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Waste Management in Milan, China, E.U. and Greece

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Columbia University, Zhejiang University, and WtERT-Asia have completed the “*Guidelines of Sustainable Waste Management*” which consists of about six hundred pages of detailed information on how to implement large infrastructure projects in developing nations. This paper presents data from the *Guidelines* and discusses the 2000-2018 global evolution of waste management. In terms of GDP per capita, Greece (USD 27,000) is considered a developed nation while China, at USD 17,000, is developing. This distinction is artificial in terms of waste management, as China is now ahead of Greece and even of the U.S.A. (GDP/capita: USD 59,000).

The paper starts with examining what is the maximum fraction of MSW that can be recycled and composted. Milan, Italy is an example of city where an enormous amount of recycling effort, regulations and strict fines for non-compliance are in place. Milan recycles 23% of its MSW and composts 17%. The remaining 60% of “post-recycling” urban wastes are combusted with energy recovery in a waste-to-energy (WTE) plant within the city. Milan complies fully with the zero landfilling directive of the E.U. The result of this directive is that in the last twenty years the European Union tripled its recycling rate (11% to 30%) and its composting rate (6 to 17%), doubled its WTE rate (14 to 28%) and more than halved its landfilling (64 to 25%).

Turning to a developing nation, at the beginning of this century, the rapidly growing cities of China were literally surrounded by landfills. Therefore, the national government instituted policies, such as a credit of USD30 per MWh of WTE electricity, that have resulted in the construction of 375 WTE plants with annual WTE capacity of 74 million tons. In comparison, the WTE capacity in the U.S. has remained static since 1995 at about 27 million tons, which represents only 10% of its post-recycling MSW; about 62% of its MSW is landfilled.

In the last twenty years, the author has given innumerable lectures in Greece on the dire need to phase out landfilling, including one showing that, each year, about 50 hectares of precious Greek land (equivalent to three National Gardens) was wasted to landfills. Of course, there are other potential benefits to WTE, such as avoiding millions of tons of GHG emissions and producing about three million MWh of renewable electricity. Senior politicians the author has met in Greece over these years have visited WTE plants in the E.U. and know the significant benefits that WTE will bring to Greece. But when a political figure states the obvious need for WTE, there is a vociferous minority who oppose WTE as well as other infrastructure projects. Regrettably, the governmental leaders have not stood up to the “hoi oligoi”. The result is that Greece, an early member of the E.U. and “the cradle of Western civilization”, is left behind in terms of sustainable waste management.