

GREEN CREW

Green - Employment in the Management of Biowastes Best practices of waste management in Greece

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Municipality of Nastos



Best management practices for organic waste recycling must include the following actions:

► Prevention actions:

- **Prevention of bio-waste/organic waste.** Initiatives which aiming at prevention of bio-waste and organic waste via the use of economic instruments or the introduction of targets, should be taken. This could be done by adopting measures for the minimum possible waste production. Bio waste prevention reduces the material flows, the corresponding emissions and the amount of waste to be collected, treated and landfilled. This in turn results in a lower pressure on biodiversity, human and environmental health
- Payment of municipal taxes not based on the square meters of our residence, but based on the amount of waste we produce in order to apply the principle of reciprocity and become all responsible citizens who will participate in recycling and composting.
- The disposal fee paid by Municipalities to landfills should be linked to the quantities buried from each Municipality in order to apply the “polluter pays” principle
- A tax system could be established to encourage separate collection and potentially reduce the amount of waste generated; thresholds are defined for quantities of waste not separately collected and taxes apply if such thresholds are exceeded. Such a policy encourages separate collection of bio-waste and more generally incites prevention. A tax of this kind could be applied to quantities of bio-waste separately collected to specifically target prevention of bio-waste generated by households

Best management practices for organic waste recycling must include the following actions

► Sorting at source and separate collection

- Separate bins for each stream of recyclable waste and separate collection for organic waste
- Bins for mixed non-recyclable waste
- It includes the separation of the organic fraction (biowaste). It is generally accepted that source separation provides the best quality feedstock for composting with both a maximum organic content and minimum contamination with heavy metals, glass and plastics. After composting in a reliable process, this will result in the formation of quality compost

► Composting and recycling Actions:

- Home composting in small bins per household where it will deposited organic waste
- Municipal composting in brown bins where the great mass of organic waste of the municipality will be deposited

Best practices of waste management in Greece

► Recycling corners in the Municipality of Egaleo

- The project "DEVELOPING THE RECYCLING NETWORK NETWORK" is intended to be implemented by the Municipality of Egaleo, with the aim of maximizing the sorting at source of the generated waste.
- The main purpose of the Recycling Corners is to sort out at source and separate primary materials for reuse and recycling by the public. This reduces the cost of transporting and managing waste, improves the marketability of recyclable materials, and reduces landfill residues in order to meet the country's international commitments and to avoid fines.
- Recycling Corners are an international, successful practice based primarily on citizen participation, where users, especially citizens / citizens, are able to store organized useful materials such as paper / cardboard, glass & metal packaging, edible fats & oils , electrical & electronic equipment etc.
- The foreseen Recycling Corners are to be placed at key points, selected on the basis of the daily observation and recording of the needs of the municipalities by the Municipal Cleaning Department.

Best practices of waste management in Greece

- ▶ **Program: Food for Feed in Crete - Single Waste Management Association of Crete / EIDHR**
 - The litter feed.
 - The initial budget program of € 2.5 million will be funded with € 1.5 million from the European Union (60%). Partners in the project: TEI of Crete (Department of Agronomy Technologists) Harokopio University (Department of Geography), the Agricultural University of Athens (Department of Animal Science and Aquaculture) and the Free University of Berlin (Freie Universität Berlin - School of Veterinary Medicine).
 - The program has originally listed two hotels in Crete.

Best practices of waste management in Greece

- ▶ **The first Great Green Point in Attica in the Municipality of Moschato - Tavros**
 - The bases for the first modern Great Green Point in Attica for the utilization of recyclable materials were entered with the Programming Agreement signed by the President of ENSNA, and the Mayor of Moschato - Taurus. The subject of the Programming Agreement between EDSNA and the Municipality of Moschato - Taurus is the design, construction and operation of a Recycling Center, a Training Center for Picking Up (KEDISP) and a Greener Green Point (MSS), in the Municipality Moschato - Taurus. The development of Green Points is basically the adoption of national policy on solid waste management.
 - The Big Green Points are outdoor - enclosed spaces equipped with appropriate equipment and infrastructure (building and equipment) and Green Points are delimited and appropriately landscaped areas with appropriate building infrastructure and equipment, organized by Local Authorities A 'grade, so that residents can deposit recycling materials or for re-use

