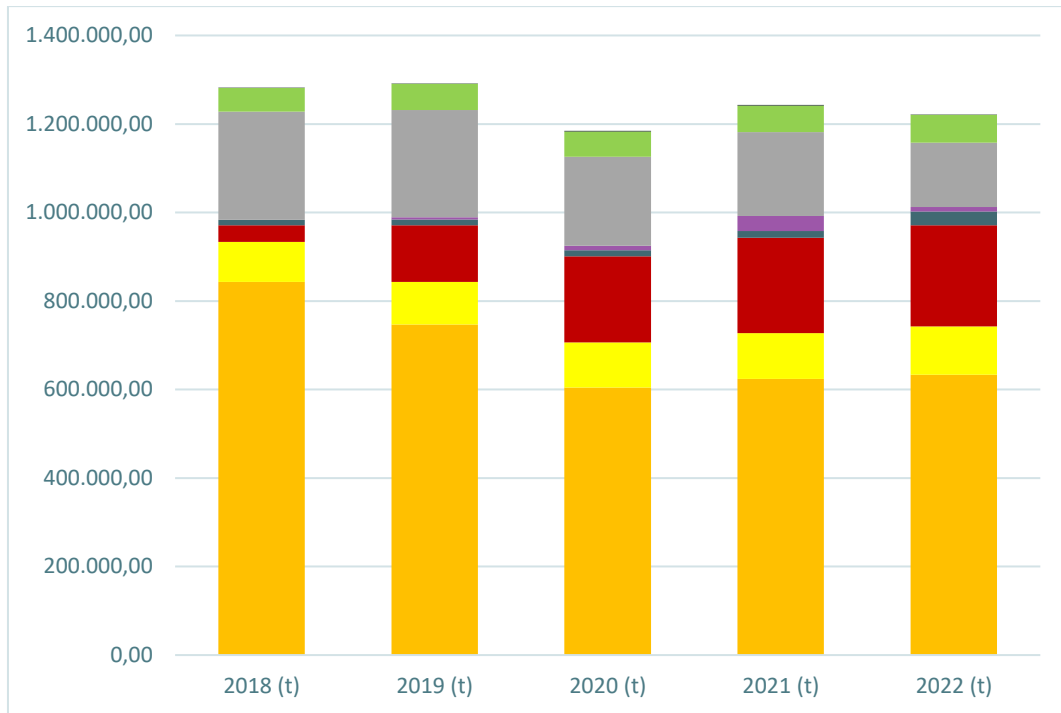
Treated waste destination in Valdemingómez Technology Park (2022, in tons)



Waste input distribution in Valdemingómez Technology Park, per plants, 2022



Waste input distribution in Valdemingómez Technology Park, per fractions, 2022



	2018 (t)	2019 (t)	2020 (t)	2021 (t)	2022 (t)
Mixed waste	843.046,87	746.701,07	604.472,40	624.172,11	633.525,91
Packaging	90.317,08	96.396,04	101.746,98	103.009,16	108.807,82
Bio-waste	37.552,99	127.777,20	194.634,17	215.485,42	228.547,16
Bulky waste	12.868,36	13.449,10	13.605,18	15.591,56	31.579,32
Biodegradable garden and park waste	0	4.990,66	10.235,66	33.640,68	10.241,04
Direct landfill disposal	244.417,12	242.194,40	201.344,54	189.624,76	145.038,57
Glass	53.279,40	59.227,36	56.816,80	60.398,76	63.182,96
Others	487,32	407,86	1541,5	1270	635,98
TOTAL	1.281.969,14	1.291.143,69	1.184.397,23	1.243.192,45	1.221.558,76

Input flow evolution in Valdemingómez Technology Park

B. Recovery of recyclable materials

Once the waste has been treated, 67,210 tons of recyclable materials have been recovered, a similar amount to that of 2021 (0.78% more).

While there has been an increase in the recovery of plastics in 2022, since 2019 there has been a significant decrease in paper-cardboard, which is due to the fact that there is less and less paper-cardboard in the mixed waste fraction, increasing its recovery through the collection systems located at the street (blue container) due to the better previous separation carried out by the citizens.

