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Solar drying and auto-thermal fluidized bed incineration of sewage sludge and power generation

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Summary

- Basic data

Sludge throughput DS	kg/h	700
Sludge before solar drying	kg/h	2’917
Sludge DS-content before solar drying	%	24
Sludge after solar drying	kg/h	1’928
Sludge DS-content after solar drying	%	~ 36
Lower heating value of the sludge DS	kcal/kg	3’600
Lower heating value of the sludge DS	MJ/kg	15.1
Ash content of the sludge DS	%	26.4
Ash quantity for phosphorus recovery	kg/h	185

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Summary

- Process data

Thermal capacity FBI	MW	2.1
Auto-thermal incineration in the FBI at	° C	870
Combustion air quantity	m_n^3/h	4’000
Combustion air temperature	° C	≤ 150
Flue gas quantity (wet)	m_n^3/h	5’800
Steam parameters	° C/ bar(a)	220 / 23
Steam production	t/h	3.1
Electric power production by ORC-unit	kW	300
Heat transfer from ORC-unit to solar drying plant	MW	1.4

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Summary

- Excess energy production

Electric power production by ORC-unit	kW	300
Power consumers of the plant	kW	160
Excess electric power (to be fed into the grid)	kW	140

- Other

Total space requirement	m^2	4’600
Operation personnel	men/shift	2-3
Natural gas/light fuel oil	only for start-up	

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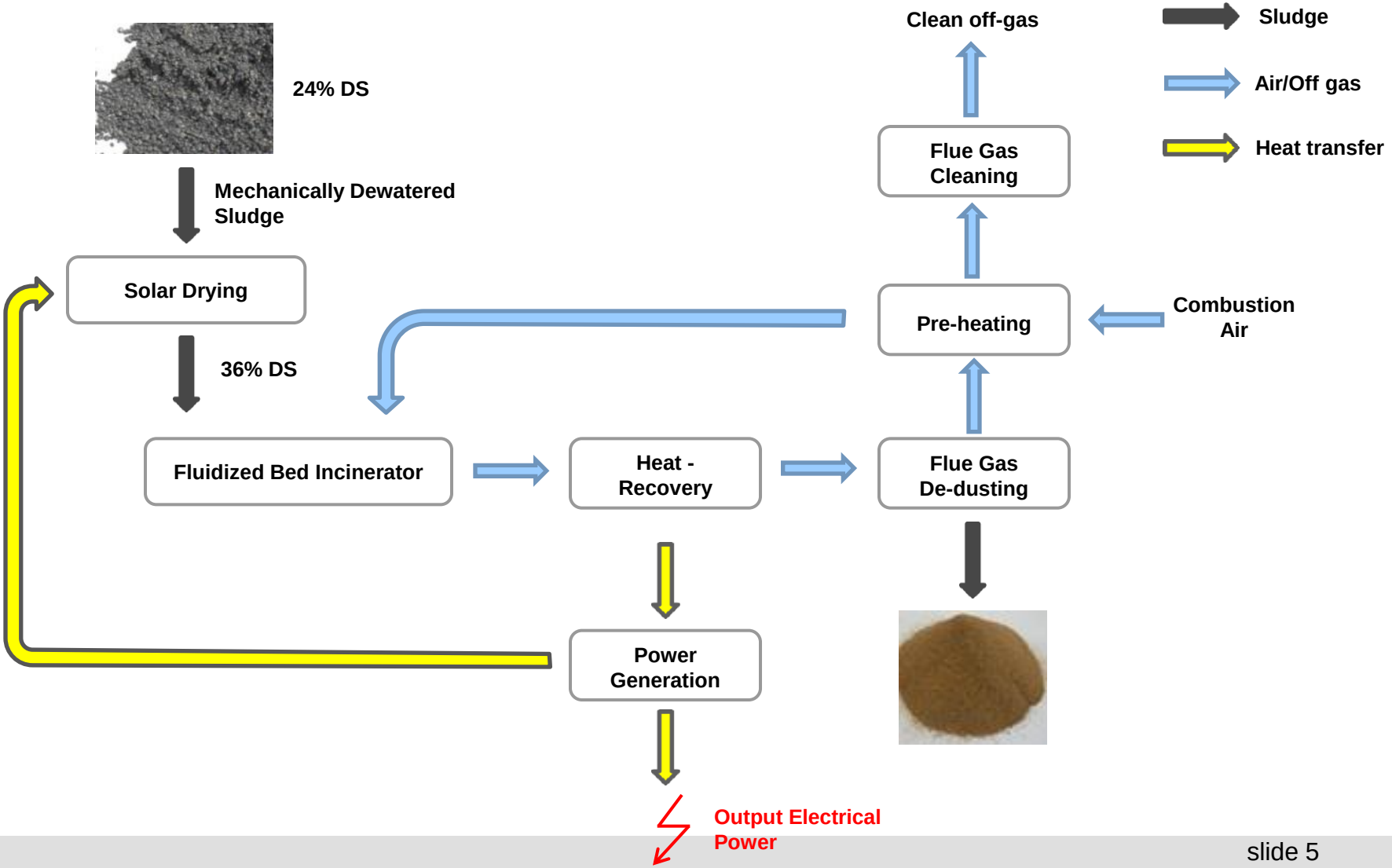
Sludge solar drying and incineration process – block diagram



