CONSTRUCTION COMPANY
CHR. D. CONSTANTINIDIS S.A.

Thermal Drying Plant of Sludge at Thessaloniki's WWT Plant

Study and construction of Dewatering Sludge Drying Plant EELTh.

Design budget (total cost)	17,700,000.00 €
Tender date	24-11-2008
Contract amount	17,081,993.56 € (incl. VAT)
Eligible for co-funding expenses	13,646,644.00 €
Contract Date	26-08-2009
Completion of construction & performance tests	14-12-2011
Commencement of trial operation	15-12-2011
Completion of trial operation	15-04-2013
Contractor	T.C. Chr. D. Konstantinidis S.A.
Supervising Service	EYDE for Water Supply, Sewerage and Sewage Treatment of Greater Thessaloniki Region of the General Secratariat for Public Works of the Ministry of Development, Competitiveness, Infrastructure, Transport and Networks
Management Consultant	**Joint venture**: • HYDROELECTRICA Ltd. • NAMA Consultanting Engineers & Planners Engineers S.A. • Gr. & M. Kafetzopoulos / D. Benakis & CO. E.E. • HYDROMELETITIKI, E. Katsonis – N. Asmeniadis & CO E.E. • Spyropoulos Anastasios, Avgitidis Vasilis, Limnaios Stavros, Demiris Panagiotis