RECOVERED RECYCLABLE MATERIALS	YEAR				
	2018	2019	2020	2021	2022
Paper-cardboard (recovered in plant)	19 267.71	16 214.96	10 046.33	11 416.19	10 456.78
Glass (recovered in plant)	751.86	582.90	360.75	306.08	223.38
Plastics	29 110.99	29 760.17	30 548.02	31 388.62	32 214.04
Ferromagnetic	16 061.35	14 197.09	13 772.13	12 130.88	11 411.25
Other metals (no packaging)	677.34	644.38	620.48	607.54	661.86
Burnt iron	5 171.00	5 780.00	5 570.00	5 254.00	5 845.37
Aluminium	2 232.03	2 568.30	3 100.69	2 755.34	3 010.55
Carton	3 997.87	3 868.38	3 521.52	3 512.54	3 386.73
TOTAL RECYCLABLE MATERIALS	77 270.15	73 616.18	67 539.92	67 371.19	67 209.96

Recovered materials in Valdemingómez Technology Park (2018-2022, in tons)

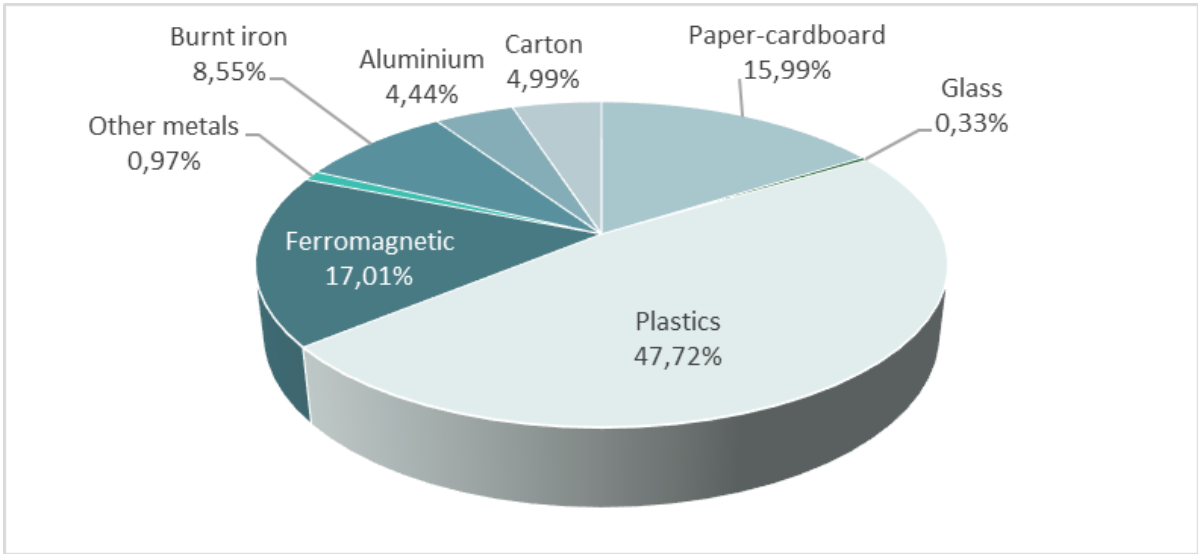
From the organic matter contained in household waste two kind of materials have been obtained: compost (when the organic matter comes from selective collection at source, OFSC¹) and biostabilized material (when the organic matter comes from another fraction). These materials, due to their physicochemical characteristics, can be used as soil structuring agents or fertilizers.

The management of organic matter has resulted in 12,822 tons of biostabilized material and compost, 4.37% less than in 2021, of which 6,192 tons came from separately collected organic matter (OFSC).

