Energy management in municipal solid waste treatment: a case study of a mechanical biological treatment facility

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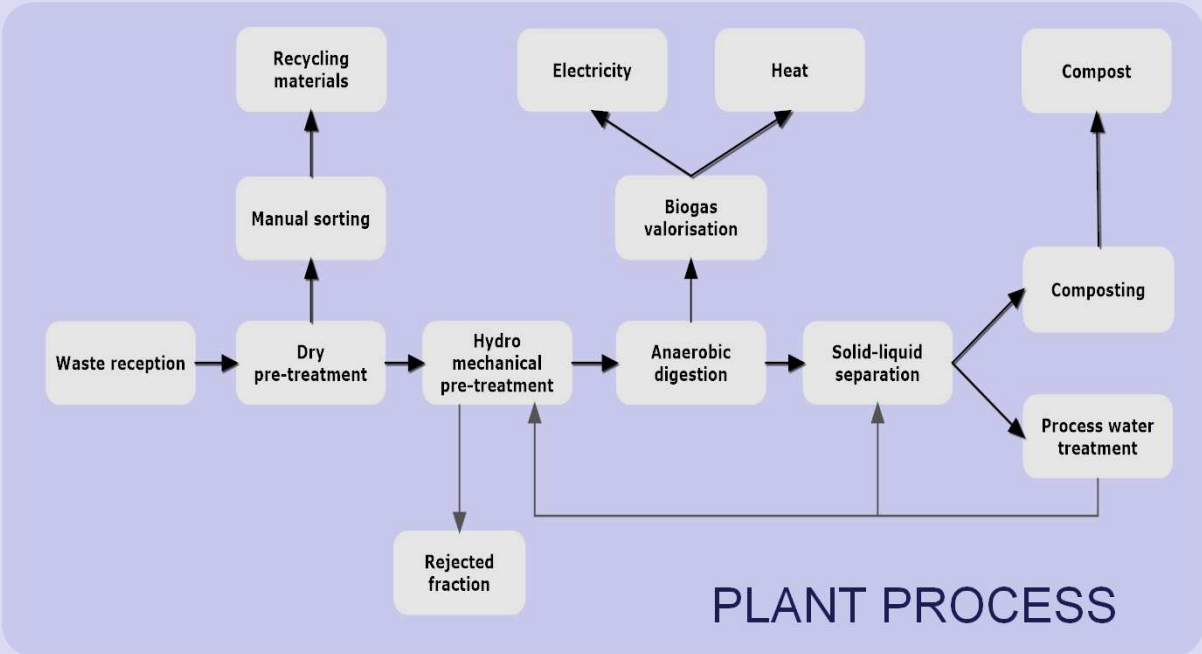
INTRODUCTION

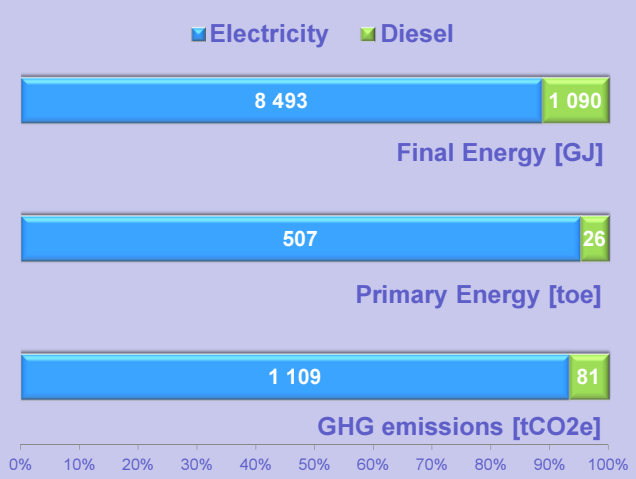
- This paper presents the main results of an energy audit performed to a Mechanical Biological Treatment facility in Portugal
- This required a coordinated, phased approach to identify, evaluate and recommend energy conservation measures (ECM)

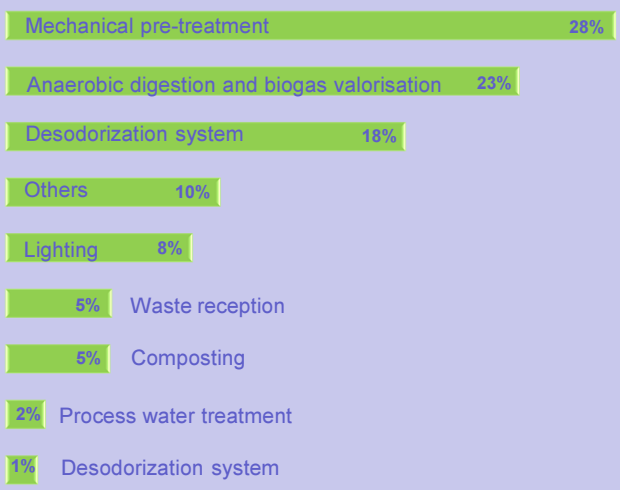


PLANT PROCESS

ENERGY AUDIT AND ANALYSIS

- Preliminary data collection and analysis
- Facility inspection
- Energy consumption measurements
- Identification and evaluation of ECMs
- Energy audit report and action plan





ENERGY SAVINGS POTENTIAL

Energy conservation measure	Energy savings		GHG avoided [tCO_2e]	Cost reduction [EUR]	Investment [EUR]	Payback [years]
	[GJ]	[toe]				
Enhancement of compressed air system performance	146,3	8,7	19	4 501	12 270	2,7
Improvement of lighting systems	234,9	14,0	31	7 230	36 620	5,1
Replacement of lower efficiency motors and installation of VSD	134,4	8,0	18	4 107	17 490	4,3
Efficiency improvement of rejected fraction transportation	154,1	3,7	11	8 414	44800	5,3
TOTAL	**669,7**	**34,4**	**79**	**24 252**	**111 180**	**4,6**

- Energy saving potential of 34,4 toe, (69,7 GJ)
- Reduction of 6,5% in facility energy consumption
- Total investment for the proposed set of ECMs is 111 180 EUR
- Overall payback time of 4,6 years.

CONCLUSIONS

- MBT consumes more energy than conventional mass grate combustion facilities, due to energy necessary to the pre-treatment processes
- Usually MBT anaerobic digestion technology is associated to the production of electricity and heat from recovered biogas, which recovers, partially, the added cost of energy
- Results presented here are only valid for this particular facility, but can be used in comparison to similar facilities in layout and process

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