Experience from 1 year's operation of the MBT plant in Alexandroupoli

MESOGEOS S.A.
Resource Recovery

Contents


1. MESOGEOS «At a glance»


2. Experience from 1 year’s operation in Alexandroupoli

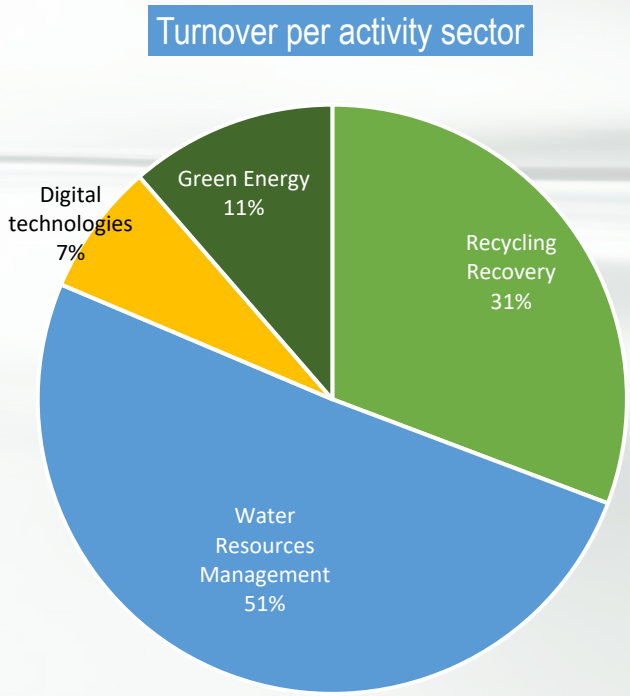

3. MBT plant upgrading to Resource Recovery Facility (RRF)

1. MESOGEOS «At a glance»

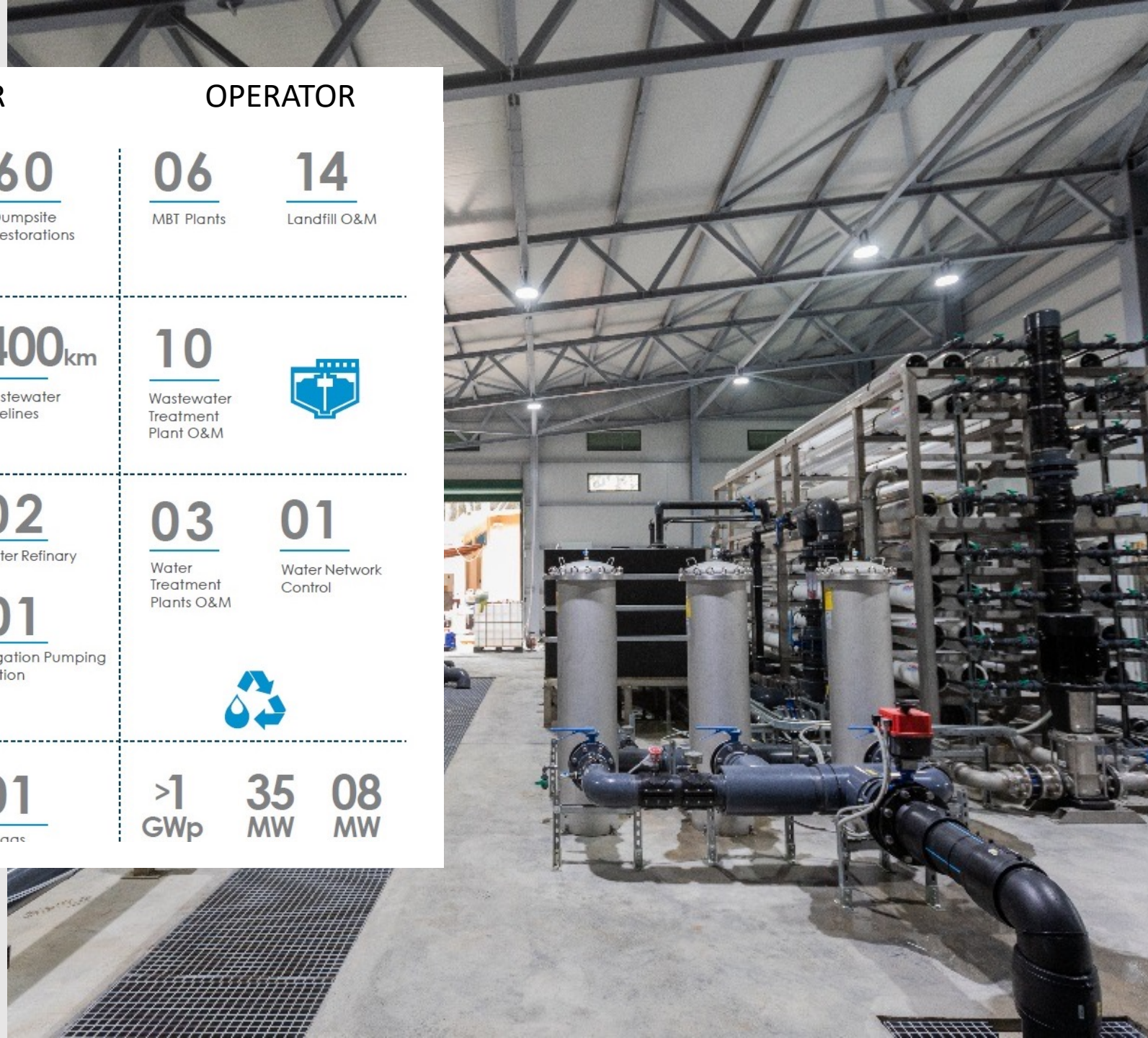
Sectors in which Mesogeos Group is active

