INTEGRATED MANAGEMENT OF BIO-WASTE IN GREECE: THE CASE STUDY OF ATHENS LIFE10 ENV/GR/000605

LAYMAN'S REPORT


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The ATHENS-BIOWASTE project with title: “Integrated Management of biowaste in Greece - The case study of Athens” implemented the first pilot source separation of biowaste in two Municipalities of the Attica Region, the Municipality of Athens and the Municipality of Kifissia. The biowaste collected was forwarded for composting to the Mechanical Recycling and Composting Facility (MBT) at Ano Liosia, where it was separately treated for the production of high quality compost. The project beneficiaries were: the National Technical University of Athens (NTUA), the Association of Municipalities of the Attica Region – Solid Waste Management (EDSNA), EPTA SA Environmental Engineers – Consultants, the Municipality of Athens and the Municipality of Kifissia, while the project was funded by LIFE+, the financial instrument of the European Commission for Environment.

According to the Waste Framework Directive 2008/98, organic waste (biowaste) is defined as the biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, as well as similar waste from food processing plants. In Greece, in the Law 4042/2012 (Government Gazette 24/A/132-2012) it was set that the biowaste separate collection target for 2015 should reach at a minimum 5% of their total weight and at a minimum 10% for 2020. Also, the aim of diverting biodegradable municipal waste from landfill (Joint Ministerial Decision 29407/3508/2002) and the special tax of landfill (Law 4042/2012), indirectly require separate collection and treatment of biowaste. The separate collection of municipal biowaste has been a European-wide practice for several decades, while it was applied for the first time in Greece in 2013 under the Athens-Biowaste project. The extension of similar systems will be, in the coming years, an important focus of policy in the municipal solid waste management. The ultimate goal is the composting or anaerobic digestion of biowaste for the production of high quality materials and the diversion of similar waste flows from landfills.

MAIN PROJECT GOALS

• The implementation of the biowaste separate collection in Greece for the very first time.
• The composting of the collected biowaste and the production of high quality compost
• The dissemination of best practices in other Municipal authorities wishing to develop similar waste management systems.

1. INTRODUCTION

The main project activities included:

• Design of the source sorting scheme for the Municipality of Athens and Kifissia.
• Implementation of the source sorting schemes in the selected areas.
• Composting of the collected biowaste and laboratory analysis of the final product.
• Development of a software tool for the design of biowaste management schemes.
• Guide for effective biowaste management and institutional suggestions at national level.
• Dissemination of the project results.
2. SYSTEM FOR THE SOURCE SEPARATION OF BIOWASTE

The system for the source separation of biowaste was implemented after detailed design (see also paragraph 4: Information campaign).

MUNICIPALITY OF ATHENS

The separate waste collection scheme of the Municipality of Athens was based on the design of a dense network of central waste bins, that were carefully placed close to each household. The citizens transferred the pre-sorted biowaste to the bins, which were collected by the Municipality services. The collection was initiated in October 2013.

PILOT AREAS

COLLECTION WITH THE USE OF CENTRAL BINS

660lt and 1,100lt bins, placed outside residences and catering businesses

Collection by exclusive vehicles (continuous monitoring via GPS) and trained staff

Other collection points of food waste in the Municipality of Athens

The Officers’ Restaurant of Armed Forces of the Ministry of National Defence has been collecting the food waste from the restaurant since April 2013. The separate collection of biowaste was expanded later in the kitchen facilities of two (2) major military hospitals i.e. 401 GNSA and Athens Hospital of the Hellenic Navy, as well as in the kitchen facilities of the Air Force General Staff (GEA) and the Hellenic Navy General Staff (GEN).

The Agricultural University of Athens has been collecting the food waste from the students’ restaurant and small quantities of green waste since April 2013.

The Agricultural Cooperative of Attica SPE ‘Synidioktisia’ has been participating since June 2013 by providing flower residues.
MUNICIPALITY OF KIFISIA

In the Municipality of Kifissia, a door-to-door collection system was implemented, where an exclusive bin was distributed to each building of 30-360 lt capacity for the collection of biowaste. The collection was initiated in November 2012.
3. COMPOSTING OF SEPARATED AT SOURCE BIOWASTE

The treatment of biowaste was performed in the EDSNA MBT Facility. After appropriate adjustments of the production process, EDSNA received the pre-sorted biowaste from the Municipalities for the first time.

Following, the processing steps of biowaste composting are briefly described.