DRYING PLANT CAPACITY: (2) LINES x 4.000 kg H2O/ hour evaporation capacity

PRODUCT – Dried Sludge

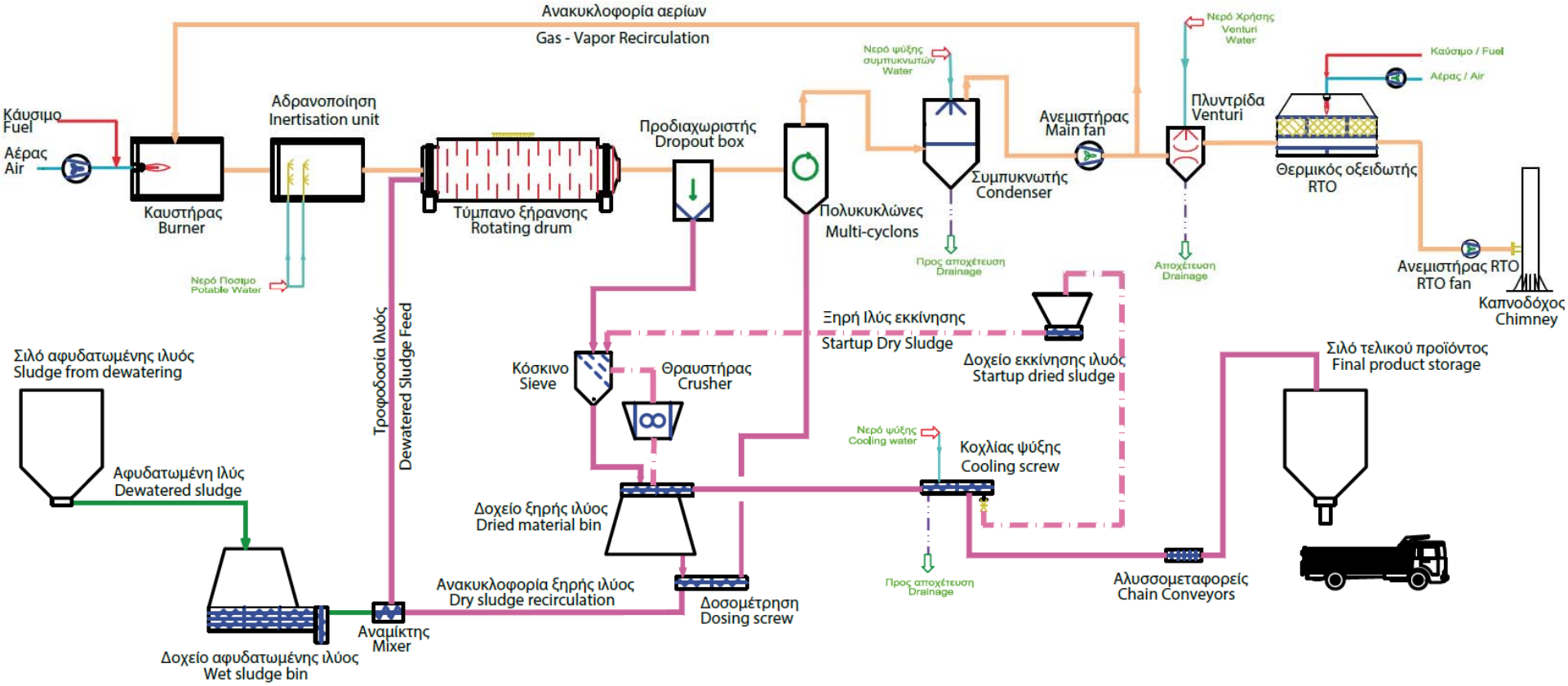
Drying Unit Treatment Capacity

Nominal evaporation capacity per line for non-stop operation	4,000 kg H_2O/h
Maximum evaporation capacity per line (up to 7 days of non-stop operation)	4,600 kg H_2O/h
Plant operating period	24 h/day

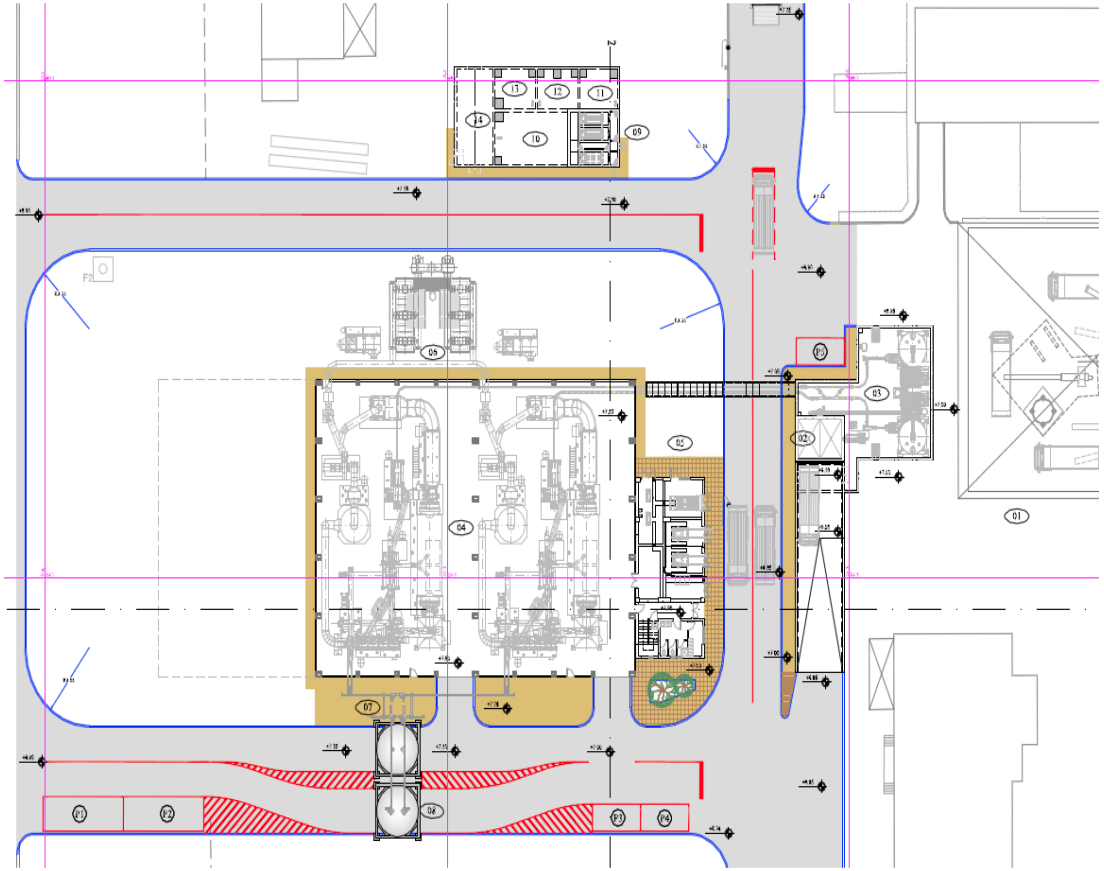
Input and output data

Solid content of dewatered sludge	24% on average (18% - 28%)
Solid content in dried sludge cake	92% on average (90% - 95%)
End product granulation	1-4 mm
Calorific value	3,000-3,300 kcal/kg (volatile concentration 60-65% VSS/TSS)

