Transforming Biowaste into Renewable Fuels through Sustainable Management Practices

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BioTheRos

October 23rd, 2025, Workshop on Alternative and Renewable Fuels in Motor Oil Hellas Corinth Refineries

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Motor Oil Group at a Glance

A Diversified Multi-Energy Group

Refining, Supply & Trading

Local Energy Champion with a Global Reach

~12,700 kt
Refining Processed Volume[1]

12.61
NCI[2]

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Retail

One of the Largest Mobility Networks in Greece

c.1,500
Fuel Stations in 5 Countries

>250,000
Electricity and Gas Customers

AVIN · Coral (Shell Licensee) · nrg · incharge

Regional RES Champion

#2 RES Operator in Greece

839 MW
Installed Capacity

2.7 GW
Pipeline

more energy

Circular Economy and Alternative Fuels

Integrated Circular Economy Platform

~1,000,000 tpa
Solid Waste Management

43,000 tpa
Lubricants Processing and Regeneration

Thalis · LPC · verd · ΗΛΕΚΤΩΡ

Financials (2024)

€12.2bn	€0.967bn	€433ml	€1.4
Revenues	EBITDA	Investments	Dividends per Share

Notes: 1.2023. 2. The Nelson Complexity Index (NCI) is a measure of the sophistication of an oil refinery.

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We Have Made Significant Progress on our Energy Transition Plan…

Building Low-Carbon Projects to Enhance Resilience and Sustainability at the Refinery

160,000 tpa
new propylene splitter unit **under construction**

+67 MW
dependable efficient generation capacity to reinforce resilience, **under construction**

30 MW
electrolyser **under construction**
Expansion to 50 MW under consideration

3
major investment programs under review (advanced biofuels, e-fuels, CCS)

Established Leading Positions Across the Electrification Value Chain

#2
RES operator in Greece[1]

RES installed capacity
279 MW (2021) → **839 MW** (1H 2024)

+877 MW
Komotini CCGT commissioning started: the most efficient gas-fired facility in Greece

e-mobility leadership
145 EVC[2] (2021) → **~1,550 EVC**[2] (1H 2024)

Integrated and Diversified Circular Economy Business

One of the largest
circular economy platforms in Greece

~1,000,000 tpa
solid waste management

>15,000,000 m³/year
municipal wastewater treatment

>25,000 tpa
UCO collection and biofuel production

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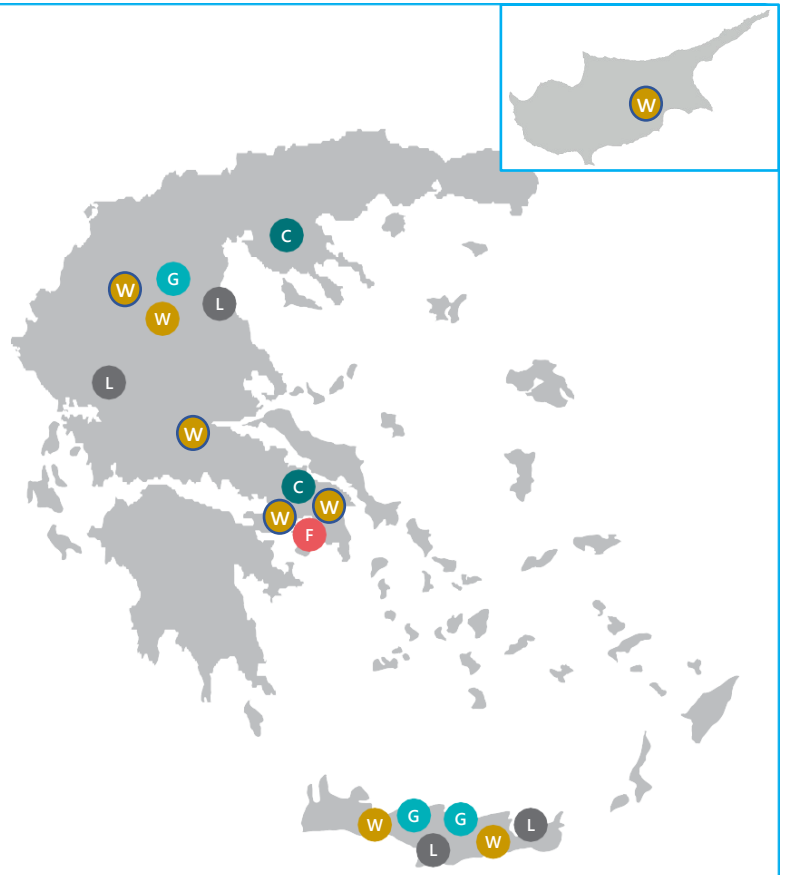
Circular Economy: An Emerging Strategic Pillar