MESOGEOS GROUP

Resources Recycle - Recovery	MESOGEOS SA Gen.Division for Recycle- Recovery (€ 31 M 2022 Turnover)
Water resources Management	MESOGEOS SA Gen.Division for Water Resources Management (€43,7M 2022 Turnover)
Digital & Green Technologies	UWTECH AE (50% MESOGEOS SA) (€6M 2022 Turnover)
Green Energy	MES ENERGY AE (51% MESOGEOS SA) (€8M 2022 Turnover)



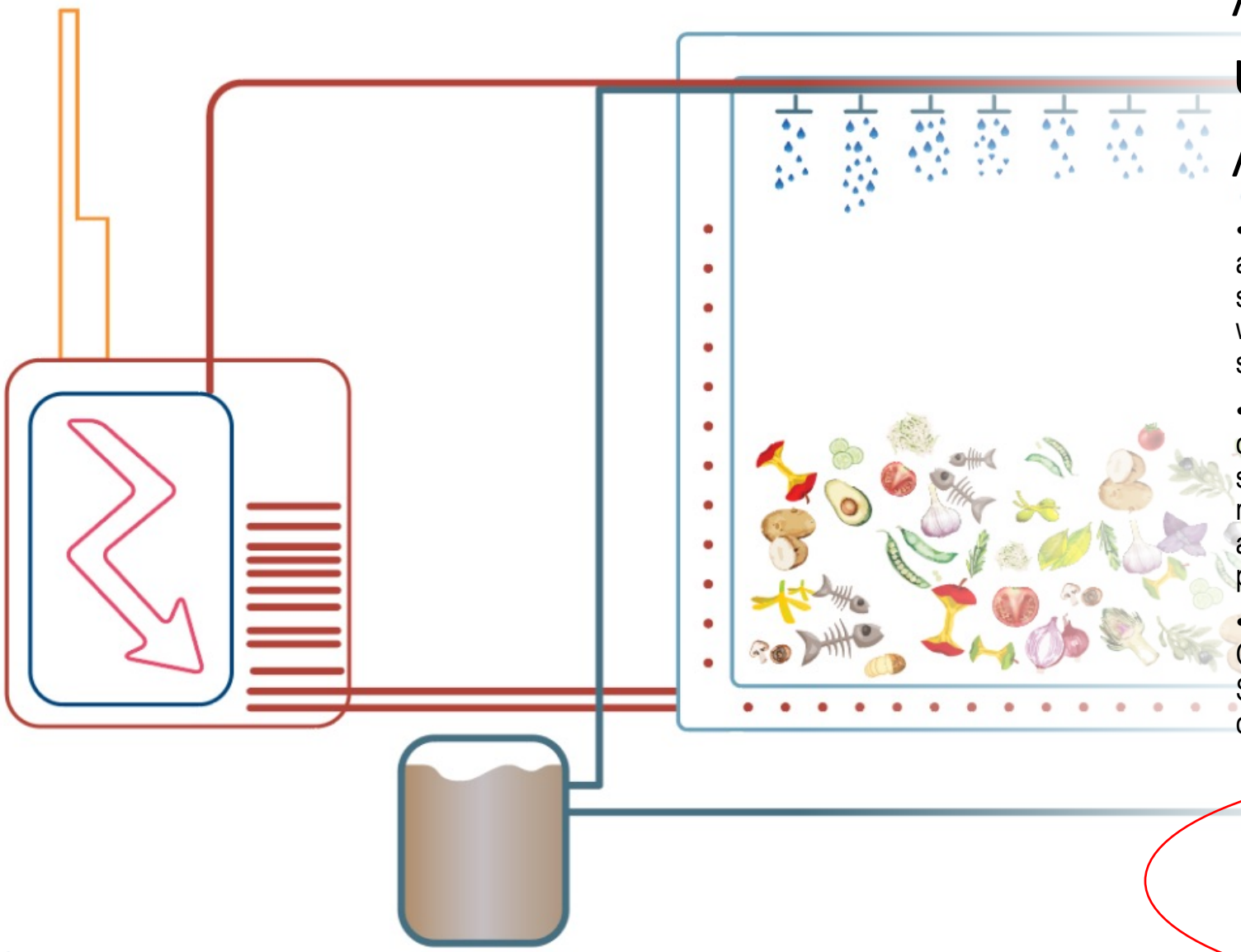
	EPC CONTRACTOR			OPERATOR	
	04 Solid Waste Treatment Plants	20 Sanitary Landfill Sites	60 Dumpsite Restorations	06 MBT Plants	14 Landfill O&M
WASTEWATER TREATMENT					
	20 Wastewater Pumping Stations	30 Wastewater Treatment Plant	400km Wastewater Pipelines	10 Wastewater Treatment Plant O&M	
WATER MANAGEMENT					
	05 Dealination Units	>300 km Water Pipelines	02 Water Refinary	03 Water Treatment Plants O&M	01 Water Network Control
	01 Pressure Control Water Network Control		01 Irrigation Pumping Station		
ENERGY					
	25 MWp	02 Electrical	01 Biogas	>1 GWp	35 MW 08 MW



Operation & maintenance of Recycling Recovery Facilities

MESOGEOS OPERATES SIX (6) MIXED WASTE SORTING FACILITIES

- ILIA – 80.000 t/year of mixed waste
- Zakinthos – 20.000 t/y of mixed waste
- Drama – Kavala: 90.000 t/y of mixed waste
- Kefalonia: 30.000 t/y of mixed waste
- Alexandroupolis 90.000 t/y of mixed waste



Anaerobic digestion units in Alexandroupoli & Ilia

- The technology is based on the process of anaerobic digestion, under dry conditions in enclosed spaces - reactors (garage type). The system is modular, which allows expansion and flexibility in cases of seasonal variation in the quantity of waste.
- Each reactor has heat exchange system, biogas collection system, leachate collection/ recirculation system as well as an automatic control system. Each reactor closes airtightly to create anaerobic conditions and to enable the safe management of the biogas produced during the process.
- The biogas collected during the process is led to a CHP unit. Indicatively the treatment of 10.000 tn/y SSOW produces about 1.600.000 kWh of electricity that can power up to 310 homes annually.

Ilia MBT Plant average production:

✓ Up to 70 Nm^3_{biogas}/tn_{OFMSW}

✓ Up to 290 MWh_{el}/month

Milestone 2030: Mesogeos' goals and strategy

Aligned with EU's strategy "FIT FOR 55", by 2030 Mesogeos commits to:

- Reduce CO_2 emissions of its operating facilities by 55% compared to current levels.
- Propose 100% sustainable solutions to customers for recycling recovery and reuse .