Sludge Drying Unit Flowsheet



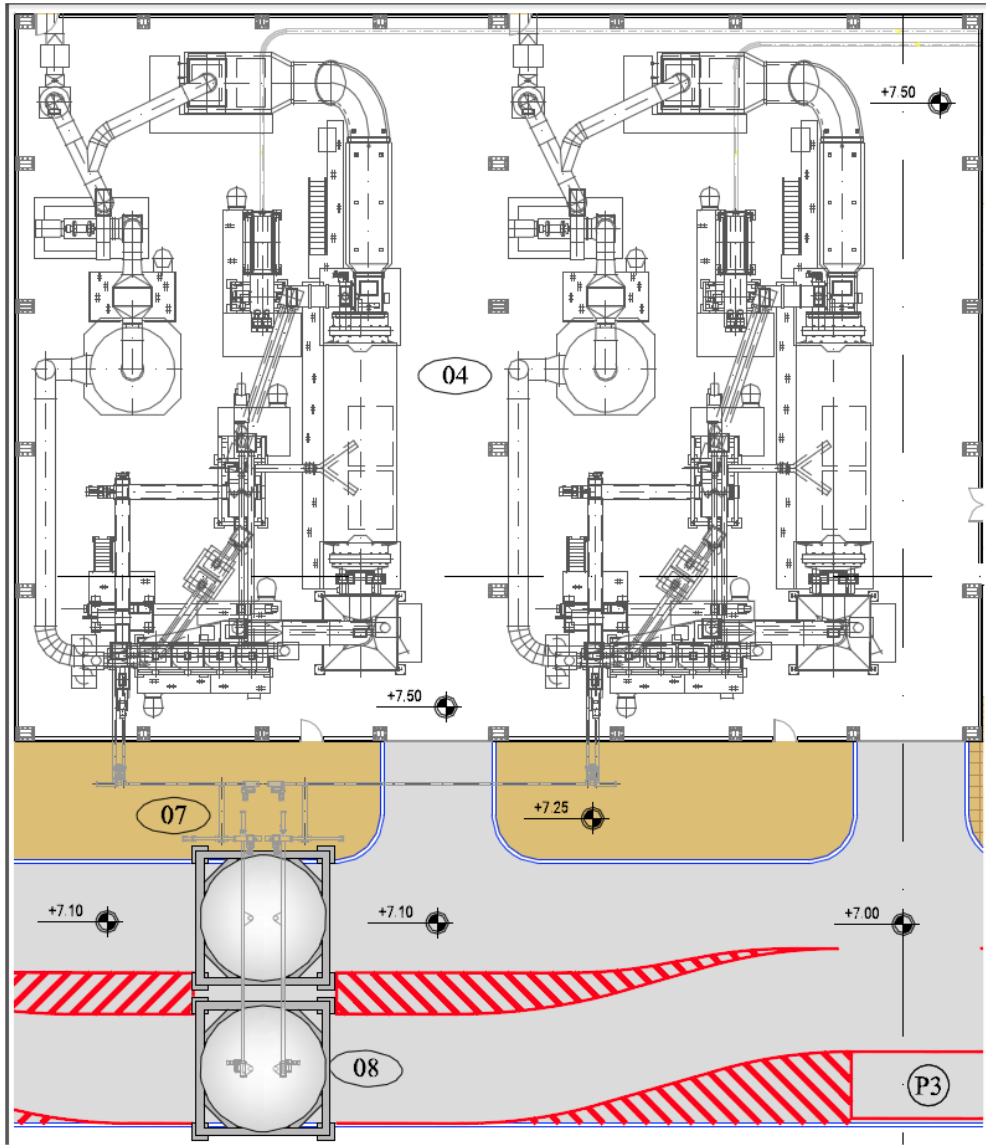
GENERAL LAYOUT



The Works include the following:

- Inlet works connecting to the Sludge Dewatering Plant.
- Reception of the dewatered Sludge from other WWTP.
- Two (2) drying lines, each of a nominal evaporation capacity of 4 tons water/hour and maximum capacity 5 tons/ hour.
- Treatment of exhaust gases with Regenerated Thermal Oxidation (RTO).
- System of storage and bagging of dried Sludge.
- Electrical Installation and central supervision and control system of the Drying Plant (SCADA).

