

**MSW INCINERATION CAPACITY EVALUATIONS FOR
THE PROVINCE OF TURIN (NORTHERN ITALY)**

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ABSTRACT

This paper assesses the incineration capacity requirement of the Province of Turin through a detailed analysis of the mass streams and the properties of residual Municipal Solid Waste (MSW).

Historical data series were elaborated to study the trend evolution of household generation and separate collection. Residual MSW material compositions were calculated for each year over an observed period and for planned scenarios. A waste properties model was applied to calculate the residual MSW chemical composition and the LHV.

The analysis allows conclusions to be drawn about the design of the planned waste-to-energy plant and to estimate the required size and technology to be used. The results show that the use of grate furnace combustor appears to be more suitable than fluidized bed.

1. INTRODUCTION

Under the pressure of EU directives on landfilling, Italy has been undergoing a transition to integrated systems for the management of Municipal Solid Waste (MSW) since the nineties.

The Province of Turin is an interesting example of this transition. Turin is the fourth largest city in Italy (the second in the north) and the capital of Piedmont, an Italian region near the French border. The Province of Turin is highly populated and productive and it is therefore representative of many other provinces in northern Italy; Table 1 shows some data about the territory.

Local authorities approved a Waste Management Plan (WMP) which defines the organization of MSW separate collection, recycling and disposal [1]. At present the residual waste (after the separate collection) is sent to landfills. The plan provides a

separate collection target of nearly 50% for 2010 and the construction of new incineration plants.

Table 1 Province of Turin: key figures

land area (km²)		
plain	1.844	27%
hilly	1.434	21%
mountainous	3.552	52%
total	6.830	
population (inh.,2004)		
City of Turin	902.255	40%
13 medium sized towns (>20.000 inh.)	487.347	22%
302 small centres (<20.000 inh.)	847.339	38%
total	2.236.941	
end-use energy consumptions (TJ, 2003)		
domestic	63.773	32%
agriculture	1.901	1%
industry	58.381	30%
services	19.456	10%
transport	52.842	27%
total	196.353	
value added (M€, 2003)		
agriculture	398	1%
industry	15.706	30%
services	36.315	69%
total	52.420	

Household waste is one of the major mixed wastes; because of its heterogeneous nature, the characterization of a MSW requires information about its material composition and the physical properties of each material [2].

The design of waste treatment plants should start with the definition of the input streams; this is true for biological or mechanical treatment and also for incineration [3]. Frequently, waste properties drive the choice among different technology alternatives [4].

On the other hand, a mass and energy analysis of MSW streams