Participating in the circular economy revolution, by 2030 Mesogeos commits to:

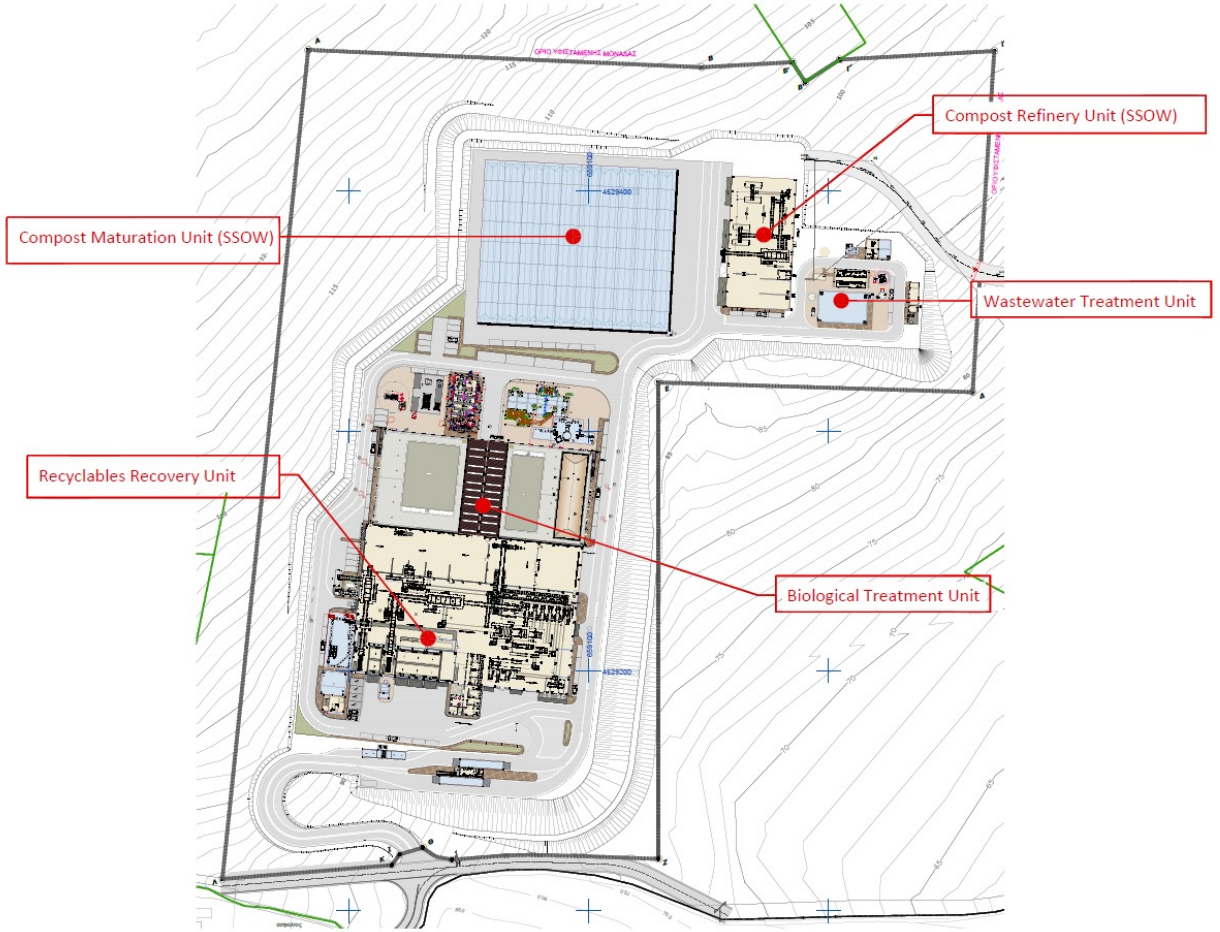
- Increase recycling and resource recovery from all operating solid waste treatment facilities to 80%
- Reduce water leakages of operating water networks by less than 30%
- Ensure reuse in all wastewater treatment facilities