DRYING PLANT BUILDING



There (2) Drying lines. Each line consists of:

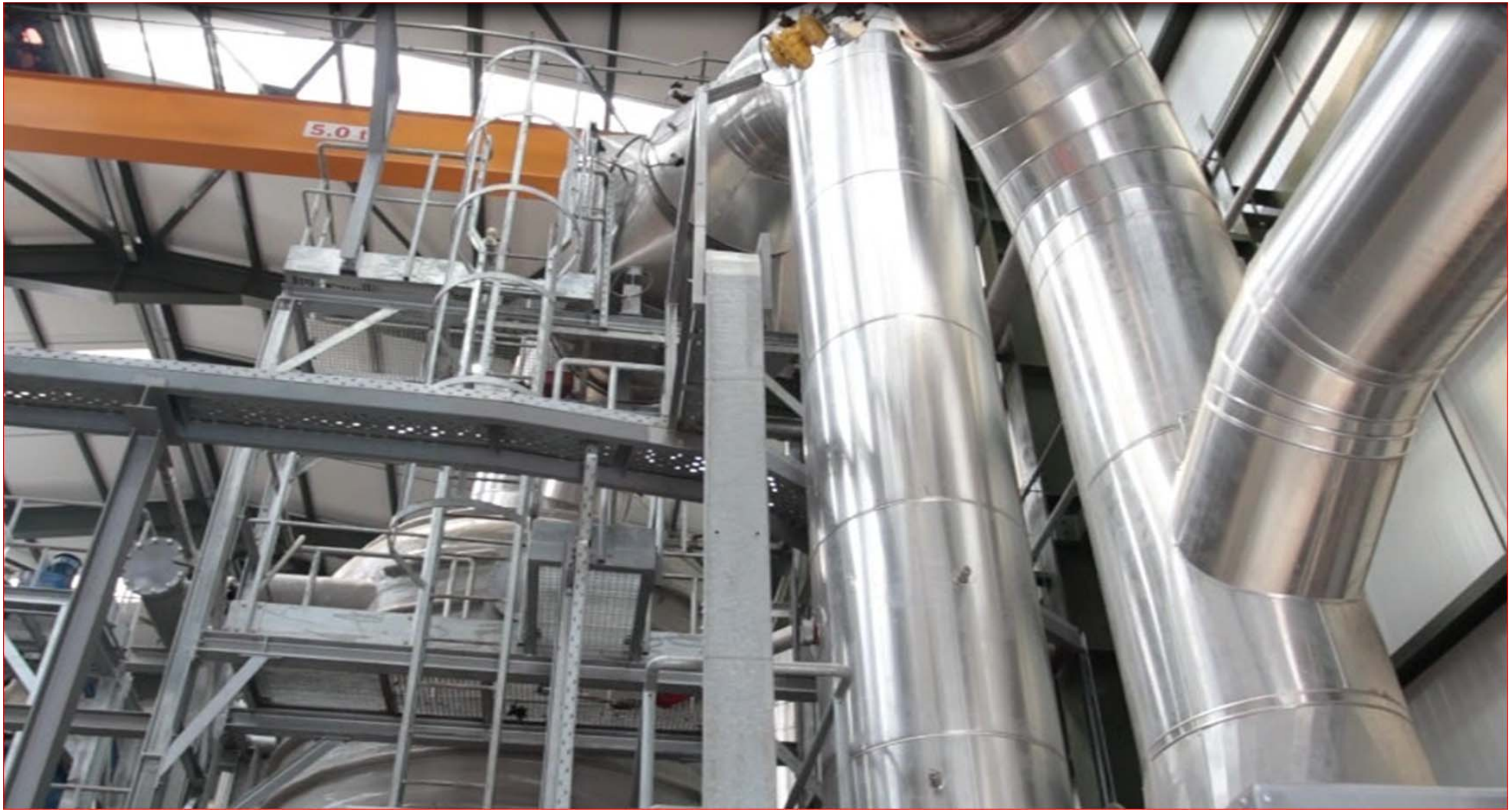
- Storage and dosing of Dewatered Sludge.
- Mixer of dewatered with recycled dried Sludge.
- Heat production by natural gas and/or biogas (and a provision for future heat exchanger for the recuperation of heat from CHP plant).
- Main drying equipment: ROTARY DRUM.
- Recycling of vapors/gases.
- Recycling of dried Sludge.
- Sieving and cooling of dried Sludge.
- Gas/vapors treatment: condensation, venture, scrubber, demisters

- Main drying equipment: ROTARY DRUM.