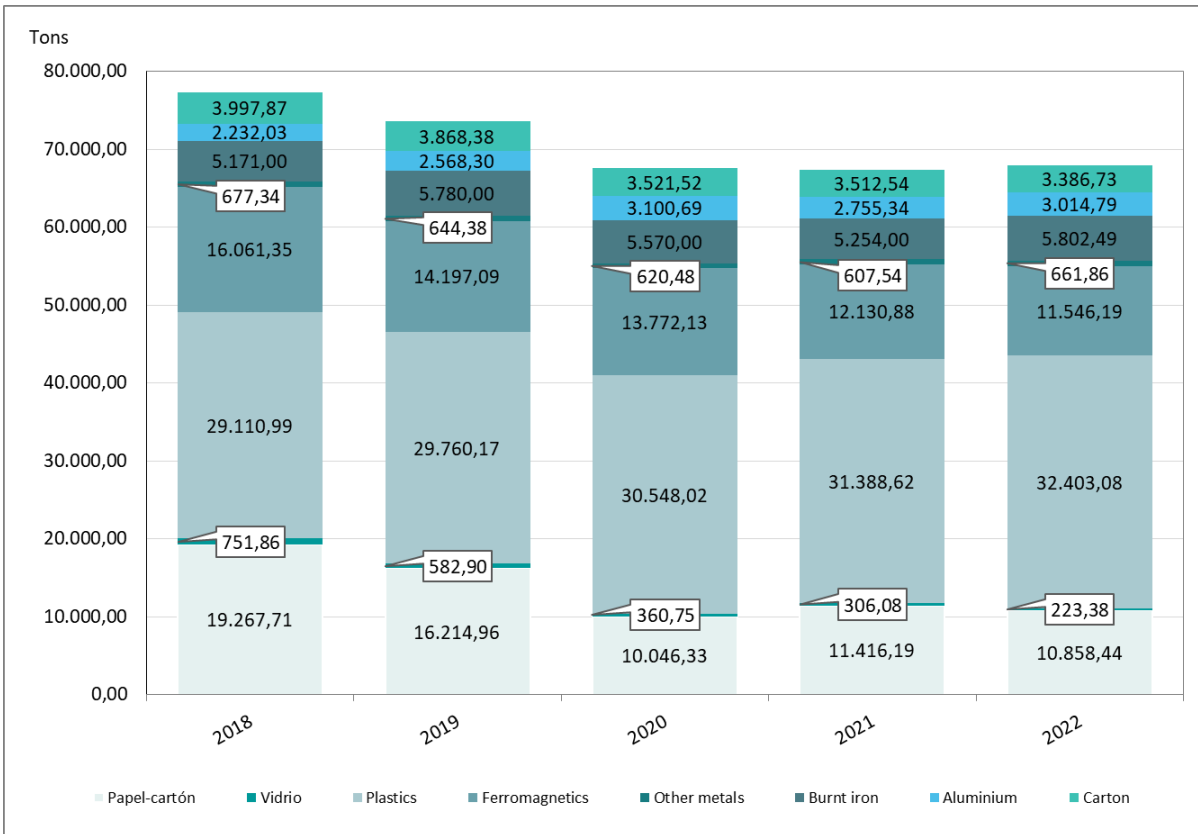
OTHER RECOVERED MATERIALS	YEAR				
	2018	2019	2020	2021	2022
Biostabilized material	13,605.10	13,275.07	5,740.03	6,734.44	6,630.04
Compost from separately collected organic matter	0.00	691.90	7,051.96	6,674.10	6,192.30
TOTAL OTHER MATERIALS	13,605.10	13,966.97	12,791.99	13,408.54	12,822.34

Recovered products from organic matter (2018-2022, in tons)

¹ OFSC: Organic Fraction from Selective Collection



Recovery percentage for each material with respect to total recovery (2022)



Recovered materials in Valdemingómez Technology Park, in tons

C. Waste energy recovery

In 2022, the energy recovery of the rejects from the separation and classification processes, as well as the energy use of the biogas generated both at the non-operating and the operating landfills provided 272,292 MWh of electricity, enough to supply approximately 85,000 households in one year (with an average annual consumption per household of 3.3 MWh). Of the total electricity generated, i.e., 70,863 MWh, 26% was destined to self-consumption in the facilities, and the remaining 74% (201,429 MWh) was exported to the electricity grid.