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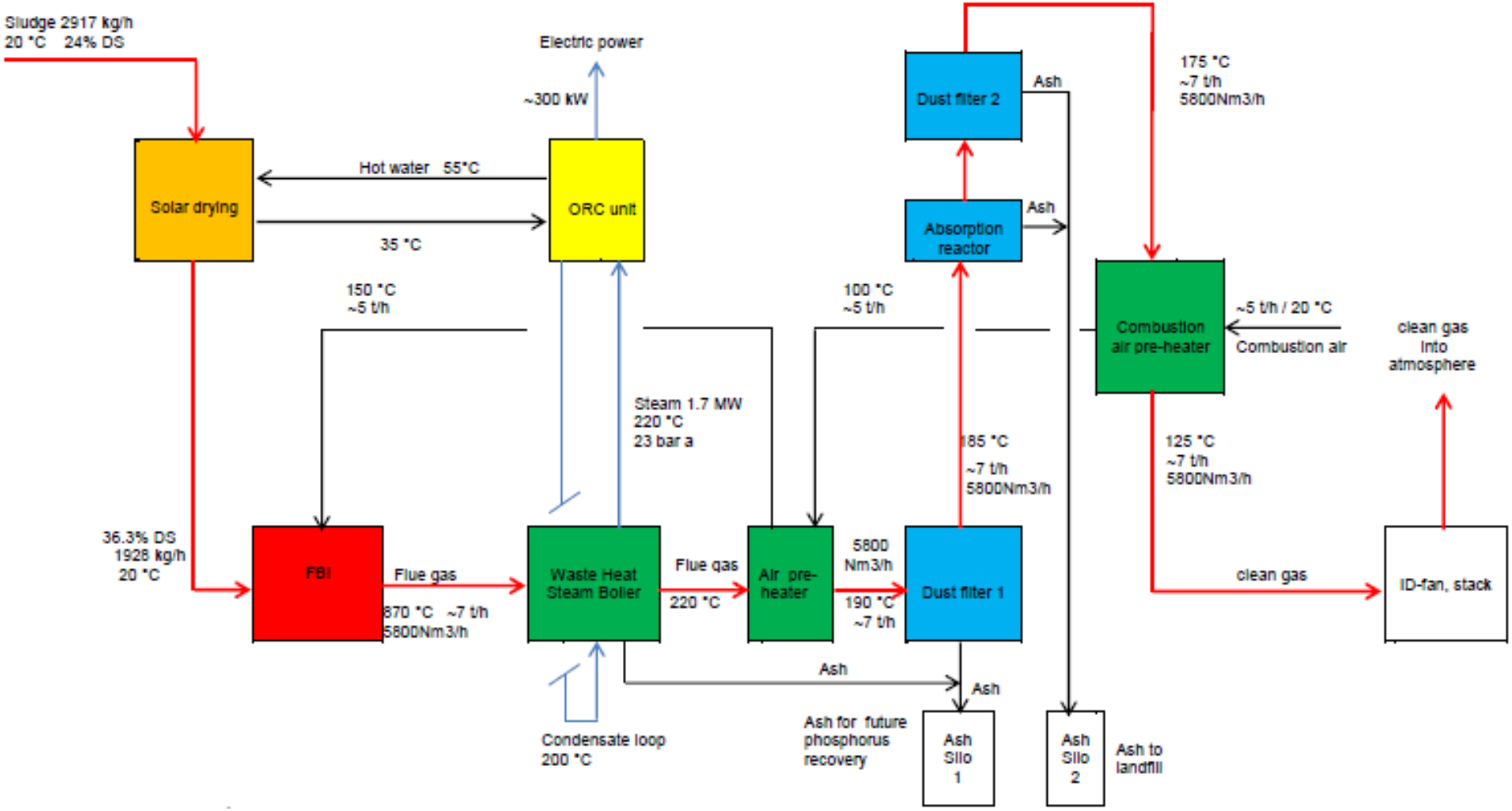
Sludge solar drying and incineration – process flow