- **Heat production by natural gas and/or biogas**
- **Main drying equipment: ROTARY DRUM.**

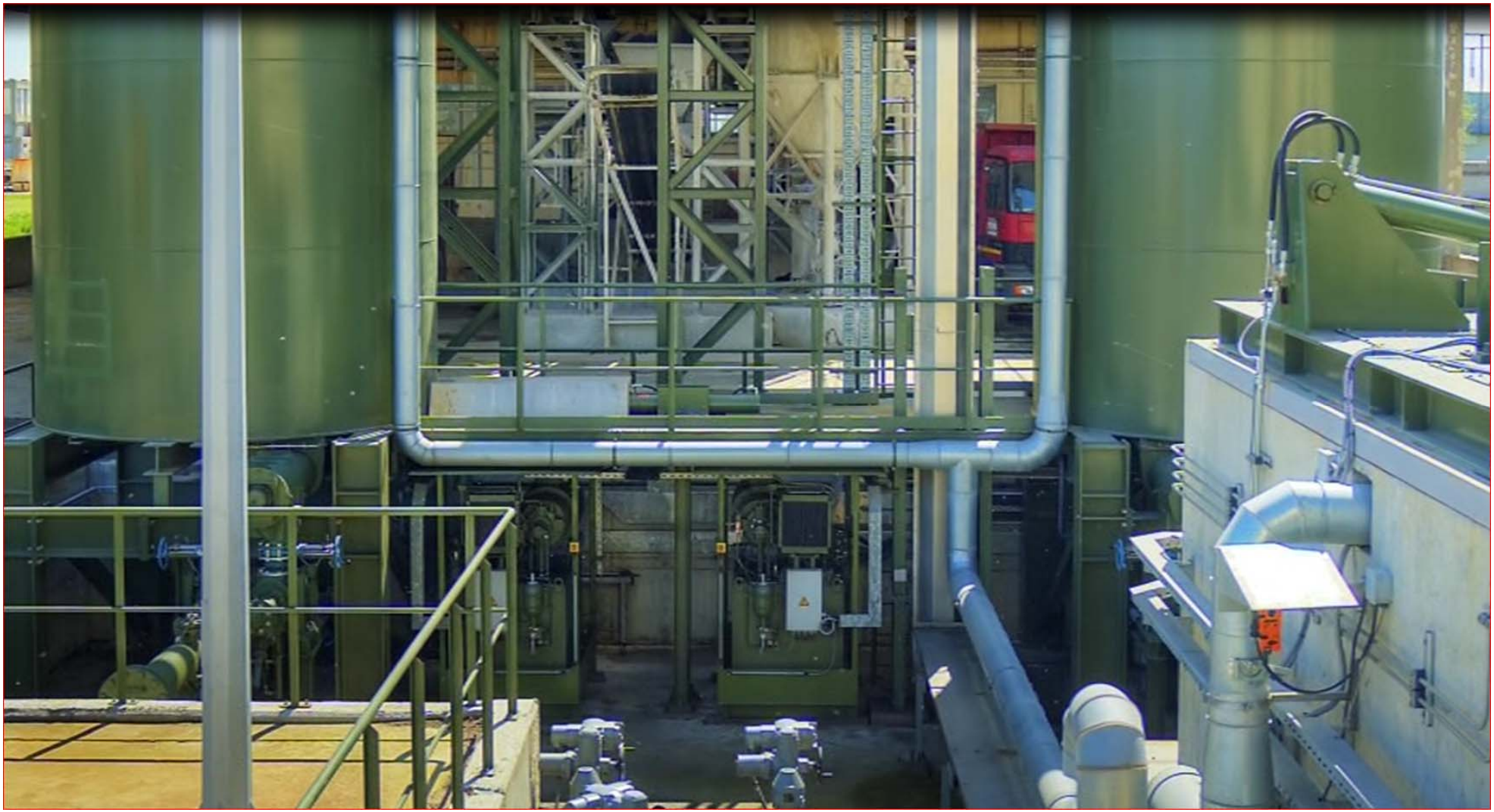
- **GAS/VAPOR Cleaning Cyclones**

- **GAS/VAPOR CONDENSER for vapor and particulates (solids) removal**



➢ GAS CLEANING with THERMAL REGENERATIVE OXIDISERS (RTO)