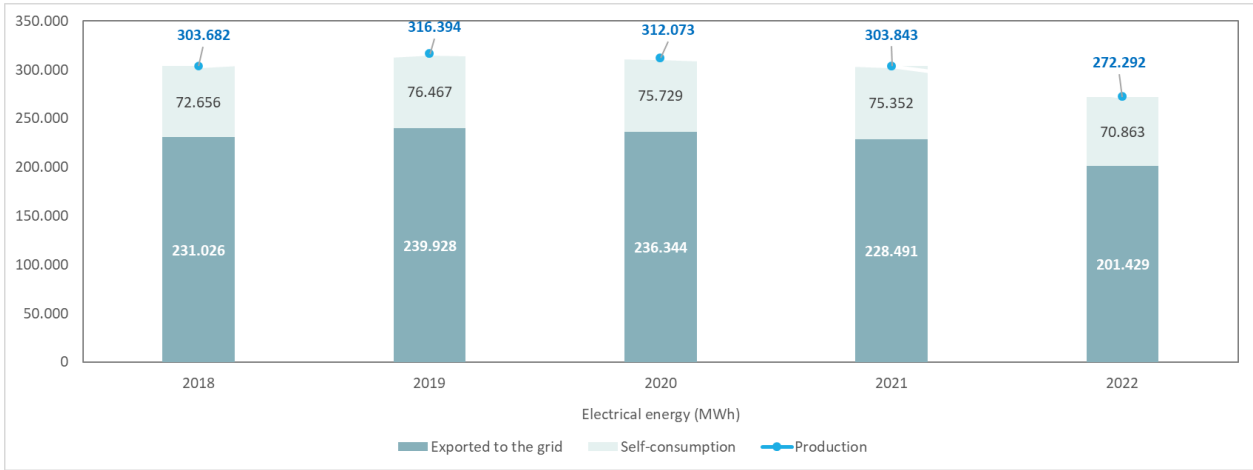
The biogas treatment plant has injected 12,446,649 Nm³ of biomethane into the gas grid, which is equivalent to 139.651.40 MWh of thermal energy, 42% more than in 2021. This is due to the technological improvement of the Biogas Treatment Plant carried out in June 2022. This amount of biomethane could be used to supply more than 27,399 households (with an average annual gas consumption per households of 5,097 MWh), or 430 buses of the Municipal Transport Company (*Empresa Municipal de Transportes*).

ENERGY BALANCE OF VALDEMINGÓMEZ TECHNOLOGY PARK	YEAR				
	2018	2019	2020	2021	2022
Electrical energy produced (MWh)	303,682	316,394	312,072	303,843	273,521
Thermal energy produced (MWh)	95,617	100,276	103,476	98,332	139,651

Biogas production in Valdemingómez Technology Park (2018-2022)

The waste management of Valdemingómez Technology Park contributes to the Circular Economy, as the treatment and recovery of household waste generated in the city of Madrid during the year 2022 allows the reintroduction of materials into the market and entails many environmental benefits, namely:

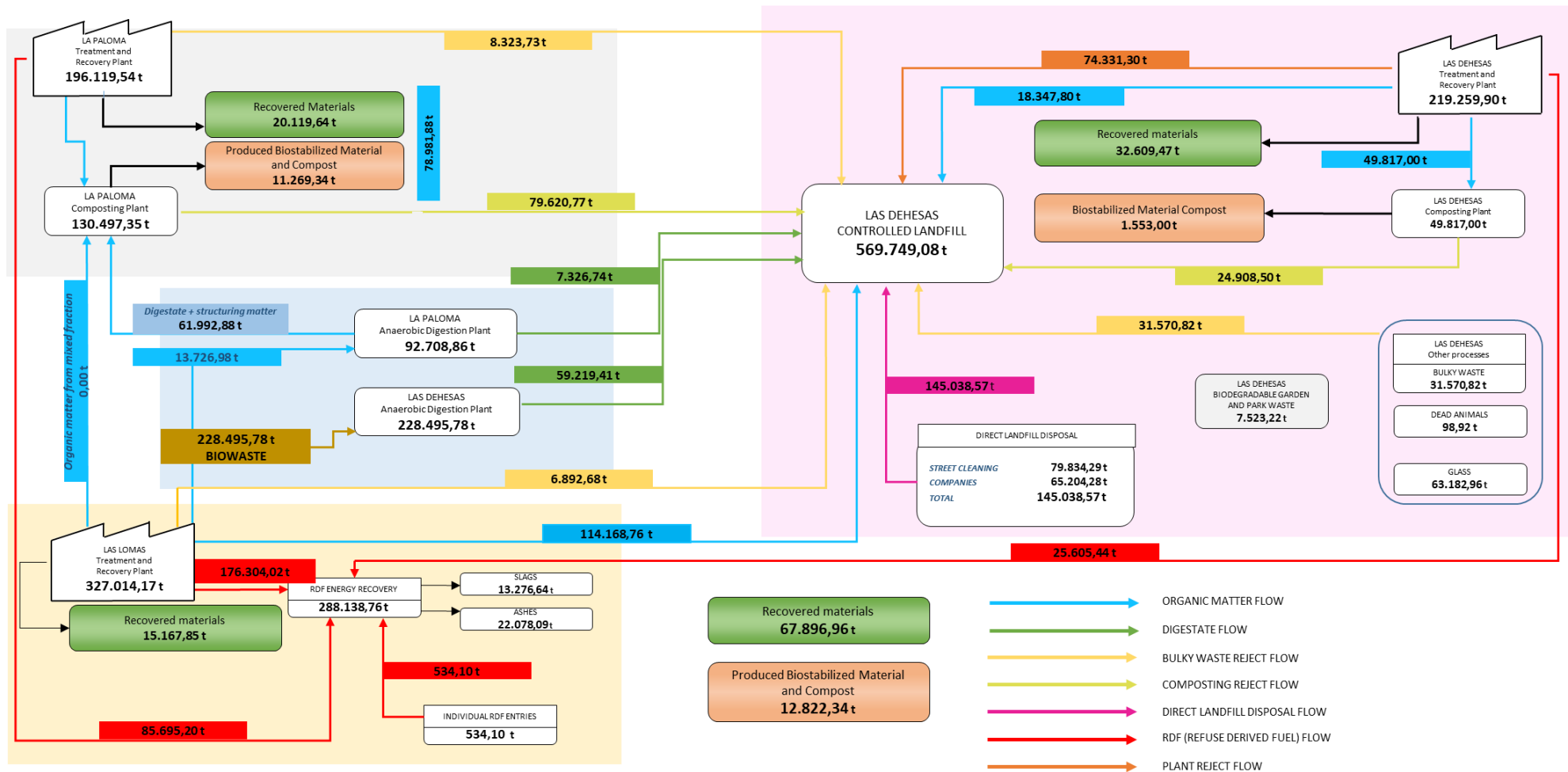
- Saving of natural resources through the material recovery.
- Reduction of the volume of waste sent to landfill through the production of electricity and biogas.
- Reduction of greenhouse gas emissions into the atmosphere associated with renewable energy/biomethane production due to the substitution of emissions from other energy sources (i.e., fossil fuels).