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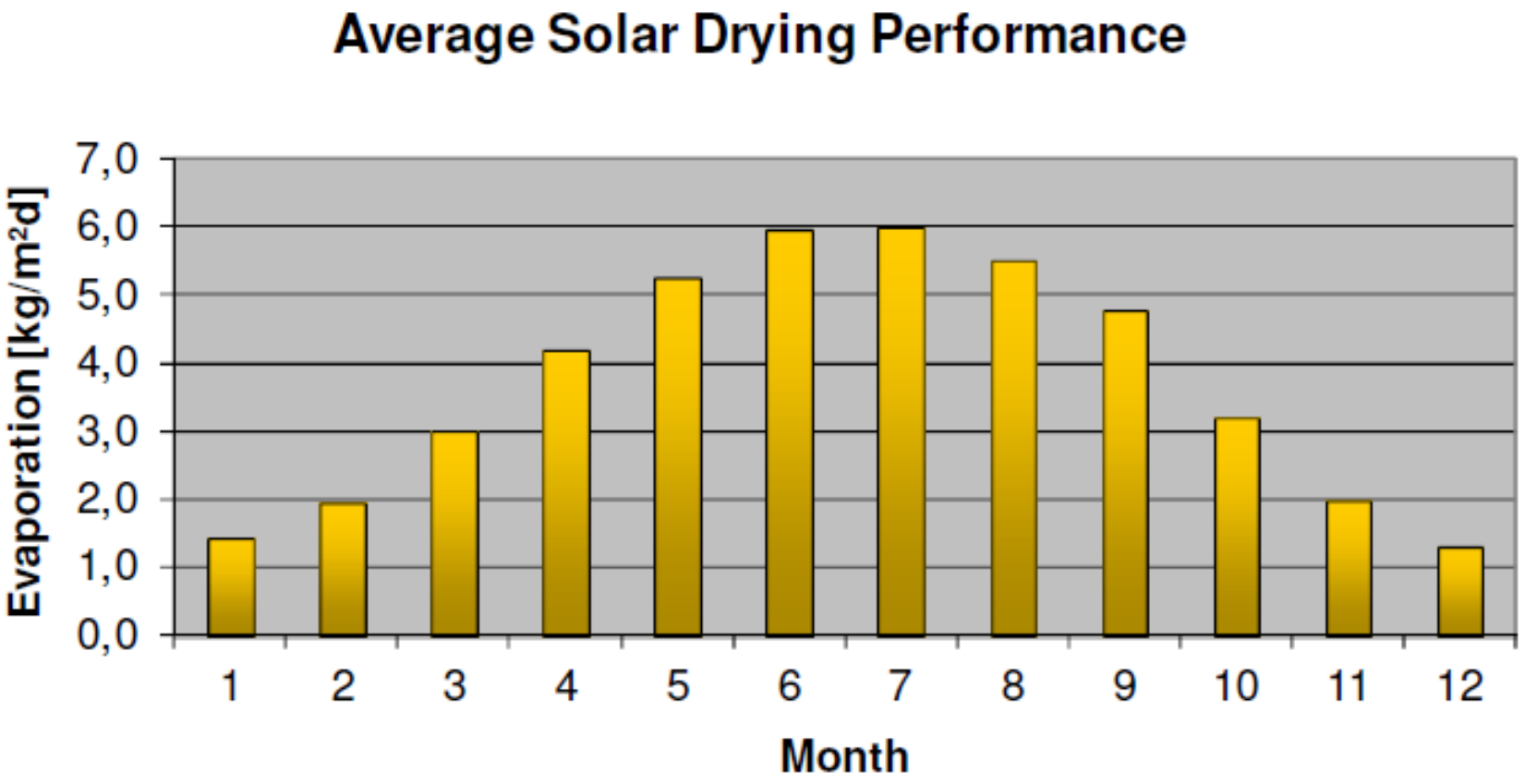
Sludge solar drying performance (Turkey as example)