One of the most diversified circular economy platforms in Greece[1]



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Solid Waste
~300,000 tpa under management in 7 sites[2]

Helector
member of MOTOR OIL Group

Solid Waste
~700,000 tpa under management in Greece & Cyprus

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Municipal Wastewater Treatment
> 15,000,000 m³/year

ΠΡΑΣΙΝΑΔΙ

Waste Cooking Oil Collection
> 28,000 tpa

LPC

Lubricants Processing and Regeneration
> 43,000 tpa

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Thalis ES a Reliable Innovative Provider of Environmental Services

EPC Contractor	✓
Operator	✓
Operations	
Recycling	✓
Treatment (solid waste & wastewater)	✓
Waste-to-Energy	✓

Financials	
Revenue (2024)	EBITDA (2024)
~€92mn	~€8,3mn

Thalis ES is a Leader in the Region of Crete and other regions of Greece

Wastewater

Expert in WWTP upgrades and a pioneer in circular solutions and safe large-scale wastewater reuse

The acquisition of Thalis ES has been completed in Q4-2022

Backlog	Market Opportunities
~€281mn	~€3bn

Solid Waste, Water, Wastewater

Important knowhow in the field of waste, water, municipal and industrial wastewater

Thalis ES has completed over 250 construction projects of environmental infrastructure

The company manages 354.000 tons of Municipal Solid Waste per year and 15,6 million cubic meters of wastewater per year and 140.000 m3 of landfill leachates

Diverts 26.500 tons/year from landfills Recycles 6.500 tons/year of valuable materials and addresses the needs of more than 1.500.000 persons

Designed, delivered & operating the MSW management facility in Amari, near Rethymnon in Crete

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Key Projects

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Landfill Gas-to-Power Valorization at Pera Galini Landfill, Heraklion, Crete

Contract Scope: Collection and utilization of landfill gas from the Pera Galini Sanitary Landfill to generate electricity, including a 20-year concession for landfill gas exploitation rights.

Energy Recovery Facility: The installation comprises two (2) combined heat and power (CHP) units, each with an electrical output capacity of 499 kWel, for converting landfill gas into electrical energy.

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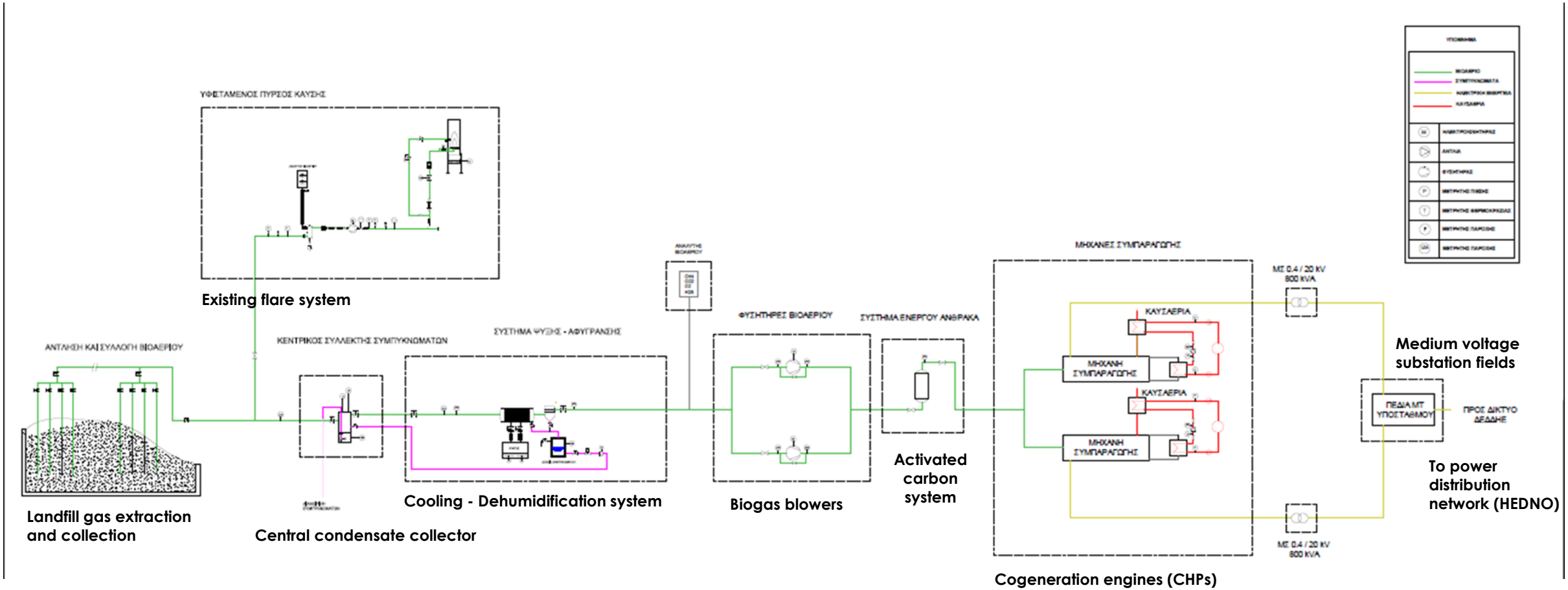
Landfill Gas-to-Power Valorization at Pera Galini Landfill, Heraklion, Crete