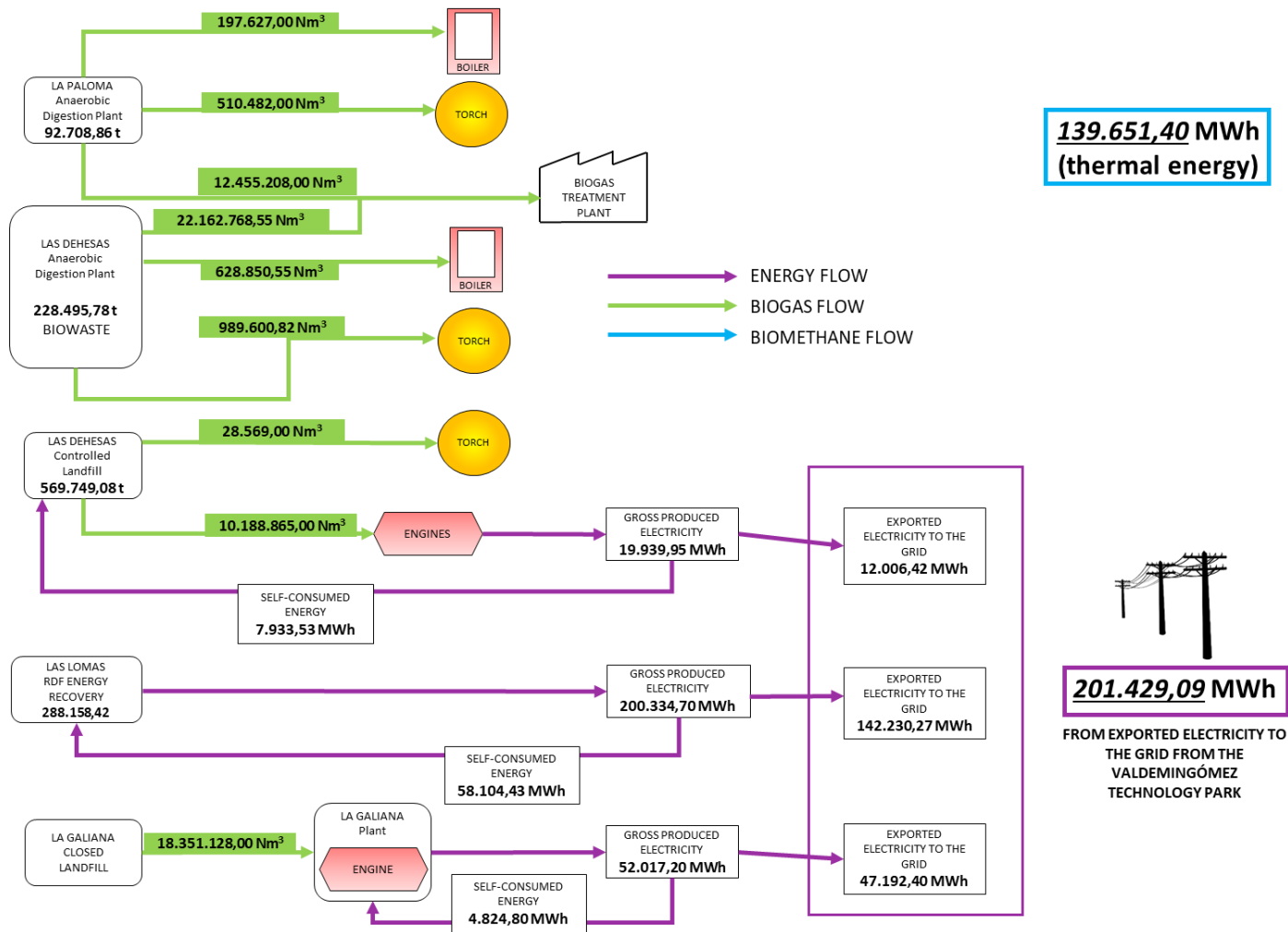
Production and destination of the electrical energy in Valdemingómez Technology Park (2018-2022)



Biogas treatment plant extension



Main material flows of Valdemingómez Technology Park (2022)



Main biogas and energy flows of Valdemingómez Technology Park (2022)



FERTILISER AND SOIL AMENDMENT PRODUCTION: COMPOST + BIOSTABILIZED: 12.822 t



RECOVERY OF RECYCLABLE MATERIALS: 67.897 t (CARTONS, CANES, P/C, GLASS)



BIOFUELS PRODUCTION: 36,9 mill. Nm³ BIOGAS AND 139.651 MWh BIOMETHANE

+27.399 Homes (gas) + 430 Buses EMT



ELECTRICITY PRODUCTION: 272.291,85 MWh

+ 85.090 Homes (electricity)

Main work lines of Valdemingómez Technology Park for Circular Economy (2022)

1.1. ENVIRONMENTAL EDUCATION

The Environmental Education program carried out by Valdemingómez Technology Park allows visualizing all the industrial processes that, nowadays, are applied to waste treated in this Technology Park, a unique facility from a technical and didactic point of view.

Its general objectives are to raise the environmental awareness among citizens through training and informative activities related to waste and recycling.

The programmed activities include visits adapted to the different population groups that can participate in them. Through these visits it is possible to appreciate all the technical, economic, and human efforts that are necessary, daily, to ensure that the waste of a large city like Madrid receives the treatment required by both environmental protection and legislation.

On the web page www.madrid.es/valdemingomez you can find all the information related to these visits, as well as didactic material.