2. Experience from 1 year's operation in Alexandroupoli

Design parameters

MBT plant design data		
Residual MSW		
	Value	**Unit**
Annual quantity	38,855	tn/year
Days/year	312	d/year
Hours/day	7.5	h/d
Shifts/day	1	shift
SSOW		
	Value	**Unit**
Annual quantity	7,166	tn/year
Days/year	312	d/year
Hours/day	7.5	h/d
Shifts/day	1	shift

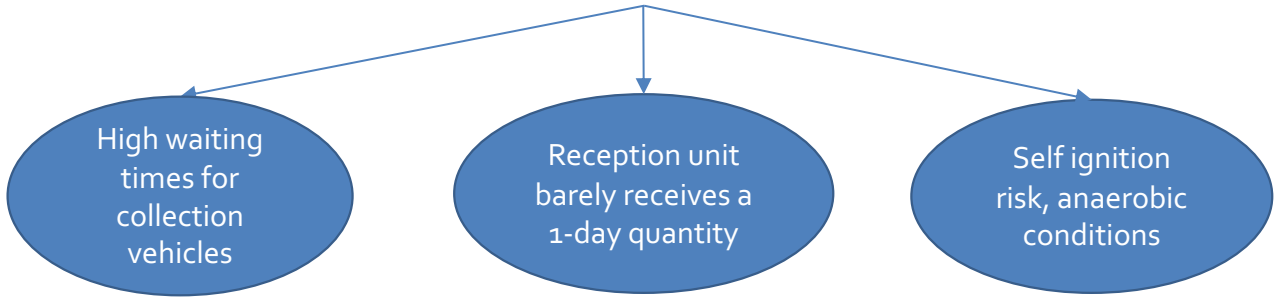
GENERAL LAYOUT (RESIDUAL MSW & SSOW TREATMENT)



Targets	
Residue (% input residual MSW)	<40%
Recyclables (% input residual MSW)	>12.5%

Experience from the 1st year of operation

- Incoming Residual MSW quantity **was approx. 80,000 tonnes** (~**2x times** compared to design quantity), while no quantities of SSOW were collected at source, mainly because:
  - the N. Evros and Kavala facilities and infrastructure are not yet developed
  - the Separation-at-Source System is not fully developed
- Large incoming Residual MSW quantities caused difficulties:
  - The Reception Unit (including the SSOW Reception Unit) could barely receive the daily quantity



- Low paper/cardboard quality compared to our experience (eg Ilia MBT Plant) due to separate collection of paper and pressing at Waste Transfer Stations
- Wood: 1-3% of input Residual MSW (instead of 10% provided by the initial design data)

Necessary adjustments in cooperation with DIAAMATH

- Introduction of 2nd shift for Mechanical Sorting and Refinery Units to process large input quantities and 3rd shift for maintenance and cleaning
- Biological Treatment Unit adjustments:
  - Exclusive processing of OFMSW stream
  - Temporary operational adjustment due to interchangeability, also due to future adjustments to meet NWMP objectives (Biodrying – see chapter 3)
  - Operational parameters adjustment (Residence time, height) in compliance with legislation requirements
- Recovery of additional categories of recyclables in presorting, given the particularities of the inflow stream from served area:
  - Copper
  - Aluminium foil
  - Bulky plastics
  - Large pieces of packaging Film
  - Plastic crates
  - Tetrapak
- Additions in Mechanical Sorting Unit to improve efficiency (baler's bypass for low quality paper, magnetic separator for vibrating screen protection, additional handsorting positions)
- New products storage shed design and construction

Results and overall assessment of 1st year (1/2)

- Recyclables recovery from mixed MSW and CO_2 emissions avoided

	Production (tn/year)	*Co2 avoidance* ($tnCO2_{eq}$/year)*
HDPE	186	238
PET	892	1856
PP	275	443
Tetrapak	7	11
Aluminium	133	1258
Glass	6	1.2
Plastic film	1077	471
Paper/Cardboard	1895	-114
Large piece plastic film	357	156
Aluminium foil	5	47.3
Bulky plastics	183	295
Plastic crates	11	17.7
Ferrous	632	855
Cardboard	441	-26.5
Paper	4485	-268
Total	**10,585**	**5,240**

