Waste Management

A promising and upcoming service sector

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The Greek waste management sector
Greece produces a large volume of solid waste... Almost 50% is produced in Athens & Thessaloniki.

Greece produces 5 million tons of residential and commercial urban solid waste annually. This is equivalent to an average of 450 kilograms per person.

Source: Ministry for the Environment, Energy & Climate Change – Hellastat, waste management sector study (September 2009)
...with organic/biodegradable waste in top ranking position

Composition of urban waste in Greece

- Organic: 40%
- Paper: 29%
- Plastic: 14%
- Glass: 11%
- Metals: 3%
- Other: 3%

Composition of urban waste in the E.U.

- Organic: 25%
- Paper: 35%
- Metal: 6%
- Glass: 11%
- Plastic: 9%
- Other: 3%

Source: Ministry for the Environment, Energy & Climate Change – Hellastat, waste management sector study (September 2009)
Greece is near to the EU recycling average but relies still heavily on landfill disposal

Management of solid waste in Greece

- Landfill disposal: 77%
- Recycling: 21%
- Composting: 2%

Management of solid waste in the E.U.

- Landfill disposal: 40%
- Recycling: 23%
- Composting: 17%
- Thermal treatment: 20%

Waste Recycling in Greece is expected to rise 33% in 2012

Current treatment infrastructure involves also MBT & recycling...

- 63 sanitary landfill sites
- 25 centers for recycling materials sorting
- 5 units for mechanical waste sorting and compost production
- 7 units for Waste of Electrical and Electronic Equipment recycling
- 8 units for tire processing and partition
- 1 unit for incinerating and 3 units of sterilizing medical waste

7 collective recycling schemes are in operation today
Biogas from landfills and power generation holds a discrete position in large urban centers

**Athens Area**
- Co-generation of heat and power from biogas at Ano Liosia sanitary landfill
- A power plant with 23.5 MW installed capacity

**Thessaloniki Area**
- Electricity generation from biogas at Tagarades sanitary landfill
- A power plant with 5 MW installed capacity capable of covering the energy needs of 80,000 residents
Greece has made a considerable progress in decreasing waste to landfills and CO2 from recycling...

Source: Hellastat, waste management sector study (September 2009)
...but has significant targets to reach especially in the biodegradable waste stream

Country targets

According to EU and national directives Greece should:

- recover at least 60% by weight all packaging waste by 2011 which includes recycling of at least 55%
- decrease biodegradable waste that is sent to landfill by 1,100,000 tons in 2010, 1,900,000 tons in 2013, and 2,700,000 tons in 2020
- collect and recycle 44,000 tons of WEEE annually
- collect at least 70% of used oils & lubricants annually from which 80% should be recycled
- collect and recycle 25% of the sold batteries annually

Current status

According to the latest market figures:

- 50% of the produced packaging waste has been recovered and recycled (2008)
- Biodegradable waste that is sent to landfill has been decreased by 461,079 tons (42% target coverage)
- 47,141 tons of WEEE were collected and recycled (2008)
- 52,800 tons of used oils and lubricants were collected and recycled (2008)
- 497 tons of batteries were collected and recycled. An amount that corresponds to 26% of the sold batteries (2008)

212 wastewater treatment plants are currently in operation throughout Greece serving the needs of almost 90% of the population.

80% of the operating plants follow aerobic stabilisation, which is the most common method for sludge treatment.

The largest installations (Athens and Thessaloniki) use anaerobic digestion and produce energy from biogas.


Percentage of the population covered by wastewater treatment plants in Greece:

- 2002: 47%
- 2005: 85%
- 2007: 86%
- 2008: 91%
Psytalleia treatment plant (Athens)
✓ Serves the needs of 3,800,000 residents, treats 800,000 m³ of wastewater per day and produces power of 24.3 MW
✓ Since 2007 a sludge drying plant operate in the facility of Psytalleia treating sludge quantities that correspond to 50% of total sludge production

Metamorfosi treatment plant (Athens)
✓ Serves the needs of 450,000 residents

Treatment plant of Thessaloniki
✓ Serves the needs of 1,100,000 residents

Greece produces around 510,000 tons of sewage sludge annually. Athens and Thessaloniki represent 60% of total production

Source: «Αξιολόγηση Μεθόδων Επεξεργασίας Βιολογικής Ιλίου από Μονάδες Επεξεργασίας Αστικών και Βιομηχανικών Λυμάτων με Έμφαση στην Ενεργειακή Αξιοποίηση», Καραγιαννίδης Α., Σαμαράς Π., Κασαμπάλης Θ., Ζιώγας Π., 2009 – Ελλάδα, Η Κατάσταση του Περιβάλλοντος 2008
Business drivers and areas of growth
A favorable business environment that drives investments...

- **Binding national and EU legislation** that sets specific quantity targets in waste management and recycling
- **A favorable 4th EU Programming Period** (NSRF 2007-2013) for waste and wastewater treatment projects
- **A promising Public Private Partnership (PPP) framework** favoring the development of environmental projects and relevant infrastructure
- **Fast licensing procedures** for large projects and projects of strategic importance ensured by the new ‘Fast Track’ law (L.3894/2010)
- **Generous incentive schemes** for environmental projects through a brand new investment incentives legal framework (L.3908/2011)
- **Easier, simpler and faster company establishment** regulated by a brand new legal framework
A favorable business environment that drives investments (2)...