Best practices of waste management in Greece

- ▶ **Municipality of Vrilissia: Innovative rewards program for recycling**
 - The platform is open to all our fellow citizens to participate in the integrated and innovative environmental awareness and reward program for recycling with the support of the local economy.
 - The Municipality of Vrilissia launched the integrated and innovative program of environmental awareness and rewarding of citizens based on a "smart city" platform (www.followgreen.gr/vrilissia) that connects citizens - local businesses and schools on initiative municipality's.
 - The common goal of all is to increase recycling, by rewarding citizens for their information and their involvement in environmental protection actions. The award is rewarded with points redeemed for local business products / services rebates and rebates in order to benefit citizens by enhancing the local economy and society in this way.

Best practices of waste management in Greece

- ▶ **Kozani is pioneering in the management of domestic organic waste (10.10.2017)**
 - Following the highly successful pilot application and the particularly encouraging results, the Municipality of Kozani and the Waste Management of Western Macedonia / DYDIMA extend the sorter program to the bio-waste source in another 250 households of households and / or health care stores until 31/12/2018.
 - The program concerns the extension of the recycling program for the 4 packaging materials (paper, plastic, aluminum and glass) and the installation of a coffee bin for the sorting of household bio-waste at source.
 - To date, more than 13 tonnes of separately collected bio-waste have been composted while about 2 tonnes of compost have been produced.
 - The goal is for the bio-waste collection network to be extended throughout the city.

Best practices of waste management in Greece

- ▶ **WASTE4THINK in Halandri**
 - The Municipality of Halandri, in collaboration with the National Technical University of Athens, implements a pilot program for the collection of domestic fermentable refuse. This initiative is being implemented under the European Waste4Think, HORIZON 2020 program, involving four European cities (Halandri, Cascais Portugal, Zamudio Spain, Seveso, Italy).

Best practices of waste management in Greece

► Pay as you throw - PAYT" (Greece, Germany, Estonia, Cyprus)

- In January 2009, the European LIFE - Environment Program was launched, entitled "Developing the Payment System as I Drive to Greece, Estonia and Cyprus", which is co-funded by the European Union of 48.5%. It is implemented by partners from four European countries (Greece, Germany, Estonia, Cyprus) and completed in December 2011.
- This is a 30-month program implemented by six actors from four EU member states. with the main contractor of the Municipality of Elefsina and partners from Greece, Estonia, Cyprus and Germany.
- Its total budget was € 1,357,953 and was funded by 48.5% from the European Union, 16.5% from the contractor and 35% from the partners.
- Description of the program: <http://www.payt.gr/>
- [Update: The "pay as I go" principle is included in the new recycling law (November 2017) and from 2020 onwards it is foreseen that citizens will be able to pay municipal fees depending on the waste they will fly, "They pay what they throw"

SAFE WASTE CYCLE

Recycling of organic waste and green entrepreneurship in the urban web to secure public health

- ▶ The project was implemented within the framework of IPA Cross Border Programme Greece-The former Yugoslav Republic of Macedonia and had partners The Municipality of Thessaloniki, the Aristotle University and the Municipality of Struga
- ▶ The overall objective of the project is the organization of a network for recycling organic waste from enterprises of the urban fabric in the Municipalities of Thessaloniki (Greece) and Struga (FYROM) which will enable citizens to actively contribute to an alternative waste management system and ensure the protection of public health and environment

SAFE WASTE CYCLE

Recycling of organic waste and green entrepreneurship in the urban web to secure public health