**"CO2 reduction potential in European waste management", FEAD, 01/22*

Results and overall assessment of 1st year (2/2)

- Meeting contract objectives:

	Results	*Target*
Residue (% input residual MSW)	39%	<40%
Recyclables (% input residual MSW)	13%	>12.5%

- CLO produced: **8,240 tn** (Utilization in local querry in compliance with legislation)

- Landfill diversion (volume in landfill site): **49,000 m³**

3. MBT plant upgrading to Resource Recovery Facility (RRF)

Nationwide implementation of separate waste materials collection (at least for paper, metals, plastics and glass)

Targets to increase the level of preparation for reuse and recycling of municipal waste to 55 % by 2025, to 60 % by 2030 and to 65 % by 2035 (article 25 of Law 4819/2021)

Target to reduce waste disposed in landfill to maximum of 10% of municipal waste by 2030

National Waste Management Plan (NWMP) & Law 4819/2021 targets

NWMP & L.4819/2021 targets for EMT - Eastern Sector

- To achieve the abovementioned targets, Separation at Source System is implemented for the collection of waste materials. A comprehensive study for the upgrading of the system is been prepared by DIAAMATH, aimed at prioritizing the establishment of new separate collection networks in addition to the expansion of existing networks to maximize efficiency.
- The upgrading of Alexandroupoli MBT plant and its conversion to a Resource Recovery Facility is considered necessary to treat three separate waste streams collected at source:
  1. Recyclable materials
  2. Source-Separated Organic Waste
  3. Residual MSW

Incoming waste quantities (new Regional Waste Management Plan)

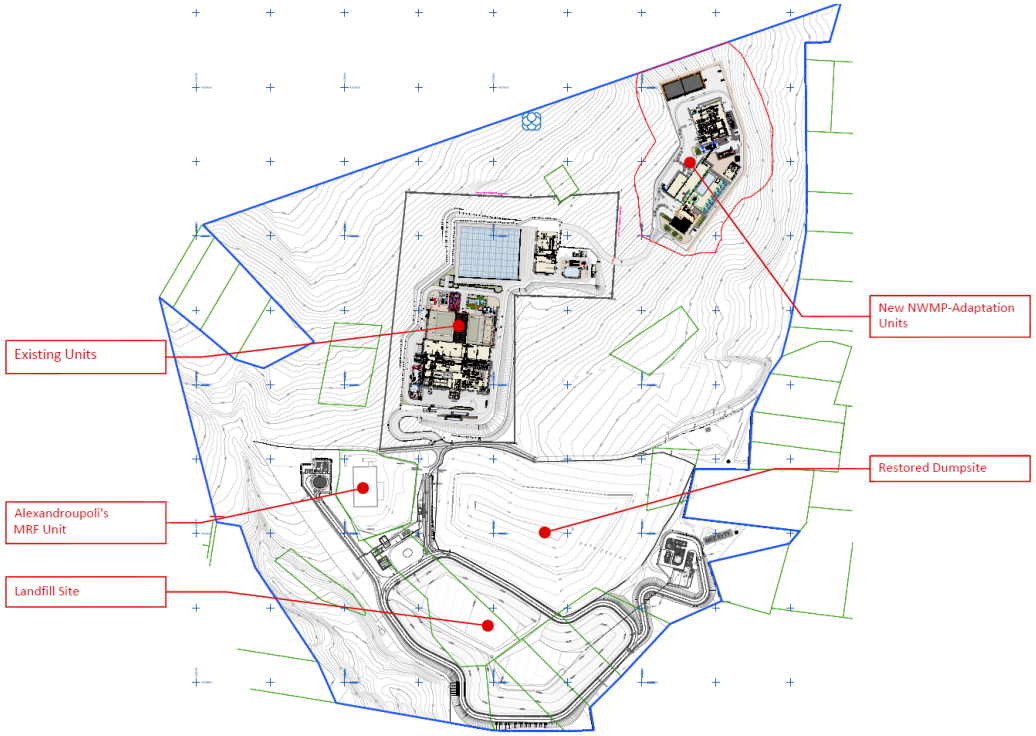
(t/year)	Design	2025	2030
Residual MSW	38,855	36,885	31,280
Recyclable materials	-	18,851	19,369
SSOW	7,166	6,626	7,348