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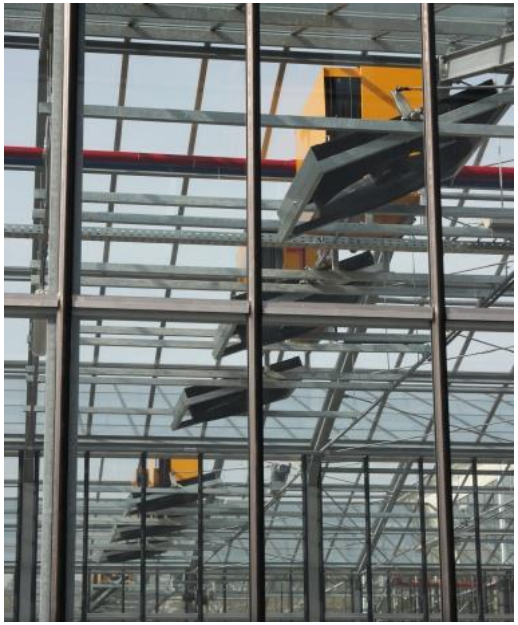
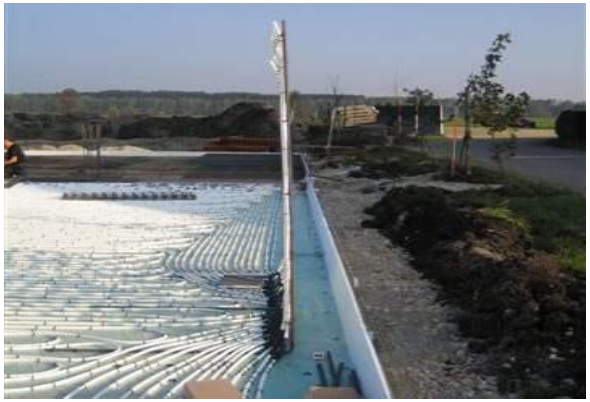
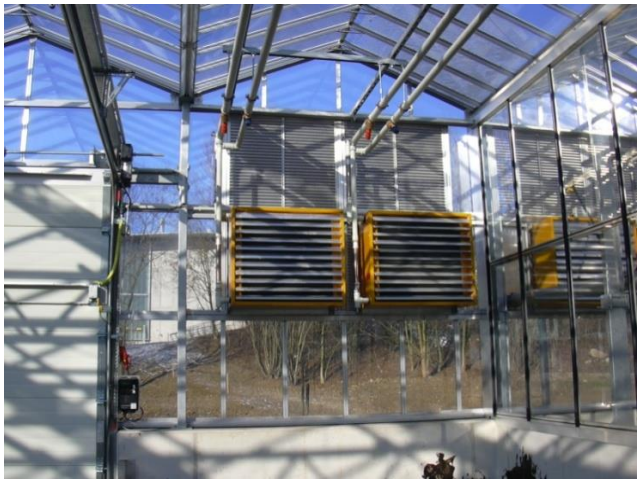
SolarPlus™ Heating system combined with Raschka's FBI technology



Heating source:

- Solar Energy
- Surplus heat from Raschka incineration and power generation system