Objectives of the project

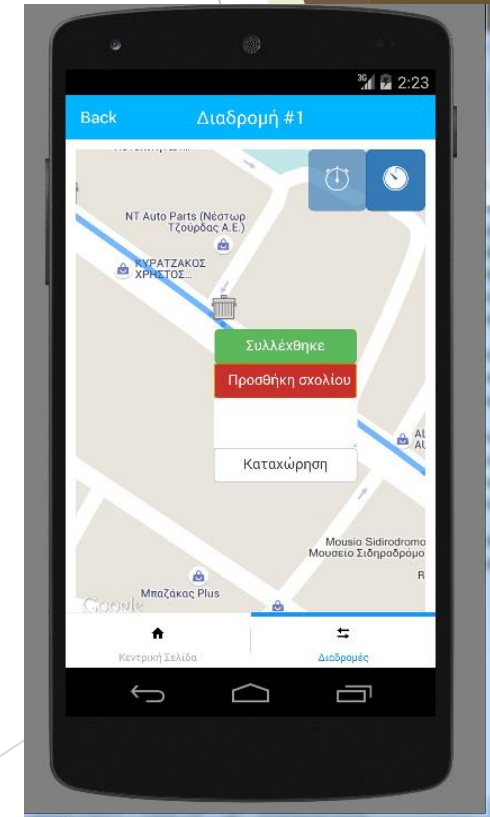
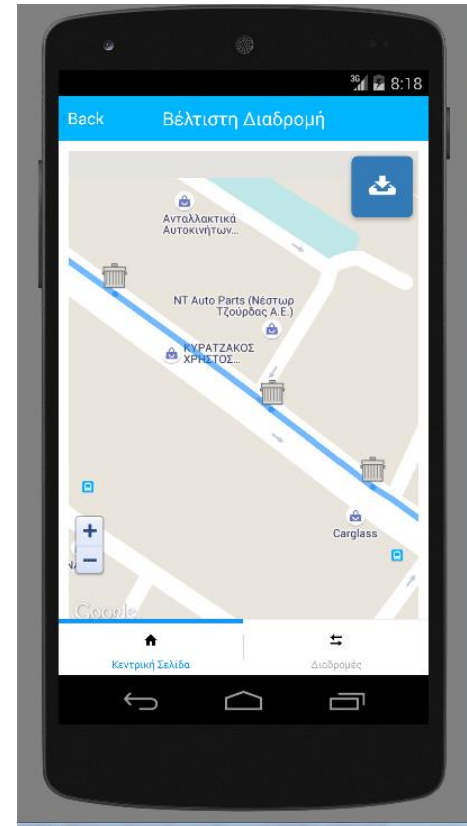
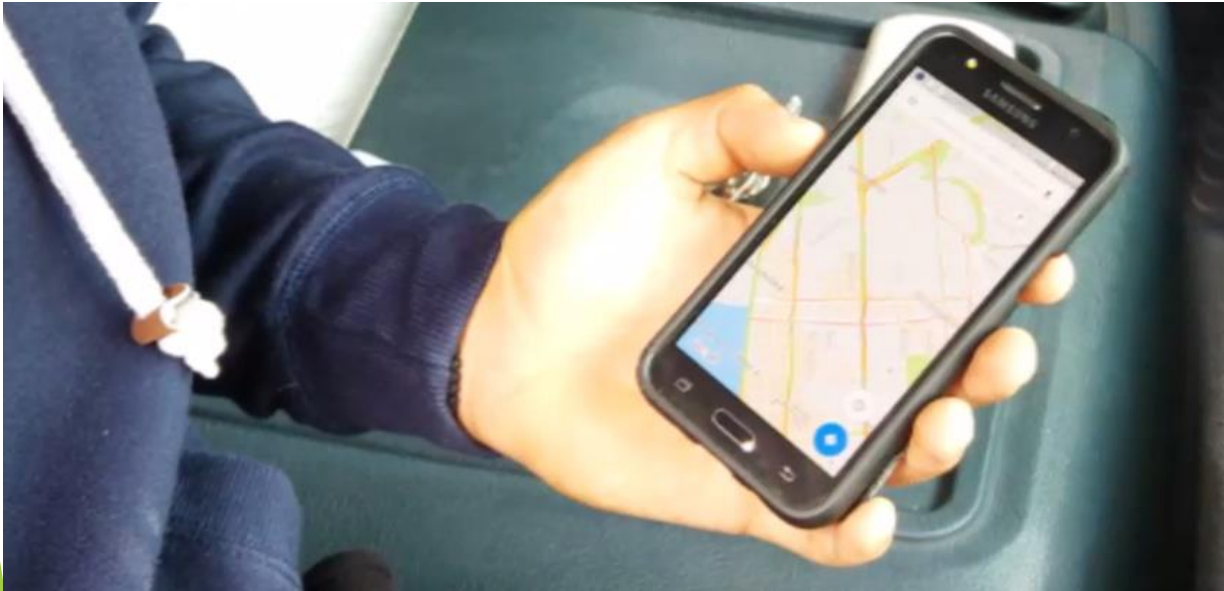
- ▶ Collection of organic wastes from Restaurants of the Municipality of Thessaloniki
- ▶ Composting of organic waste
- ▶ Use of compost produced in green areas and Nurseries of the Municipality
- ▶ Reducing the amount of biodegradable organic waste destined for burial [Harmonization with Directive 1999/31 / EC]
- ▶ Best management practices in collection, treatment and re-use of organic waste
- ▶ Development of common standards for organic waste collection methodology
- ▶ Promoting the cyclical economy in the municipality