*Agitation-aeration-hydration and promotion of the material is performed with a rotating drum (rotor) with knives and metal film for the turning and displacement of the substrate. The aeration system involves suction in the first three aeration zones and blowing in the last zone. Adding moisture is done automatically by a device that is installed in the agitation system.*
3.1 COMPOSITION ANALYSIS OF BIOWASTE & COMPOST PRODUCED WITH THE COLLABORATION OF THE CERTIFIED NTUA LABORATORY (ISO 9000 & ISO 17025) & EDSNA

BIOWASTE COMPOSITION FOR EACH MUNICIPALITY

PRODUCED COMPOST COMPOSITION

<table>
<thead>
<tr>
<th>Compost</th>
<th>Cd</th>
<th>Cr&lt;sub&gt;tot&lt;/sub&gt;</th>
<th>Cu</th>
<th>Hg</th>
<th>Ni</th>
<th>Pb</th>
<th>Zn</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATHENS BIOWASTE compost from source sorted biowaste (n=17)</td>
<td>0.23 ±0.19</td>
<td>17.07 ±11.90</td>
<td>126.15 ±42.40</td>
<td>0.07 ±0.05</td>
<td>20.05 ±9.51</td>
<td>103.99 ±36.20</td>
<td>290.97 ±83.51</td>
</tr>
<tr>
<td>EDSNA compost from Mixed waste</td>
<td>0.94</td>
<td>33.02</td>
<td>214.36</td>
<td>1.08</td>
<td>47.63</td>
<td>182.90</td>
<td>433.81</td>
</tr>
<tr>
<td>European criteria End of Waste Criteria (EcWC)</td>
<td>1.5</td>
<td>100</td>
<td>200</td>
<td>1</td>
<td>50</td>
<td>120</td>
<td>600</td>
</tr>
</tbody>
</table>

The produced compost from the pre-sorted biowaste has very high quality and value. The laboratory analyses of the produced compost performed by the certified laboratory of the Unit of Environmental Science & Technology, NTUA demonstrated that the composting process of the separate collected biowaste led to the production of a product with very good characteristics, properties and value. As a result, this compost can actually be used as soil conditioner, reducing the need for fertilizer imports.
For the successful implementation of the project, a multi-faceted and extensive information campaign it was designed and implemented, using online media (the project site, websites of the municipalities and EDSNA, Facebook), press releases in all print media (all newspapers, magazines, online media), press conferences with great media coverage of nationwide and local scale media, presence in radio and television programs at national level, use of information kiosks and distribution of informative material, models of garbage trucks, door-step information of families and students by organizing events in schools of the pilot areas.
Ηρθαν οι καφέ κάδοι

Μετά τους μπαμπού και πράσινους κάδους την εμφάνιση τους στις περιοχές Καρπενησίου (Αγία Παρασκευή) και Γιάννενα έκλεισαν και οι καφέ κάδοι καμποτζιοποιήστηκαν στο πλαίσιο του προγράμματος “Athens BioWaste” που συγχρηματοδοτήθηκε από το LIFE+ της Ευρωπαϊκής Ένωσης.

Δείτε πώς μπορείτε να συμμετέχετε και εσείς, ακόμα και η προσέχει να γνωρίζετε!

Δημ. Αθήνας
5. GUIDE FOR THE IMPLEMENTATION, CONTROL & ASSESSMENT OF BIOWASTE SEPARATE COLLECTION & COMPOSTING SCHEMES

The steps that the Municipalities have to follow in order to develop and implement separate at source schemes for biowaste with success are described in the integrated Guide that the ATHENS-BIOWASTE working team has prepared.

The Guide includes step by step guiding instructions and practical advice about how a Municipality can design, install, implement and monitor a separation at source scheme (in combination with information campaign), promoting enhancing the development of a market for compost and the awareness of the citizens, the competent authorities and other stakeholders on the management of bio-waste. The guide is available at www.biowaste.gr.

6. SOFTWARE FOR BIOWASTE MANAGEMENT

In the framework of Athens-Biowaste project, a model has been developed in order to help municipalities build a separate biowaste collection scheme, estimate the direct investment and operational costs and identify the areas where substantial GHG savings in CO₂ equiv. could be achieved. The model has been developed in Microsoft Excel platform in order to be user friendly and is accompanied by a Guidance Manual. The model and the manual can be downloaded from the Athens-Biowaste website, www.biowaste.gr.
The model has been applied in three different Municipalities, representing European urban, suburban and rural areas, varying in population and building characteristics. For all areas, two types of collection schemes were examined, namely door-to-door and road containers collection.

All scenarios modelled showed that the investment cost for establishing a separate collection scheme was approximately 10€ per inhabitant, without new vehicles. Operational cost is directly linked with the type of the collection scheme applied in the area, the participation rate and the collection frequency. Increasing the participation rate from 25% to 64%, the operational cost per tonne of biowaste was reduced approximately by 50%, while by doubling the collection frequency, the operational cost increased by 40 to 60% in all examined cases.
7. INSTITUTIONAL SUGGESTIONS AT NATIONAL LEVEL

The working team of the ATHENS-BIOWASTE project proceeded into concrete proposals for promoting the implementation of separate collection schemes for organic waste in the country, for reaching the relevant requirements of the national and European legislative framework and the modification of technical specifications and provisions of waste management.

8. FINAL CONFERENCE FOR DISSEMINATION AND PRESENTATION OF THE PROJECT RESULTS

ATHENS-BIOWASTE Conference: 12-14 June 2014, Royal Olympic Hotel, Athens, 130 presentations, 12 different Sessions, 800 participants from 40 countries. Under the auspices of the Hellenic Presidency of the Council of the EU and the Ministry of Environment, Energy & Climate Change.

Site visit of the participants of the conference at the EDSNA Mechanical Recycling and Composting Facility at Ano Liosia