

Mataro, Spain a World Class Waste Management Facility & its Potential Applications in USA

WTERT 2016 CONFERENCE
Earth Engineer Center,
Columbia University

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Sacyr

ESTADOS UNIDOS

WE CREATE THE ENVIRONMENT
FOR A SUSTAINABLE WORLD

Sacyr

GLOBAL INNOVATION



Waste cleaning and collection



+3 | Million inhabitants

- ✓ Street cleaning
- ✓ Waste collection
- ✓ Beach cleaning

+400 | Towns

Green areas and infrastructures



- ✓ Green areas, trees and gardens
- ✓ Forest and garden restoration
- ✓ Water quality control
- ✓ Infrastructure and energy services



+75,000 | Flowers / year

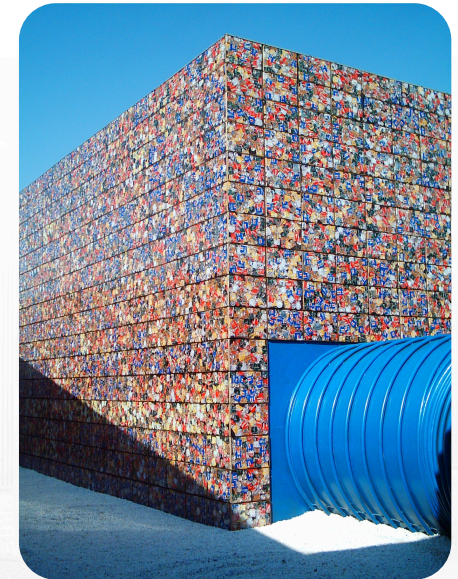
20 | Cities

+200,000 | Trees

Waste treatment and management



- ✓ Plant operation and construction
- ✓ Landfill environmental recovery
- ✓ Byproducts management and sales



Construction: **58** | Facilities

Operation & management: **41** | Facilities **+5.5M** | Inhabitants

Design, Build, and Operation of Waste Management Facilities:

A | Municipal Solid Waste

1. Waste-to energy Plants
2. Mixed Solid Waste Mechanical Biological Treatment (MBT) Plants
3. Organic Fraction of MSW Biomethanisation Plants
4. Organic Fraction of MSW Composting Plants
5. COMMINGLED RECYCLABLES Classification Plants
6. Landfilling, including Landfill Gas Control and Valorization

B | Construction and Demolition Waste Plants

C | WWTP Sludge Plants

D | Electric & Electronic Waste Treatment Plants

E | Used Tyres Recycling Plants

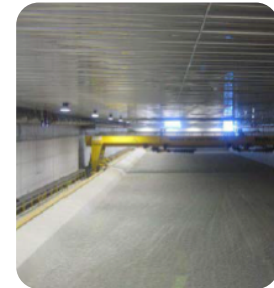
F | Residual Biomass Plants

G | Thermosolar Plants

H | Cogeneration Plants

58

CONSTRUCTION
Waste Management
Facilities



41

**OPERATION &
MAINTENANCE**
Waste Management
Facilities

405
MW

Total Power
Generation

5.5

Million of
equivalent
inhabitants served

Incineration and Energy Recovery from MSW

MATARÓ

(Barcelona – Spain)

Construction of the REST plan, retrofitting, a waste to energy process and operation during 15 years (2010-2024)

12.0 MW

Bio methanization of MSW

MATARÓ

(Barcelona – Spain)

MSW mechanical-biological treatment plant in Integral Centre of Waste Valorisation. Construction and operation during 15 years (2010-2024)

1.6 MW

LA PALOMA

(Madrid – Spain)

Design, construction and operation of biomethanization plant for organic waste and biogas treatment plant for its use as fuel in public transport

3.3 MW

TOTAL

4.9 MW

Biogas from Landfill deposit

MIRAMUNDO

(Cádiz – Spain)

Design, construction and maintenance of installation for degasification of landfill deposit

3.0 MW

VALDEMINGÓMEZ

(Madrid – Spain)

Sealling and MSW landfill deposit gasification, with energetic valorisation of biogas

18.0 MW

TOTAL

21.0 MW

Thermal drying of sludge from sewage treatment

REOCÍN

(Cantabria – Spain)