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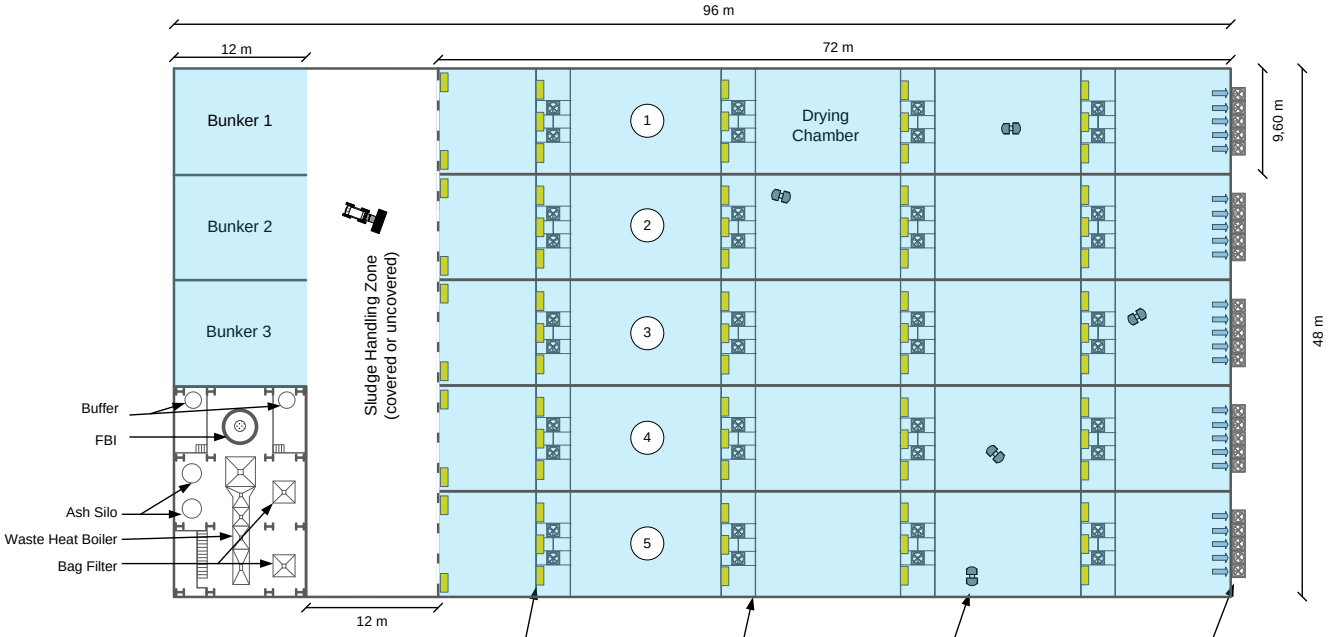
SolarBatch™ / SolarPlus™ Drying Plants

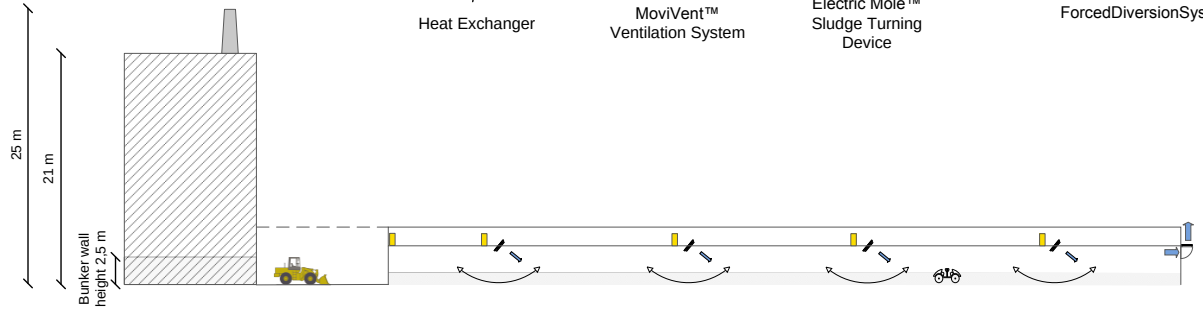
Electric Mole™

SolarBatch™ Drying Plant with FBI Incineration

Top View



Side View



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Key advantages

- Self-sufficient, simple and smart plant for the disposal of sewage sludge
- Energy optimized process with creation of surplus power
- To be operated by small staff level
- Low maintenance because of minimum moving parts
- Buffer facility for highly dewatered (dried) sludge during hot season in order to compensate for period with less sunshine
- Robust and reliable process able to cope with variations of sludge conditions
- Obtaining clean ash for future recovery of valuable phosphorus
- Volume reduction >90%

Contact

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