➢ INLET DEWATERED SLUDGE SILOS and PUMPS

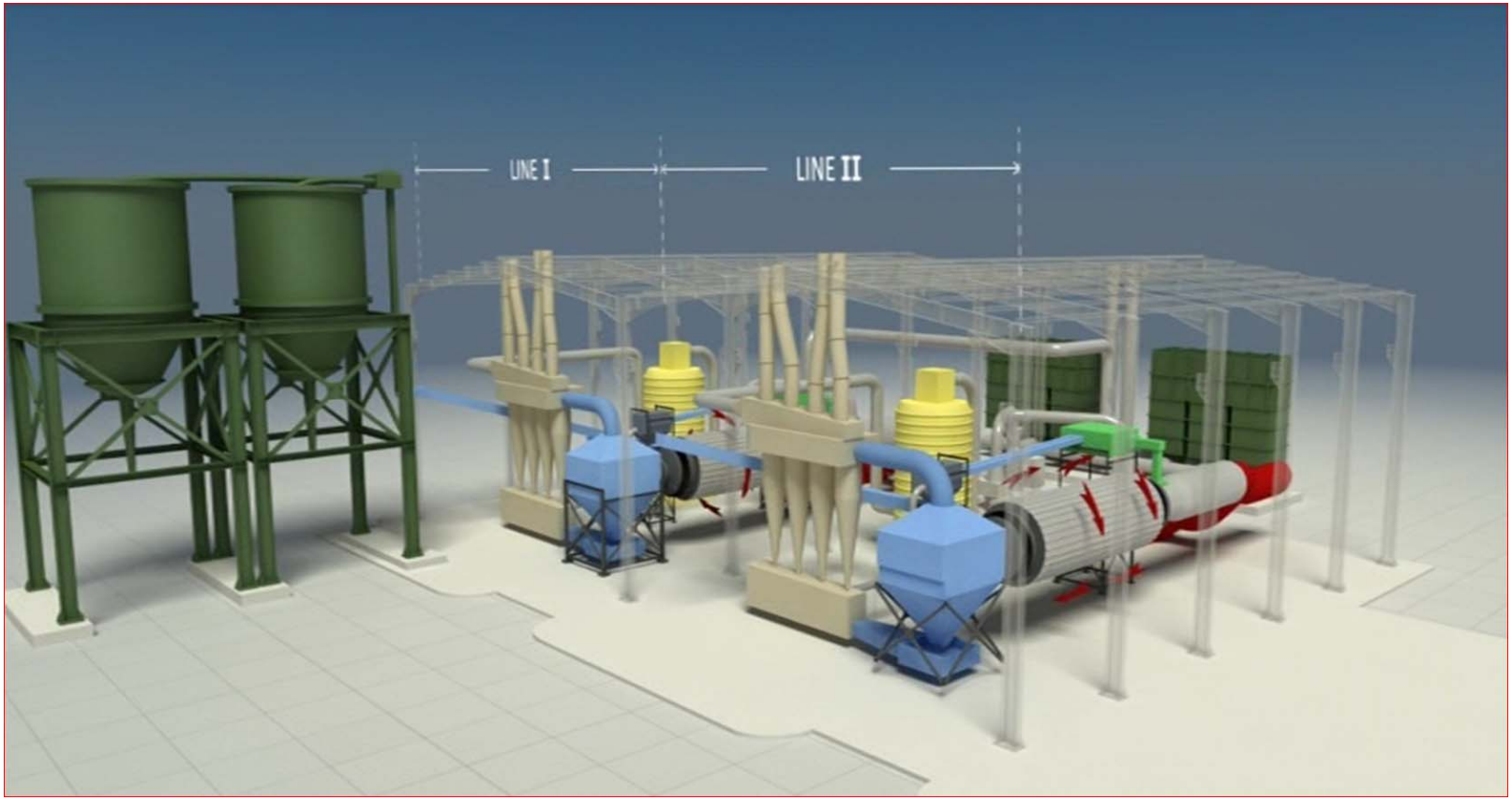


➢ OUTLET DRY SLUDGE SILOS

Auxiliary facilities:

- Ventilation and air-conditioning
- Fire-fighting systems and alarms
- Lightning protection
- Access structures, including catwalks and ladders to all equipment
- Connection to natural gas network
- Connection to biogas from the existing anaerobic digester of the WWTP.
- Supply of water to the condensers (treated wastewater)
- Cooling water for final product.
- Connection to the networks: power supply, water supply, industrial water supply, rainfall, drainage, etc.
- Roads, pavements, external lighting etc.

Thessaloniki's Sludge Thermal Drying Plant



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