Facilities and units constituting Alexandroupoli's RRF

Following its upgrade, the Resource Recovery Facility in Alexadroupoli will consist of the following Units:

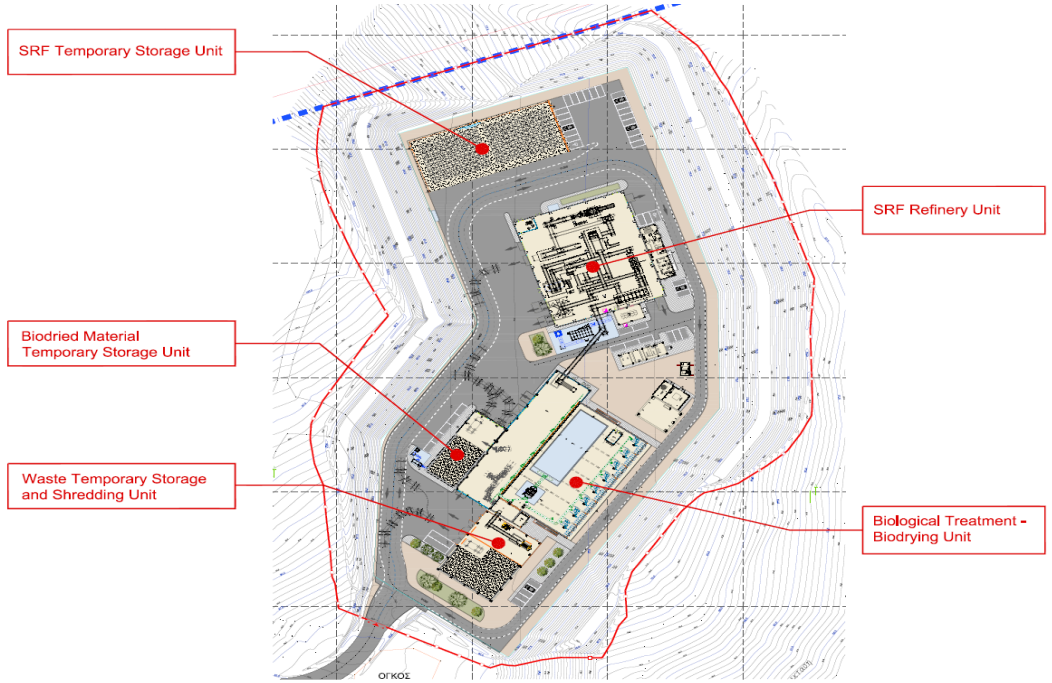
1. Reception and Sorting Unit for recyclable materials (part of the total quantity collected at source)
2. The existing MRF (located adjacent to the MBT plant inside the boundaries of OEDA and considered as part of the upgraded RRF)*
3. SSOW Mechanical sorting and Anaerobic digestion Unit
4. Bio-drying and SRF Refinery Unit for residual MSW following mechanical sorting and partial recovery of recyclables

* *Residues from Recyclable Materials' sorting will be processed in the new Biodrying Unit for SRF production*