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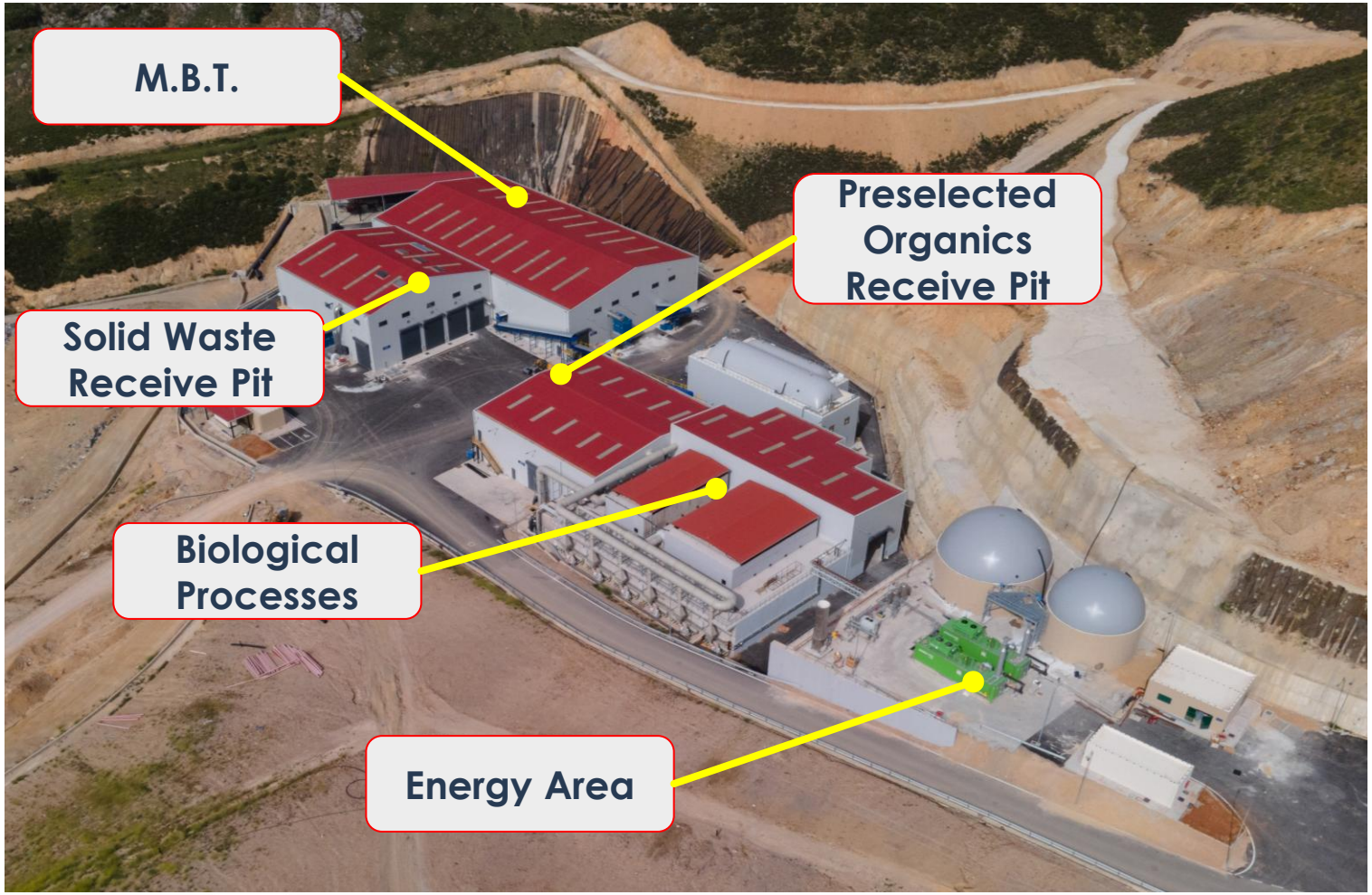
Valorization of Biogas at the Amari Biowaste Treatment Facility in Rethymnon, Crete