- Effective environmental project design and implementation through the “Kallikratis” local administration reform program
- A competitive construction sector that leads project implementation
- Further development of recycling through the provision of financial incentives to local authorities
- An immature waste to energy market that leaves significant margins for action
- Competitive and generous Feed-in-Tariff for producing electricity from the biodegradable fraction of municipal waste

Waste to Energy Feed-in-Tariff (According to RES Law 3851/2010)

<table>
<thead>
<tr>
<th>Electricity production from:</th>
<th>Interconnected system (Euro/MWh)</th>
<th>Non interconnected islands (Euro/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodegradable fraction of municipal waste</td>
<td>87,85</td>
<td>99,45</td>
</tr>
</tbody>
</table>
• Development of modern, integrated facilities for treating and disposing municipal solid waste
• Energy recovery from organic waste fraction
• Rehabilitation of the existing dumps
• Environmental sound management of industrial, medical and hazardous waste
• Construction of suitable transfer station networks and recycling centers
• Selective collection at source and further recycling of municipal wastes
• Wastewater and sewage treatment

...in fields that Greece needs
Business and investment opportunities
Two PPP projects lead the way in waste management

• Implementation of an integrated waste management system in the Prefecture of Thessaloniki
  • €242m + 20% for heavy maintenance and insurance

• Implementation of infrastructure for the integrated waste management system in the region of Western Macedonia
  • €97m + 20% for heavy maintenance and insurance

Source: Special Secretariat for Public Private Partnerships - Ministry of Economy, Competitiveness & Shipping
Prefecture of Thessaloniki: Development of an integrated waste management system

A PPP project that involves the design, construction, financing, maintenance, facility management and operation of the new infrastructure of the integrated waste management system in the Prefecture of Thessaloniki.

The selected SPV will undertake:

- The design, construction, maintenance and operation of a plant that will treat solid waste of the Northwestern unit of the Prefecture of Thessaloniki and will be composed of a treatment and exploitation unit and a sanitary landfill.

**KEY PROJECT DATA:**

- **Contracting Authority – Project Owner:** Association of Local Authorities of Greater Thessaloniki
- **Project Capacity:** 400,000 tons per year
- **Mode of Cooperation:** Public Private Partnership
- **Technology Used:** The unit will be constructed upon any proven technology that can meet the targets set by the EU Directives and the output specification set by the Contracting Authority
- **Budget:** 242 million EURO +20% insurance and heavy maintenance costs
- **Duration of Contract:** 29 years
- **Reimbursement:** The project will be reimbursed by the end users and the Greek state

Source: Special Secretariat for Public Private Partnerships, Association of Local Authorities of Greater Thessaloniki
Prefecture of Thessaloniki:
Development of an integrated waste management system (2)

The project is part of the strategic plan of the Association of Local Authorities of Greater Thessaloniki given that waste production in the Prefecture is significant. The implementation of the project ensures:

1. the decrease of the amount of waste that is sent to landfill
2. the final cease of operations in the landfill of Tagarades
3. the commercial exploitation of the plant’s output. The selected SPV will be given the right to commercially exploit the output of the treatment unit, such as recyclable products, biogas, RDF, energy, etc.

Source: Special Secretariat for Public Private Partnerships, Association of Local Authorities of Greater Thessaloniki
Region of Western Macedonia: New infrastructure for the integrated waste management system

A PPP project that involves the design, construction, financing, maintenance, facility management and operation of new infrastructure, aiming at covering the waste management requirements imposed by the EU Directives

The selected SPV will undertake:

1. The design, construction, maintenance and operation of the central integrated waste management installations which will be composed by a treatment and exploitation unit and a residues sanitary landfill

2. The maintenance and operation of the existing network of waste transfer stations, when the treatment unit begins its operation. The network consists of ten transfer stations and their mobile equipment

KEY PROJECT DATA:

- **Contracting Authority – Project Owner:** Waste Management System of Western Macedonia (DIADYMA S.A.)
- **Project Capacity:** 120,000 tons per year, reaching 152,000 tons by the end of the partnership
- **Mode of Cooperation:** Public Private Partnership
- **Technology Used:** The unit will be constructed upon any proven technology that can meet the targets set by the EU Directives and the output specification set by the Contracting Authority
- **Budget:** 116.4 million EURO that includes insurance cost and heavy maintenance
- **Duration of Contract:** 27 years
- **Reimbursement:** The project will be reimbursed by the end users and the Greek state

Source: Special Secretariat for Public Private Partnerships, DIADYMA S.A.

Public tender underway: Open until March 3, 2011, 12:00 PM
The project is part of the strategic plan of the Region of Western Macedonia. Its implementation ensures that:

1. the amount of waste to landfill is decreased and the life cycle of the existing landfill is doubled
2. the environmental impact of treating biodegradable waste is minimised
3. commercially exploitable products are produced. The selected SPV will be given the right to commercially exploit the output of the treatment unit, such as recyclable products, biogas, RDF, SRF, etc.
4. the efficiency of the investment made during the 2002-2004 period is maximised
A promising pipeline of WM projects

2011 - 2012

50 solid waste management projects are expected to be tendered and implemented*

*Data stems from a survey conducted by ‘Invest in Greece’ on the maturity level of waste management projects
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