Construction and operation of biosolids thermal drying plant

12.0 MW

LOECHES

(Madrid – Spain)

Construction and operation of water treatment plant, with composting and thermal drying of sewage sludge

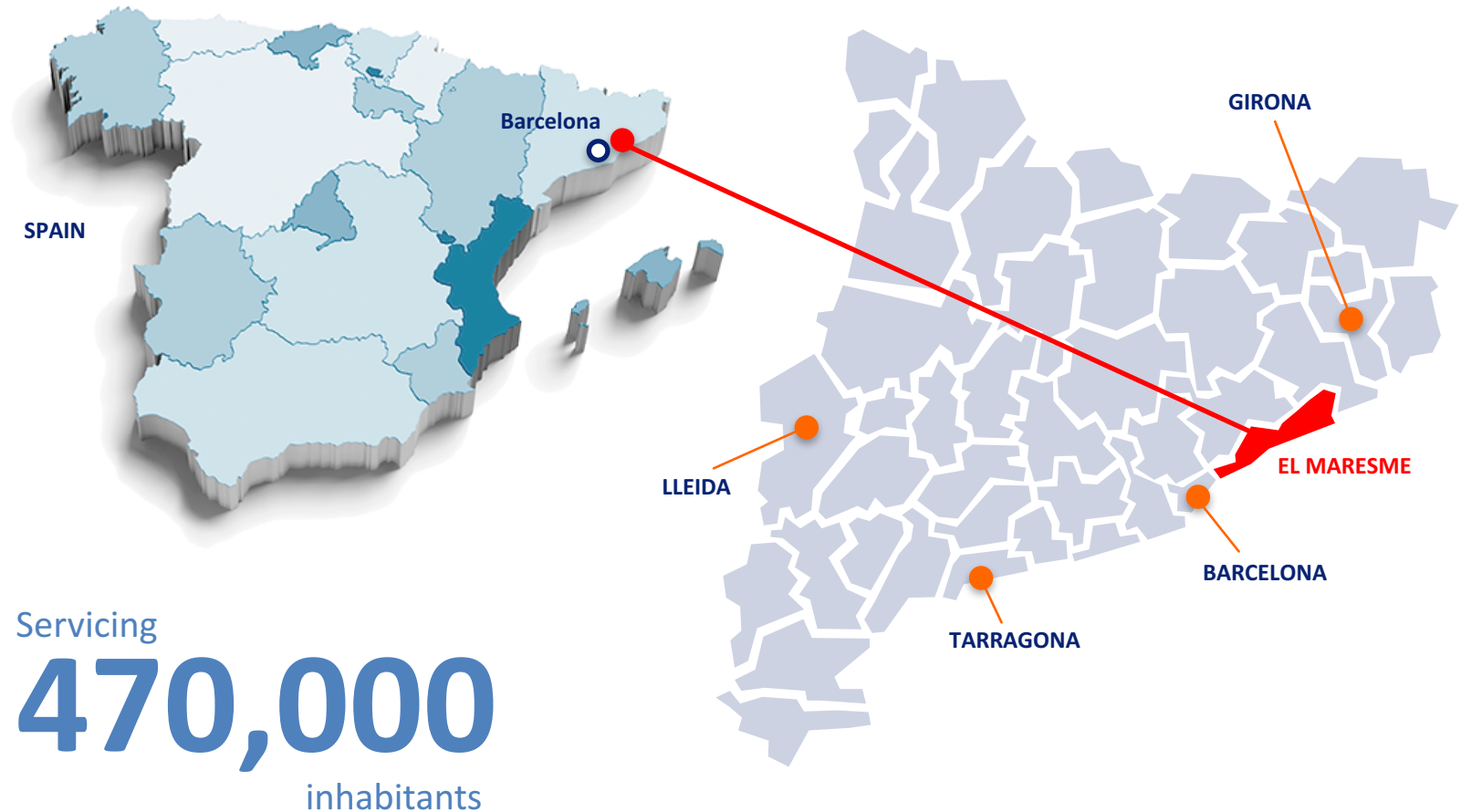
19.8 MW

TOTAL

31.8 MW

Location and Service

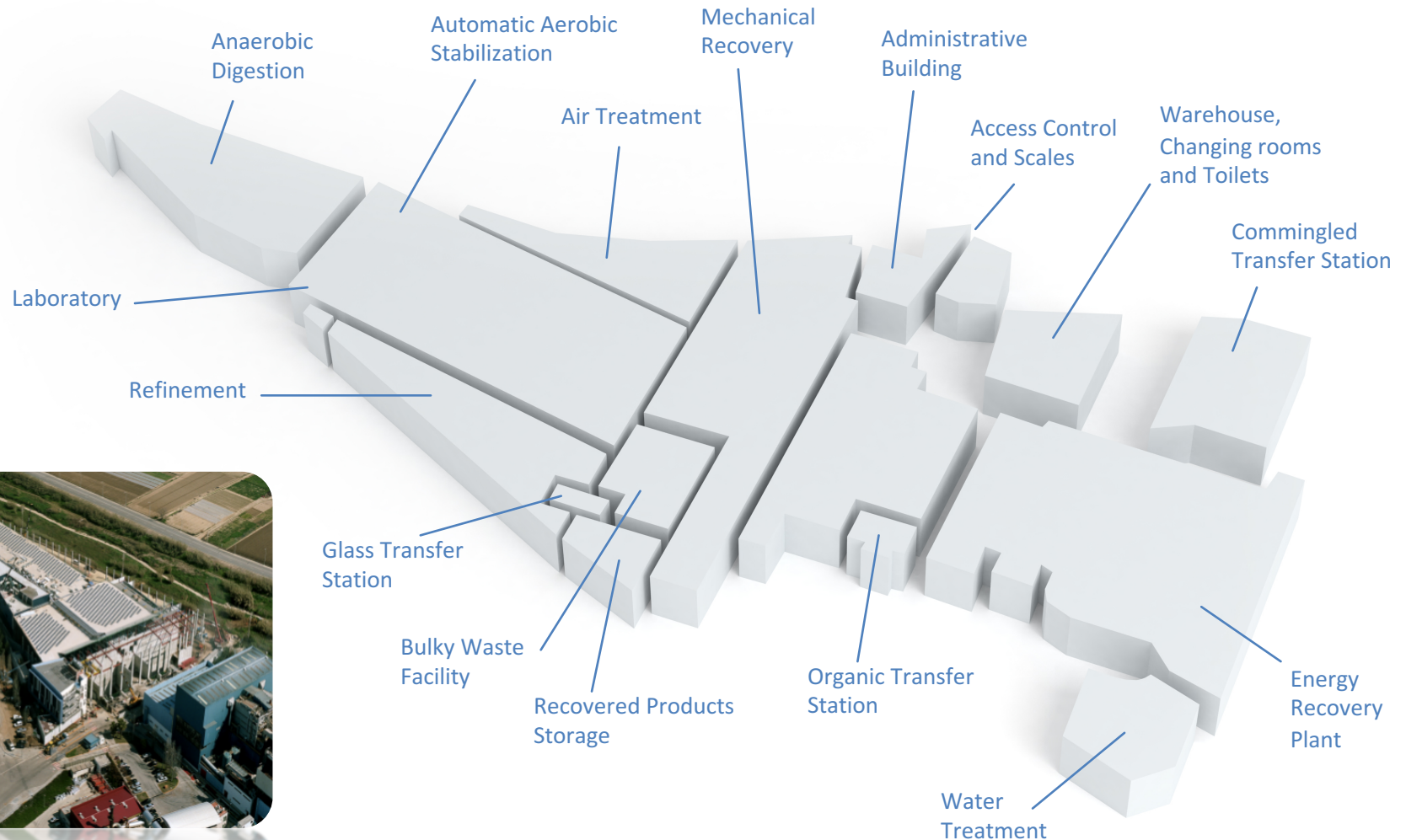
28 Municipalities of
the Maresme region



