

**WTERT (Greece and U.S.) PARTICIPATION IN ISWA-
APESB 2009 WORLD CONGRESS: “Turning Waste into
Ideas”** (Oct 12-15, Lisbon, Portugal)

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Dr Efstratios Kalogirou from the Earth Engineering Center, Columbia University and the president of SYNERGIA (WTERT Greece) participated in the ISWA World Congress 2009, held between 12-15 October 2009, in Lisbon, Portugal and was attended by more than 700 participants worldwide.

The event was organised by the International Solid Waste Association (ISWA) and the Portuguese Association of Sanitary and Environmental Engineering (APESB) and constitute a premier scientific and technical international event in the field of solid waste management. The theme of the Congress “Turning Waste into Ideas” was a starting point for exchange knowledge and experiences in order to reach the best waste management solutions for all the sectors of our society, from industry to arts. Besides the classic scientific sessions, the Congress activities also included an Ibero-american symposium. The Programme Committee invited recognized world leaders to anchor each Congress theme, and also additional platform speakers and poster presenters to complement the invited speakers.

The main objectives of the conference were :

- Peer to peer learning and network development.
- Fostering innovation solutions in the solid waste sector.
- Covering gaps in international legal and development targets.
- Developing a research and technology agenda.
- Socializing and establishment of links between technical practitioners and policy makers.

The main thematic sessions were :

1. Innovative Waste Solutions
2. Sustainable Waste Management
3. Waste To Energy
4. Waste&Climate Change
5. IberoAmerican Symposium

Regarding Waste to Energy the conclusions were that, in line with the new EU directive of 2008/98, Waste to Energy is getting higher in the hierarchy of Waste Management and the percentage of the use of this technology will be higher within the next years in Europe, USA and also in developing countries in order to reduce use of fossil fuels.

Two technical visits took place with participation of Synergia (WTERT).

1. Visit to Lipor's Integrated Waste Management System

Lipor (Intermunicipal waste management service of greater Oporto) is the entity responsible for the management, valorisation and treatment of municipal solid waste produced by eight associated municipalities. There are Espinho, Gondomar, Maia, Matosinhos, Porto, Póvoa de Varzim, Valongo and Vila do Conde. Lipor was originally created as an association of municipalities in 1982 and it has come to implement an integrated management of waste. Lipor treats around 500,000 tonnes of municipal solid waste, produced by 972,000 inhabitants per year. Sustaining modern municipal solid waste management concepts such as the adoption of integrated systems and minimising disposal in landfills, Lipor has developed an integrated treatment, valorisation and confinement strategy for municipal solid waste based on three main components: Multimaterial valorisation, organic valorisation, energy recovery. All these are complemented by a sanitary landfill for the final disposal of residuals.

Visit to Lipor's Recycling Circuit

In the Multimaterial Lipor Recycling Circuit, the whole process was seen from their deposition in the Eco- Containers and Drop-of-sites to their passage by the Sorting Plant, where they are sorted and baled for recycling. Lipor's Sorting

Plant is prepared to treat 35.000 tons of waste per year coming from selective collection.

Visit to Lipor's Organic Recovery Circuit

The Organic Recovery Circuit included a visit to the Home Composting Plant – Horta da Formiga – and a visit to the Composting Plant, where the organic waste is processed to be transformed in compost for agricultural use. The Composting Plant has the capacity to treat about 60.000 tons/year of organic waste and produces about 20.000 tons/year of high quality compost. Any residuals produced from non-organic material found in the waste such as paper, plastics etc is sent to the energy recovery circuit.

Visit to Lipor's Energy Recovery Circuit– Maia

The “Energy Recovery Circuit and Sanitary Landfill” included a visit to the Energy Recovery Plant, located 8 kilometres from the center of Porto and to Lipor's Sanitary Landfill. The Plant, with two lines of treatment with continuous and almost automatic production, combusts nearly 1.000 tons of waste a day, producing 25 MWe of electrical power, enough to supply a population group of around 150 thousands.

The Lipor's Sanitary Landfill located next to the Energy Recovery Plant and was designed under strict environmental control and protection standards. The amount of residue and ash deposited on this landfill is estimated at about 75.000 tons annually

Technical Details:

1. Capacity :1.000 tpd MSW x 330 days
2. 10 years of operation
3. 26 MWe, 60 tph steam x 2 lines
4. Incineration temperature at the time of visit was on the grate 1050°C and flue gas temperature 950-970°C. Normal operating temperatures on the grate are (1000-1200°C)
5. Gate fee 40 €/ton
6. Electricity selling price 80 €/MWh
7. Semi wet scrubbers, SNCR (levels of NO_x emissions 150-190 mg/Nm³)
8. Solidification of fly ash with cement, on site (0,2 ha), and then is driven to landfill

9. Bottom ash is inert and is driven either to landfill or road construction
10. The plant was constructed by CNIM (Grate type MARTIN) and is operated by a subsidiary company of VEOLIA
11. The total leachates from all ashes are biological cleaned through Ultra Filtration & Reverse Osmosis.

Some photos of the LIPOR WTE plant:



Scrap from the bottom ash



Exit from Fly ash silo



Fly ash



Fly ash is solidified with cement on site



Inert fly ash with cement .1



Inert fly as with cement .2



Leachate from WtE and landfill Tank

2. Visit to Valorsul's Waste to Energy Plant

The Valorsul WtE plant is located around 6 kilometres from the center of Lisbon. The Plant receives daily approximately 2000 tons of waste and produces enough energy to supply a city of 150 thousand inhabitants. It occupies an area of 4 ha and has a nominal processing capacity of 662 thousand tons/year (90% availability). A very complete environmental monitoring programme is implemented in order to evaluate the impact of the plant in the involving area.

Technical Details:

1. Technological process: Mass Burning with energy recovery
2. Location: S. Joao de Talha, Municipality of Loures
3. Area Occupied: 4 ha
4. Origin of the municipal solid waste: mixed collection by municipalities or privates entities
5. Nominal processing capacity: 662.000 tonnes per year (90% availability)
6. Calorific Value of the MSW: nominal 7820 kJ/kg
7. Firebox grid: Detroit Stoker Reverse-Acting Stoker
8. Steam production boilers: 2 units with natural circulation of a water panel with superheating
9. Steam discharge in the turbine: 222.000 kg/h
10. Superheated steam: 52.8 bar
11. Gross electrical production: 525.71 kWh per tonne of MSW
12. Electrical Self Consumption: 71.13 per tonne of MSW
13. Nitrogen oxides removal system through SNCR
14. Acid gases removal system through semi dry process through injection of lime wash
15. Dioxins and Furans removal systems and heavy metals removal systems through injection of activated carbon
16. Particle removal system through high performance baghouse filters

The Valorsul Sanitary Landfill is used to deposit waste that cannot be incinerated and also the mixed waste collection when the WTE Processing Plant is not operating. It is constituted of cells lined with impervious materials to retain the leached materials. There are also specific cells in which stabilized fly ash is deposited. In the Landfill, there is also a biogas extraction and burning network. In the sanitary landfill, there is also a Bottom-Ash Recovery Plant that receives the ash of the WTE Plant and separates ferrous and non-ferrous metals from the ash. The

metal is led to the recycling and the inert material may be used in civil construction. The ferrous metal recovered was stated to be enough to manufacture 16,500 vehicles a year. The total amount of materials deposited in the Valorsul Landfill was estimated at 130.000 tons per year for bottom ash occupying an area of 2,8 hectares.