- Construction of Solid Waste Treatment Plant: 35,600 tons MSW + 7,400 tons pre-sorted organics/year
- Construction of Sanitary Landfill for treatment residues
- Five (5) year operation period
- Optional five (5) year extension

- 30/10/2019: Signing of construction contract
- 30/01/2023: Start of six-month trial operation (construction completion)
- 31/07/2023: Start of five-year operation period
- 31/07/2028: Contract completion (without the option

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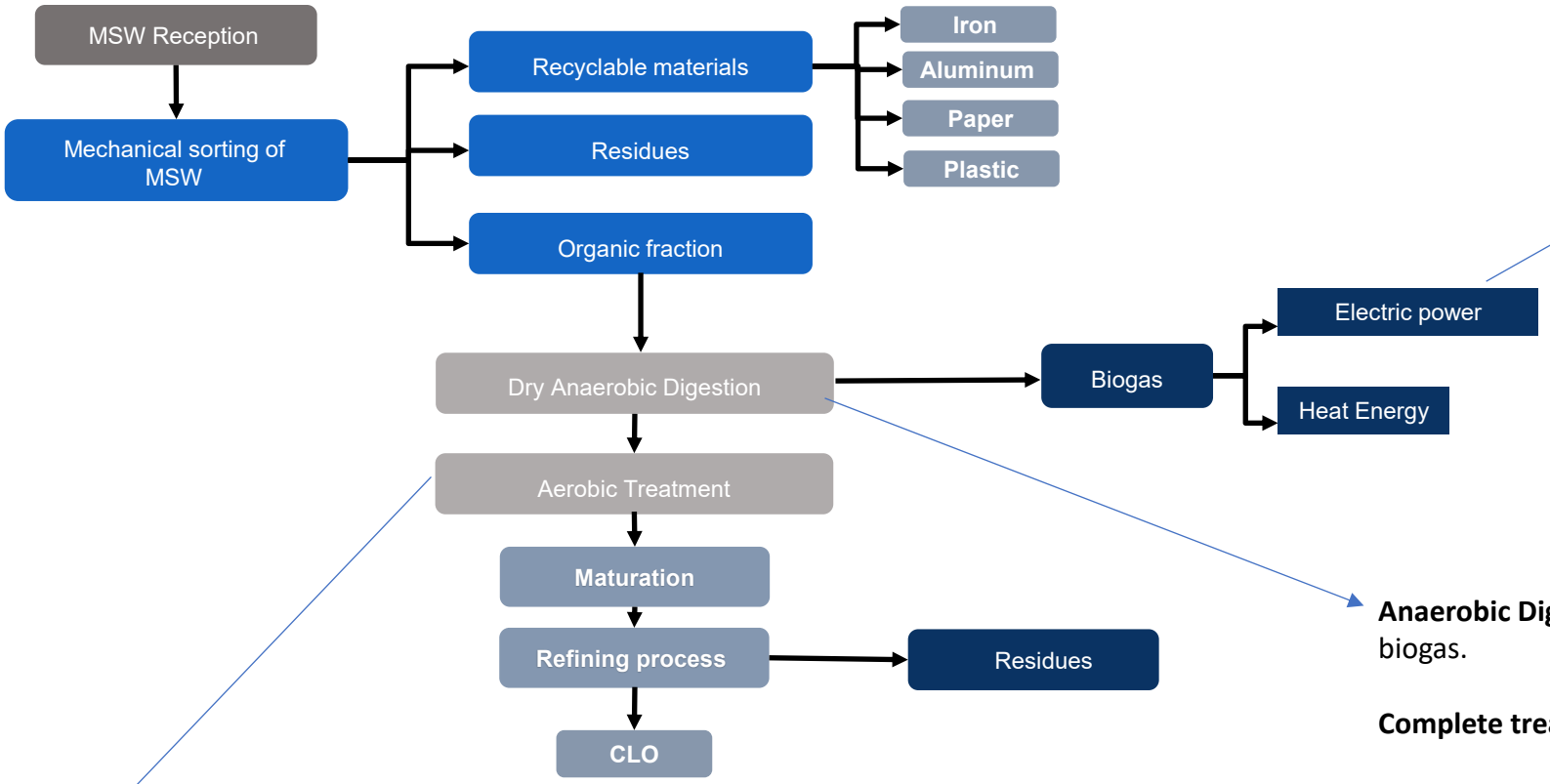