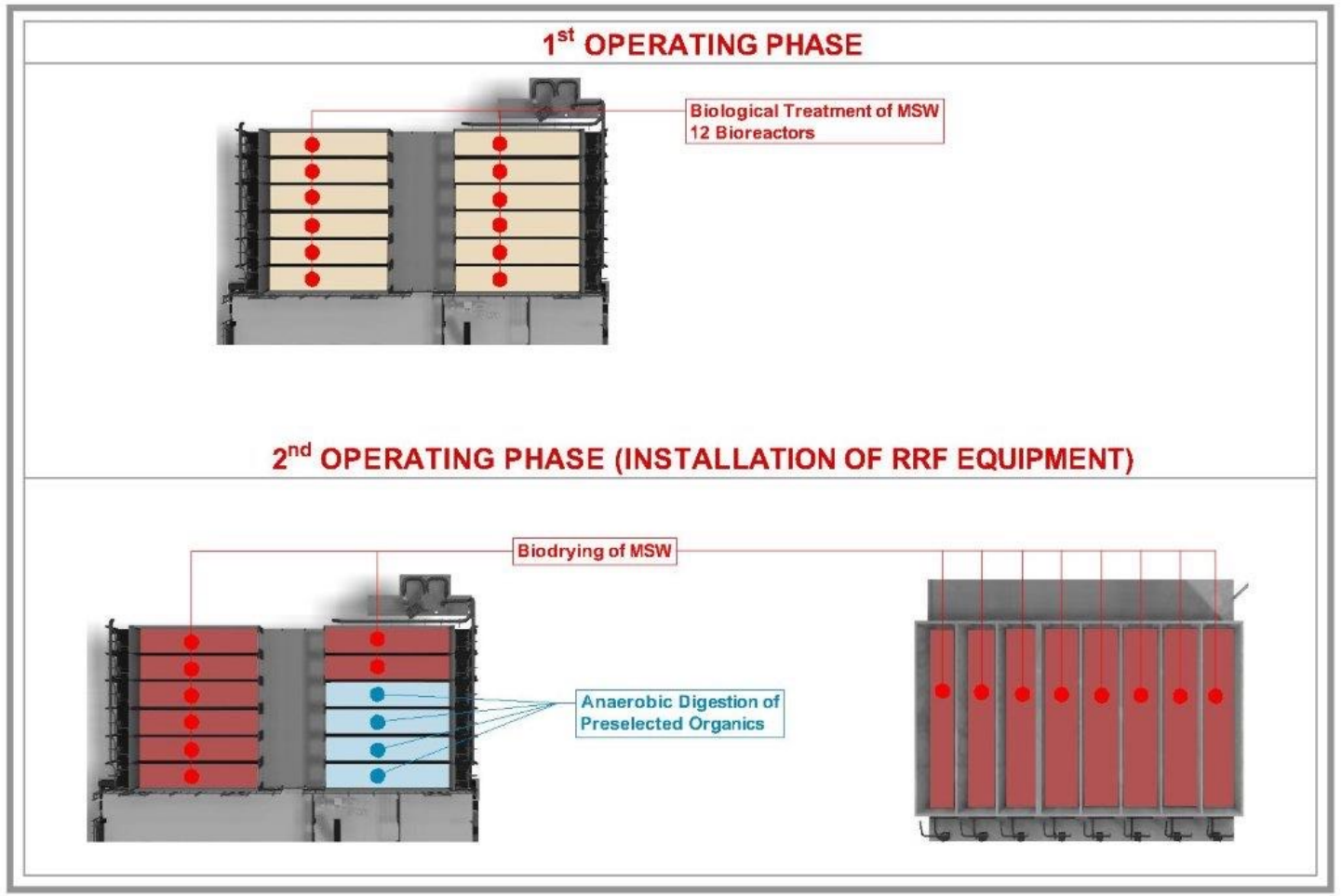


Required adjustments

- Adaptation works take place in the NE sector of OEDA site over an area of approximately 21,000 m²
- Facilities to be constructed:
  - Waste Temporary Storage – Shredding Unit
  - Biological Treatment – Bio-drying Unit
  - Bio-dried Material Temporary Storage Unit
  - SRF Refinery Unit
  - SRF Temporary Storage Unit
- Existing MSW AD Unit conversion to Biodrying + 8 new Biodrying reactors



Interchangeable bioreactors



RRF products

SRF class 3-3-3	• 27% of input Residual MSW • 11% of generated MSW
Recyclables	• 12 % of input Residual MSW • 5 % of generated MSW
Process losses	• 35% of input Residual MSW • 14 % of generated MSW
Residue	• 26% of input Residual MSW • 10 % of generated MSW
Recyclables (SSRW)	80% of input Source Separated Recyclables
Compost (SSOW)	40% of input Source Separated Organics

MESOGEOS S.A.
Resource Recovery

Thank you!