SAFE WASTE CYCLE

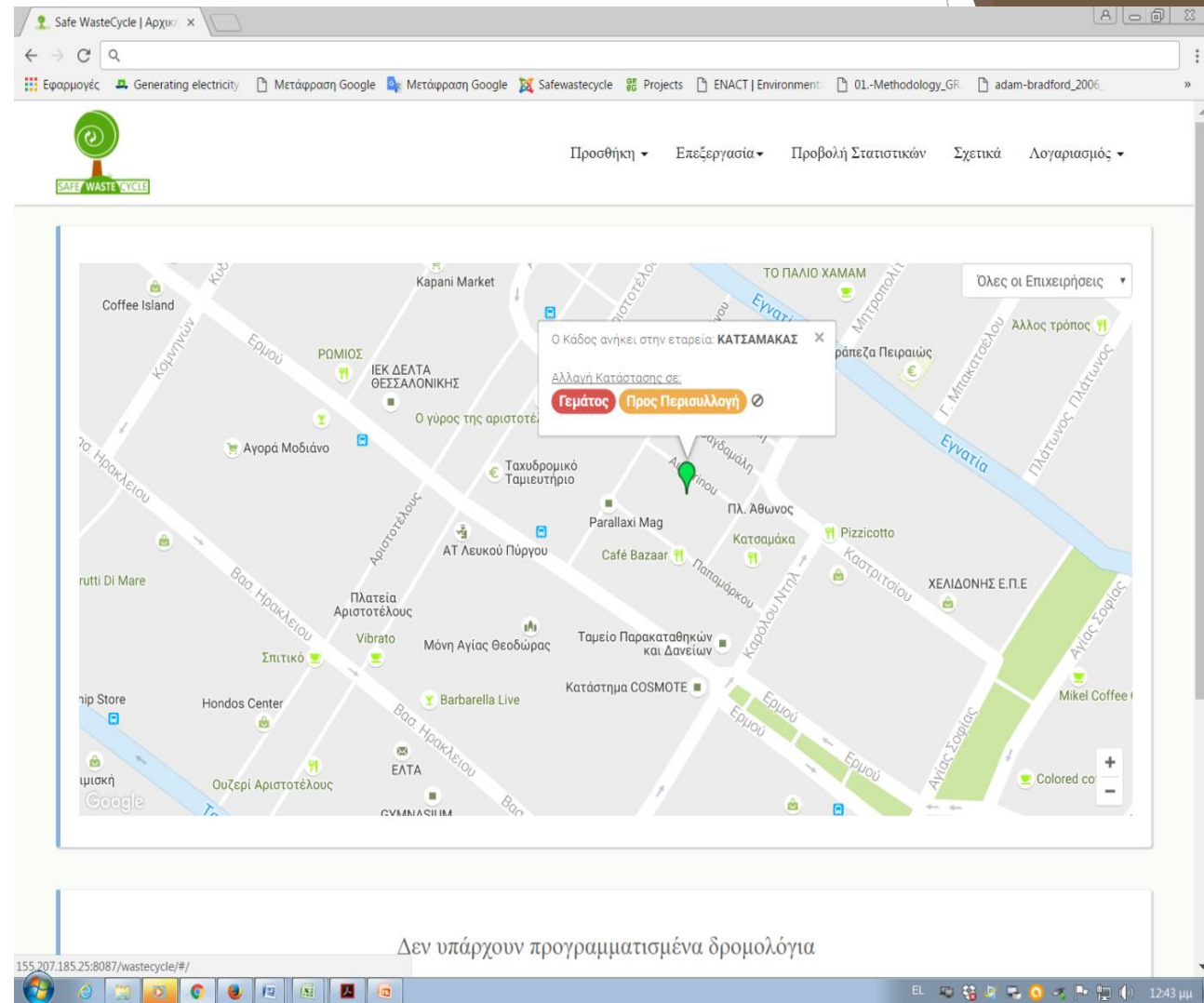
- ▶ Installation of pre-compost bins in different urban food halls
- ▶ Use of innovative e-tools for optimal routing & harvesting
- ▶ Collection of the pre-compost bins with the organic material at least every two days using a best routing tool




