Preliminary estimation of WEEE generation in Greece based on the population balance model

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Abstract: The recast European Union Directive on Waste of Electrical and Electronic Equipment (WEEE) requires Member – States to collect 65% of the Electrical and Electronic Equipment (EEE) or the 85% of WEEE generated, by 2019. However, still there is not an established, universally accepted method for the calculation of the quantity of WEEE produced. Most available estimates make use of models based on the EEE put on the market and the lifespan distribution of different categories of EEE, i.e. the statistical distribution of the time required for EEE items in each category to become waste. However, this lifespan distribution will vary over space and time, as differences in purchasing power and consumption habits will result in differences in the replacement time of the various EEE goods.

This preliminary study makes a first attempt to define the lifespan statistics for Greek households, thus refining the results of such population balance models, through the use of a questionnaire study. More specifically, the aim of this study is to estimate the amount WEEE that are and will be generated in Greek households within the next two decades. The estimation is based on the EEE put on the market, a detailed questionnaire-based study, and the lifespan distribution of EEE. This paper presents the design and preliminary results of a 50-questionnaires study. In the next step, the study will be expanded to more than 1,000 Greek households.

Keywords: WEEE, lifespan distribution, Greek distribution

1. Introduction

The amounts of collected Waste Electrical and Electronic Equipment (WEEE) vary widely throughout European Union Member States (Friege et al., 2015). In 2002, the EU Directive on WEEE (Directive 2002/96/EU) defined the collection and recovery targets to (at least) 4 kg per inhabitant per year. The recast Directive on WEEE (Directive 2012/19/EU), redefined the collections targets, introducing a percentage-based approach, based on the "put on the market" or WEEE generated amounts. The Directive 2012/19/EU requires Member – States to collect 65% of the Electrical and Electronic Equipment (EEE) or the 85% of WEEE generated, by 2019.

The implementation of the recast Directive on WEEE prerequisites the establishment of a common method for the calculation of WEEE quantities. Such a (universally accepted) method has not established as yet.

In the last two decades, several statistical models have been employed in order to calculate the amount of EEE put on the market and the generated WEEE (Huisman, 2013; Kim et al., 2013; TemaNord, 2009). Most available estimates make use of models based on the EEE put on the market and the lifespan distribution of different categories of EEE, i.e. the statistical distribution of the time required for EEE items in each category to become waste. However, this lifespan distribution will vary over space and time, as differences in purchasing power and consumption habits will result in differences in the replacement time of the various EEE goods. In order to improve these estimations models, the conduction of surveys on household level is deemed crucial.

1.1. The scope of the study

This preliminary study aims to define the lifespan statistics for Greek households, thus refining the results of population balance models, through the use of a questionnaire study. More specifically, this study attempts to estimate the amount WEEE that are and will be generated in Greek households within the next two decades. The estimation is based on the EEE put on the market, a detailed questionnaire-based study, and the lifespan distribution of EEE.

2. Methodology

The estimation of generated WEEE amounts is based on the EEE put on the market, a detailed questionnaire-based study, and the lifespan distribution of EEE. The questionnaire was targeted to Greek between the age of 18 and 80, and distributed to 50 households inviting them to participate with a front page which explained the purpose of the study. In the next step, the study will be expanded to more than 1,000 Greek households. In order to get comparable results, the UNU-keys (Balde et al., 2015) were utilized for the classification of the EEE.

3. Preliminary results

Through the questionnaire, information on the following categories were extracted: Size of EEE stock per household (including both EEE in use and EEE stored), estimated age of the stock, condition of EEE stock, percentage of repaired EEE, intention to recycle/reuse vs behavior towards WEEE recycling/reuse.

The analysis of the questionnaires showed that the average amount of EEE (lamps are excluded) in Greek households is 85 items. The figure is in agreement with the findings of Huisman (2013), regarding the EEE stock in Belgian households. However, the age distribution of EEE in Greek households is expected to differ from the one in the EU Member States of North Europe, due to the economic recession in Greece and the subsequent decrease on the put on the market (from 2009 on). As a result, the lifespan of EEE stock is expected to expand as consumers choose to repair them.

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