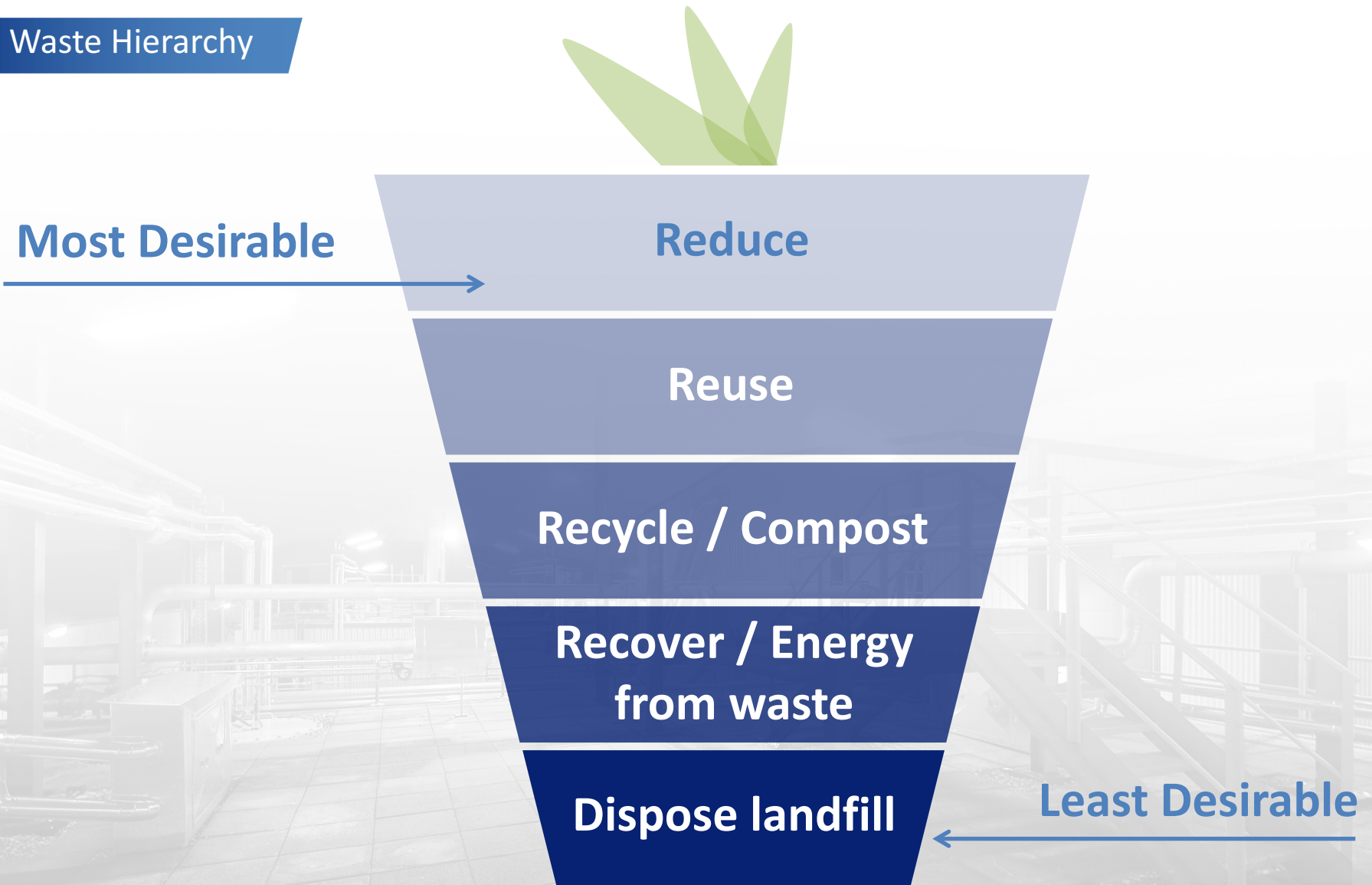
Location and Service



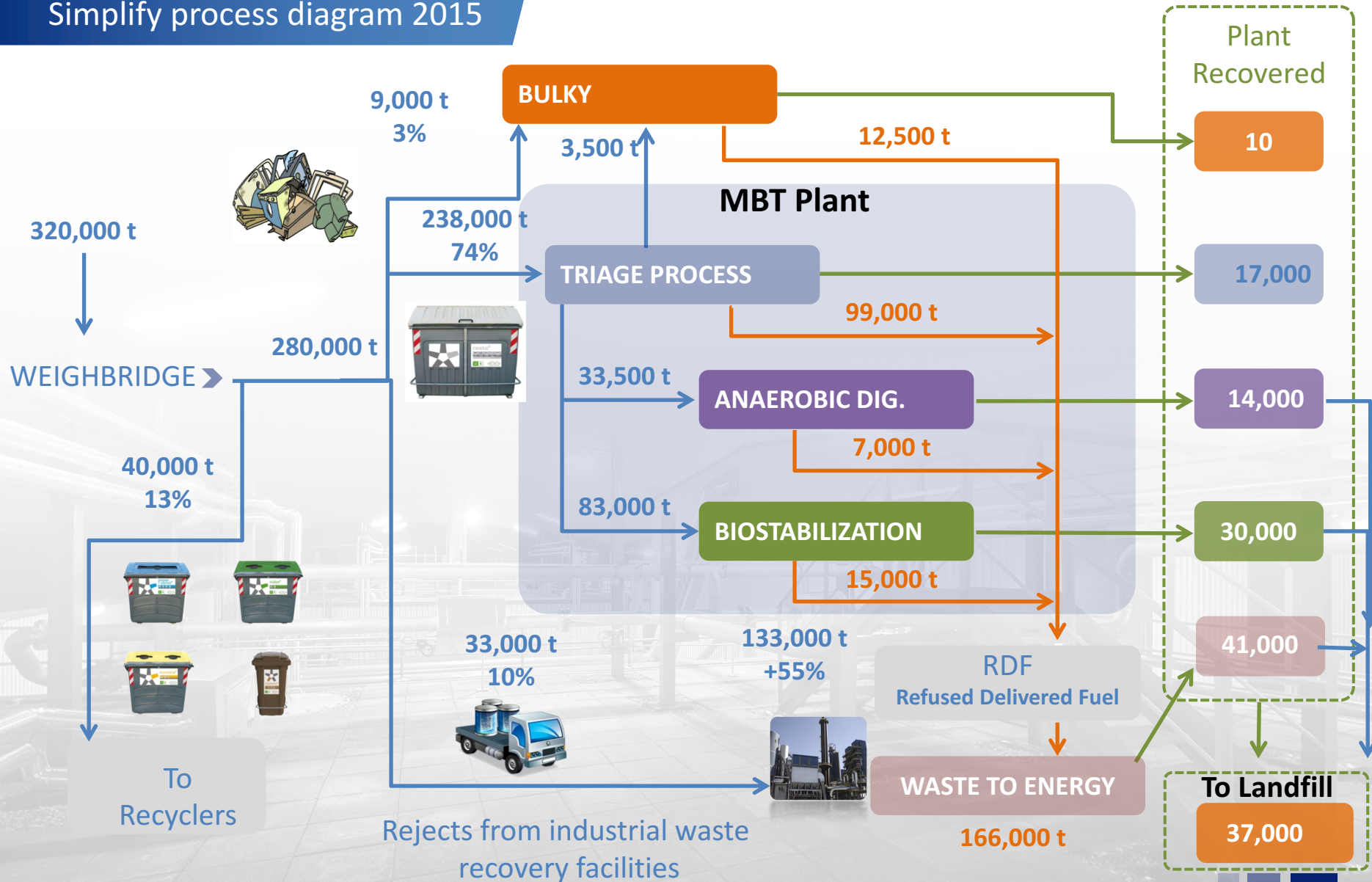
Facility's map



Waste Hierarchy



Simplify process diagram 2015



MBT (mechanical biological treatment)

Treatment Capacity	190,000 t
Treatment Lines	2
Maximum hourly capacity	30 t/h x 2
Recovered Materials (paper, glass, metal, plastic...)	8.5% incoming
Recovered organic matter	40% incoming
Composting Capacity	41,000 t/y
Anaerobic Digestion Capacity	35,000 t/y
Maximum Reject to W2E	55%
Photovoltaic power	290 kW



MBT (mechanical biological treatment)



MBT (mechanical biological treatment)

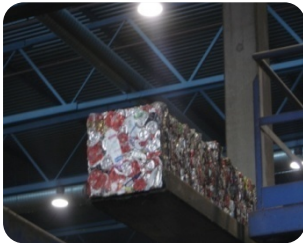


Plant Ratios 2015

From "Triage"

PAPER / CARDBOARD	4,000 t
GLASS	2,000 t
FERROUS	3,500t
NON-FERROUS	500 t
HDPE	500 t
PLASTIC MIX	2,000 t
PET	2,000 t
LDPE (film)	1,500 t
BEVERAGES CONTAINERS	1,000 t
TOTAL	17,000 t

NON-FERROUS METAL



HDPE



PET



BEVERAGES CONTAINERS



Biostabilization

Main Data

Capacity
(retention time)

41,000 t
(42 days)
82,000 t
(21 days)

Reactor dimensions

Length	120 m
Width	26 m
Height	3 m (max.)