Mobile Application which is available through Android and shows the carrier the best routes for harvesting waste from businesses



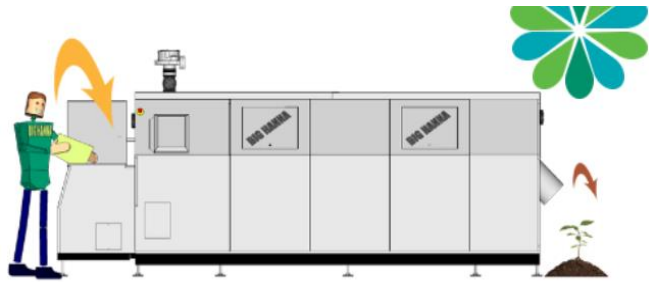
Desktop Application in which each business declares that the bins is ready for collection (full) and this is seen by the carrier from the mobile application



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- Distribution of special organic waste collection bins
 - Collection of organic waste
 - Same day transfer to composting station

Composting of organic material

► Composting of organic materials



- Capacity of composting 300-500kg/week
- Chemical and spectral analyses of various quality parameters (organic C, total N, C/N ratio, etc) in several stages of the process of compost production.
- Additional material (macroalgae, additional material full of N etc.) may be added to the composter.
- A secondary treatment of compost by earthworms.

Treatment of organic waste for compost production



A photograph of an industrial facility for organic waste processing. In the foreground, a large, tilted metal hopper is filled with brown, fibrous organic waste. Above it, a red plastic container is being emptied into the hopper. The background shows a complex structure of metal beams, pipes, and ventilation grates, typical of a large-scale industrial or municipal waste treatment plant.

Quality control and pretreatment of incoming organic waste

Control and systematic monitoring of abiotic and biotic parameters during composting



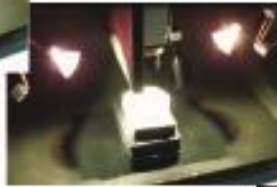
A person's hands are holding a black smartphone in front of industrial machinery. The phone screen displays a software interface for a 'Decagon STE' sensor, showing measurement options for Humidity, Electrical Conductivity, and Temperature. The background features a control panel with 'ROTOR 1' and 'ROTOR 2' knobs, and a large metal structure with a yellow and black striped safety warning. A yellow bar is visible at the bottom right of the image.

in situ
using innovative Control and Decision Software



... and laboratory
with stoichiometric analyzes

Create libraries of spectral signatures of compost produced for quality control and evaluation



Expected results

- Development of a common control protocol for the process of composting organic waste
- Production of compost type A according to the criteria and the specifications for the Ecolabel certificate of the European Union, for the needs of the Municipality of Thessaloniki



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