GE JENBACHER JMS 312 GS

Aerobic Treatment Stabilization of digestate from anaerobic treatment

- Composting of solid digestate in enclosed reactors
- Maturation in windrow piles

Anaerobic Digestion Conversion of biodegradable waste fraction into biogas.

Complete treatment line:

- Feeding system
- Anaerobic digestion unit
- Digestate dewatering
- Liquid digestate storage
- Biogas treatment line
- Combined Heat and Power (CHP) unit

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Valorization of Biogas at the Heraklion Wastewater Treatment Facility, Crete

System Overview:

- Two parallel cogeneration units (CHP 306 BG) operate to fully utilize biogas produced from anaerobic digestion of waste sewage sludge
- Each unit has an electrical rated power of 250 kW with 41% electrical efficiency

Biogas Production & Specifications:

- Daily biogas production: 4,000 m^3/day
- Thermal power of consumed biogas: 6.5 kWh/m^3
- Methane content: 60%

Biogas Pre-Treatment:

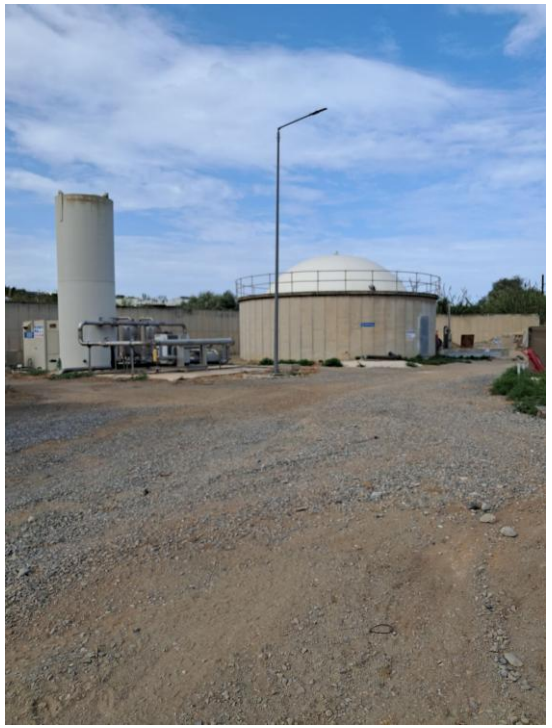
- Biological desulfurization unit (biofilter) removes hydrogen sulfide (H_2S) before feeding the engines
- Improves engine efficiency and extends operational lifespan

Biogas Storage:

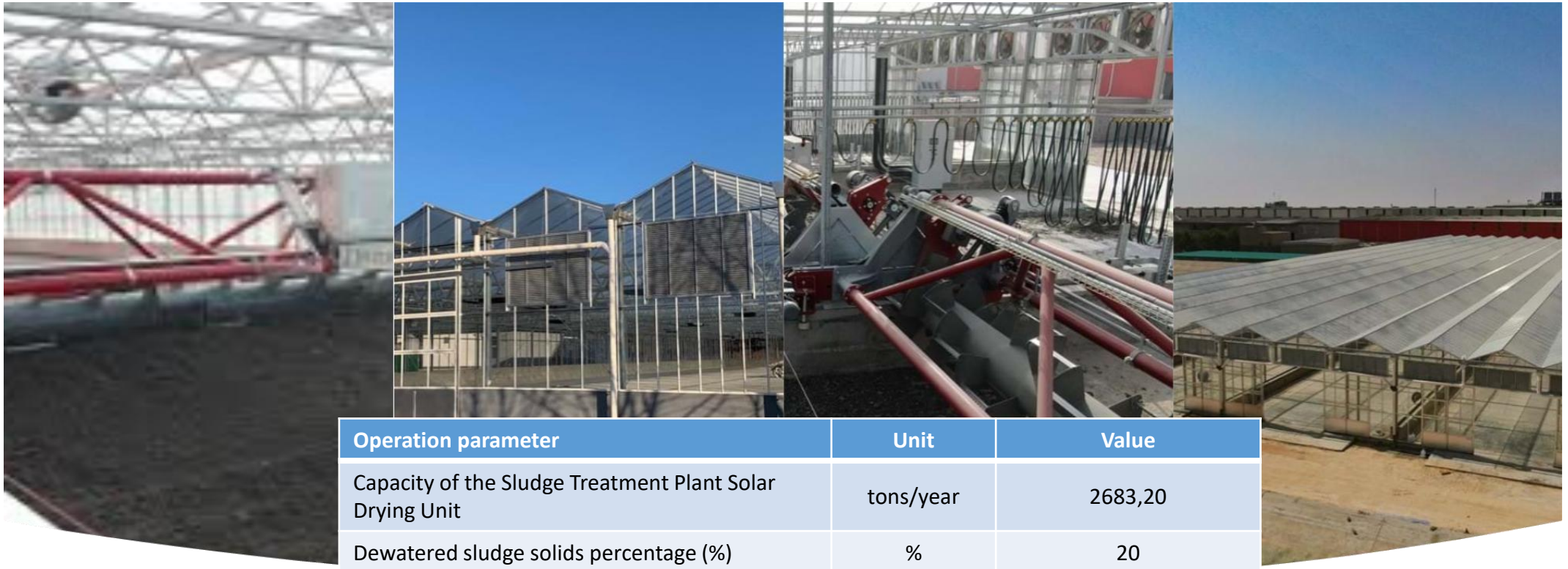
- Two gasholders (approximately 400 m^3 each) store biogas from digesters
- Valves and solenoid valves enable automation and flexible biogas distribution to any engine

Valorization of Biogas at the Heraklion Wastewater Treatment Facility, Crete

In September, the Heraklion WWTP produced approximately 35,416 m^3 of biogas from anaerobic sludge digestion, generating approximately 78.7 MWh of electrical energy.



Integrated Treatment of Wastewater Sludge through Solar Drying and Gasification: The innovative project of Levadia, Central Greece



Operation parameter	Unit	Value
Capacity of the Sludge Treatment Plant Solar Drying Unit	tons/year	2683,20
Dewatered sludge solids percentage (%)	%	20
Treatment objectives	**Unit**	**SOLAR DRYING**
Dewatering Unit: Total solids concentration of dewatered sludge (for VS/DS ≤ 75%)	%	20
Solar Drying Unit: Percentage of dried sludge solids	%	>80

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Integrated Treatment of Wastewater Sludge through Solar Drying and Gasification: The innovative project of Levadia, Central Greece

- The solar dried waste sewage sludge is fed into a gasifier coupled with a Combined Heat Power (CHP) engine
- The output of the innovative CHP is 68 KWel and 123 KWth
- Fuel: mixture of natural wood with waste sewage sludge resulting 12-14 MJ/kg Heating Value
- Max water content: < 13%
- Consumption: 0,8-1,1 Kg/KWel
- Flow temp. 85^{o}C feed water
- Return temp. 65^{o}C
- Grain size: 3-30 mm Max fines

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Take away messages

Diverse pathways for renewable fuels production: The sustainable management of biowaste in water and waste treatment sectors offers numerous applications for producing renewable and alternative fuels, transforming waste streams into valuable energy resources.

Circular economy integration: These applications close the loop toward a circular economy by converting waste into energy, creating local value and returning tangible benefits to communities.

Energy-efficient treatment processes: Energy generated during treatment processes is reinvested to power the operations themselves, contributing to net-zero or energy-positive outcomes.

Localized energy security: Waste is transformed into a local energy source, strengthening regional energy independence and improving the overall energy balance.

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Thank you!

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