Aeration type Aspirated

Max suction flow 3 x 17,000 m³/h



Anaerobic Digestion

Main Data

Capacity 35,000 t/year

Waste Types	Residual Org. Mat. <70 mm
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Reactors	2 x 3,000 m ³ , Mesophile
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Biogas Engines	2 x 800 kW (MWM)
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Biogas Production	4,200,000 Nm ³ /year
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Electricity Production	10,300 MWh/year
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Plant Ratios 2015

From
"BULKY"

Total	10 t
FERROUS	8 t
WOOL MATTRESS	2 t



From
"ANAEROBIC
DIGESTION"

Total	14,000 t
DIGEST	7,000t
REJECTS TO LANDFILL	7,000 t



From
"BIOSTABILIZATION"

Total	30,000 t
REFINEMENT TO LANDFILL	22,000 t
BIOSTABILIZED	8,000 t



Energy recovery plant

Characteristics

Designed LCV (real) 2,400 kcal/kg

Treatment Capacity	160,000 t/y
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Up time	8,100 h/year
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Number of Lines	2
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Combustion System Reverse Grill

Thermal capacity (per boiler)	24 Gcal/h
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Steam Generation (per line)	30 t/h
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Condenser type Air Condensers

Power Generation	13.15 MW
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Energy Production 83,500 MWh/year

Auto Consumption (Including Pretreatment)	33%
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Energy Exported 67%



Plant Ratios 2015

From "WASTE TO ENERGY"

Total	41,000 t
SLAG	33,000 t
ASHES	7,500 t
FERROUS CRAP	500 t

TOTAL ENERGY PRODUCTION

84,000 MWh

Auto-CONSUMPTION 26,500 MWh

EXPORTED 57,500 MWh

ENERGY SALES

PHOTOVOLTAIC 500 MWh

ANAEROBIC DIGESTION 5,000 MWh

WASTE TO ENERGY 57,500 MWh

WASTE TO ENERGY



ANAEROBIC DIGESTION



PHOTOVOLTAIC



Plant ratios 2015: recovery & landfill

280,000 t

Total amount
of treated waste

RECOVERY**t****%**

Byproducts (from triage)

17,000

slags

33,000

bulky

10

digest

7,000

biostabilized

8,000

total**66,000****24,0%****LANDFILL****t****%**

anaerobic dig. rejects

7,000

biostalization rejects

22,000

ashes

7,500

ferrous crap

500

total**37,000****13,0%**

Applied Waste Management Hierarchy



Most Desirable

Reduce

320,000 t

Reuse

Recycle+Compost

40,000 t+ 66,000 t

**Recover / Energy
from waste**

166,000 t

Dispose landfill

37,000 t

Least Desirable

Plant Highlights

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- ✓ Integrated Waste management life cycle
 - ✓ Recovery of recyclable materials
 - ✓ Waste to energy recovery respecting the waste hierarchy
 - ✓ CO₂ and CH₄ emissions reduction in landfill
 - ✓ Increase of landfill's useful lifetime

How can we contribute to continue to improve Waste Management practices in the USA ?

- 
- ✓ Waste Management “from cradle to grave “ experience
 - ✓ Strong engineering capabilities understanding technology and real challenges dealing with waste
 - ✓ Extensive experience building and commissioning + 50 facilities
 - ✓ Owners and operators

A modern, multi-story building with a large glass facade and a white, angular exterior. The building is set against a clear blue sky with a few wispy clouds. In the foreground, there is a green lawn with several young trees and a paved area. A dark car is parked on the lawn. The image is overlaid with a large, semi-transparent blue geometric shape that covers the right side and bottom of the frame.

Thank you for your attention

Victor de Ávila
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Corporate Development Officer

Sacyr
Environment
USA LLC