# “Integrated Green Spots” for Household Hazardous Waste Disposal

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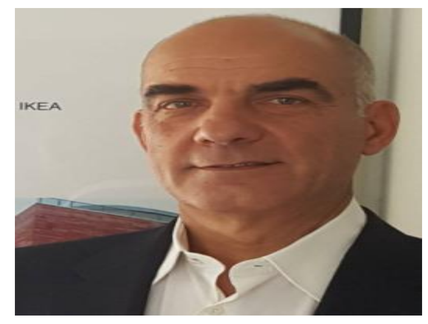


## Introduction

The management of household hazardous waste (**HHW**) has been a prominent issue in the European waste management community due to the lack of specific legislation. Currently in the EU, only a selective number of countries have created an optimal concept for the collection of HHW. This poster presents and explores an efficient and innovative HHW collection and management concept, focusing on separation at source and efficient disposal, as well as the facilitation of proper waste disposal by residents.


Figure 1: Model container for HHW and asbestos

Figure 2: Asbestos platten bags

Figure 3: Paints Barrel

## IGS Benefits

- Directly accessible to residents.
- Separation at source
- Payments method
- Use of expertise of hazardous waste management company
- Facilitation of collection and, subsequently, disposal
- HHW collection & disposal monitoring
- Asbestos contamination mitigation
- Legal and efficient HHW disposal

## HHW in Greece

It has been estimated that over a period of 2 years, an average Greek household accumulates hazardous waste and contaminated packages of 40-liters. Due to the volume of HHW that is accumulated, it becomes clear that this issue should be combated through the establishment of designated drop-off points for proper HHW handling, to which citizens have immediate access.

On 23.07.2021, **Greek Law 4819** was passed, delegating municipalities responsible for the handling and short-term storage of HHW. Article 46 of law 4819 states that municipalities must provide a designated area for residents to deliver their HHW, as well as asbestos-contaminated material.

Article 46 also notes that should the municipality have a designated recycling area, HHW collection should be integrated within that area. In cooperation with licensed certified companies, municipalities will be able to forward HHW for management and proper disposal. In order to implement this law, we explore the methodology behind the creation of the “Integrated Green Spots” innovative concept in each municipality, for the collection, sorting and disposal of HHW and recyclable waste in a safe and easy manner.

## Integrated Green Spots

The Integrated Green Spots (**IGS**) concept uses the new law as a backbone and is based on the idea that every citizen will be able to deliver HHW in appropriate packaging, and engage in the financial transaction predicted by the law.

**The IGS, therefore, are gated designated disposal areas, which:**

- Feature correct disposal barrels and bins for HHW and recyclables
- Feature a weighing scale and smart screen for residents to calculate cost of disposal.
- Feature an automated payments system
- Separate HHW upon collection
- Are sufficiently protected and secured to reduce risk of accidents
- Feature proper labelling
- Are compliant with EU and Greek laws.
- Cargo loading area

In the IGS, municipal employees who receive appropriate training can supervise the procedures, payments and proper storage of HHW.

**Post-collection HHW will be transported by a licensed company for proper disposal.**

## Types of HHW

The HHW that enters the IGS will be classified based on EWC codes, in order to place the appropriate disposal bins and platten bags (i.e. asbestos packing) in the IGS, as well as to ensure compliance with Greek and European waste management laws. More specifically, we separate HHW into sixteen (16) categories, each of which will have a separate designated packings to be disposed in (see **Table 1**). Our categories do not include HHW which is infectious, radioactive, or explosive.

| | |
|---|---|
| **Asbestos (chrysotile)** | **EWC 170605* (asbestos cement)** |
| **Asbestos (amosite, tremolite, actinolite, anthophyllite, crocidolite)** | EWC 170605* (asbestos cement) |
| **Paints (flammable, corrosive)** | EWC 080111* |
| **Pesticides, herbicides, insecticides and their packaging** | EWC 160305* for pesticides, herbicides, insecticides and EWC 150110* for contaminated packaging ONLY if empty |
| **Paint thinners, paint solvents, varnishes and polishes, oil paints and their packaging** | EWC 16 03 05* for pesticides, herbicides, insecticides and EWC 150110* for contaminated packaging ONLY if empty |
| **Nail polishes** | EWC 160305* |
| **Packaging of chemicals for swimming pools, bathroom and floor cleaners** | EWC 150110* for EMPTY contaminated packaging |
| **Aerosol sprays, technical Spray** | EWC 160305* |
| **Ink cartridges** | EWC 080317* |
| **Pesticides** | EWC 20 01 17* |
| **Batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries 20 01 34 batteries and accumulators other than those mentioned in 20 01 33** | EWC 20 01 33* |
| **Wood containing hazardous substances** | EWC 20 01 37* |
| **Paint, inks, adhesives and resins containing hazardous substances** | EWC 20 01 27* |
| **Paint, inks, adhesives and resins other than those mentioned in 20 01 27** | EWC 20 01 28* |
| **Gases in pressure containers (including halons) containing hazardous substances** | EWC 16 05 04* |
| **Gases in pressure containers other than those mentioned in 16 05 04** | EWC 16 05 05* |

Table 1: HHW Categories and Respective EWC Codes

## Conclusion

According to existing research on HHW, it is evident that there is currently no designated point for HHW storage and the benefits of its creation are notable. The study concludes that the imposition of this concept to municipality will aid cross-contamination elimination and sewage pollution, while facilitating the process of HHW handling and facilitating access to residents. Through the consideration of benefits and alternative systems, we conclude that the IGS system provides an ideal solution in the Greek legal context and this paper can be used as a guide by municipalities for the creation of IGS. Finally, we conclude that among the alternatives, the IGS ensure separation at source, minimizing risks of contamination and securing lawful disposal. Lastly, the study concludes on the most appropriate classification method of the waste, which based on European and Greek hazardous waste legislation.