

# Challenges in applying extended producer responsibility policies in developing countries: A case study in e-waste management in Serbia

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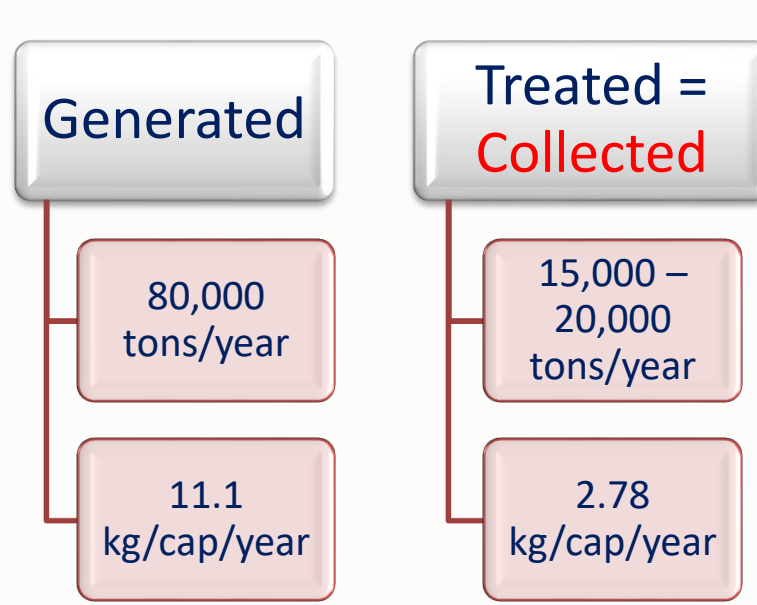
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## INTRODUCTION

The consumption of electrical and electronic products has become an essential human need in developed societies, while waste from electrical and electronic equipment (WEEE) is one of the fastest-growing waste streams. Record quantities of generated waste equipment (e-waste) and its potentially hazardous nature sheds light on several challenges that governments need to overcome in planning and implementing procedures to meet the requirements imposed by European Union (EU) legislation. This paper identifies the main shortcomings and explores the possibilities for the implementation of an adequate e-waste collection system in Serbia by adopting the main principles of good practice applied in developed EU countries. The concept of Extended Producer Responsibility (EPR) was first formally introduced in the 1990s, and today is one of the main principles on which the EU Directive on waste electrical and electronic equipment is based. This study features examples of EPR policy-making and explains the underlying of two commonly used EPR systems designs, the first with a cooperative approach and the second with a competitive one. One of the main aspects that the WEEE directive does not directly address is who exactly is responsible, for financing and collecting WEEE from private households. Regarding physical responsibility, the Directive does not explicitly identify who should be responsible for setting up the infrastructure. Concerning financial responsibility, the Directive indicates that producers are financially responsible for "at least" the collection from collection points onwards, leaving a room for extending the producer responsibility to finance collection from households.

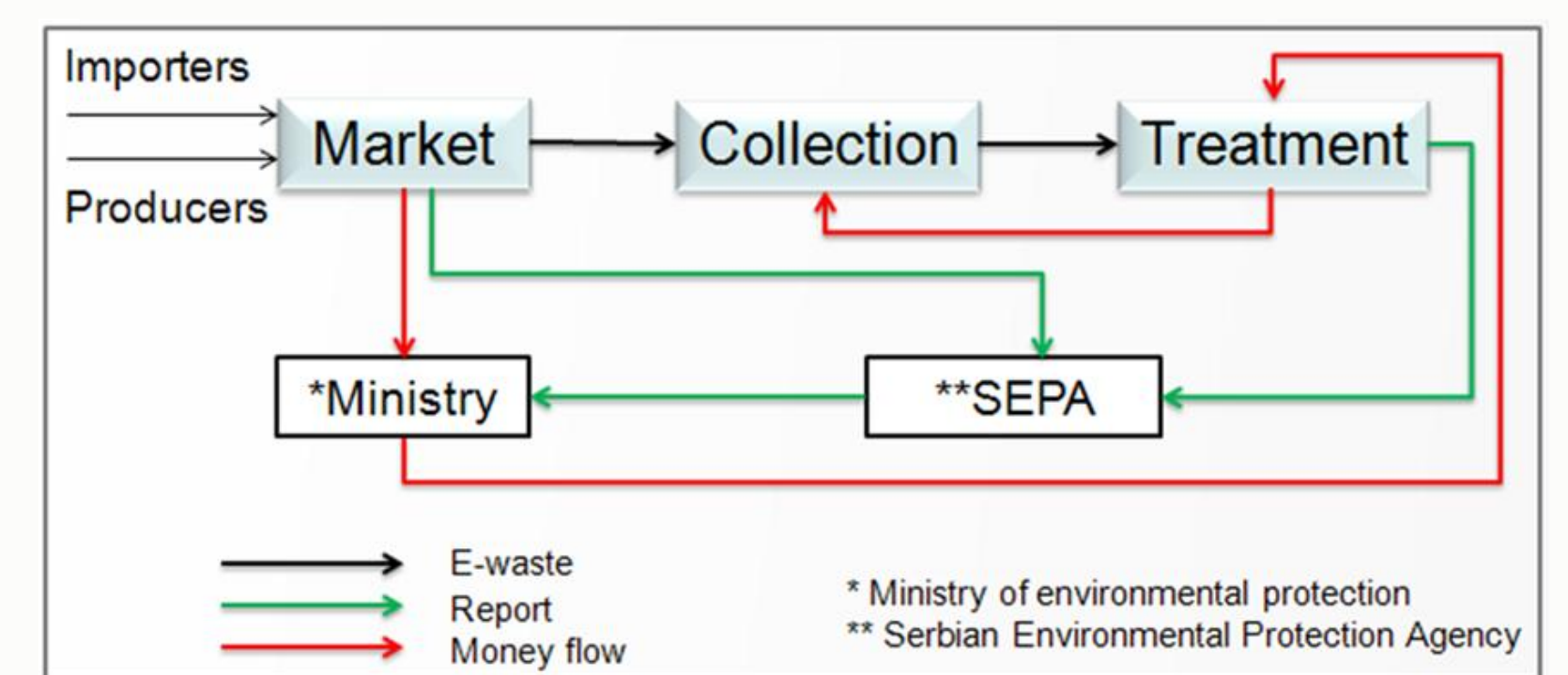
### Availability of data regarding WEEE management in Serbia

- The Republic of Serbia is in the process of approximating its environmental legislation with the EU acquis.
- Serbia has 248 obligations defined by the WEEE Directive, 115 fully transposed, 30 partially transposed, and 103 have yet to be transposed.
- E-waste is disposed mixed with MSW on landfills.
- Companies that perform treatment and recycling of WEEE, directly or through intermediaries, have the role of e-waste collectors.
- There is no regular system of collecting WEEE from households and small businesses.
- Municipalities do not provide collection facilities for separate waste collection from households.
- The informal waste collection sector provide pick-up services from households.



The detailed reporting requirements on the amount of WEEE collected from private households have not been transposed. There is no national register for waste electrical and electronic equipment, necessary for the adequate installation of EPR systems.

The current situation in the e-waste management system in Serbia does not follow any compliance scheme to meet the objectives of the EPR principle, and the legislation strives for a competitive system where SEPA will be the main managing body for registration and reporting, while MEP funds through the Green Fund.



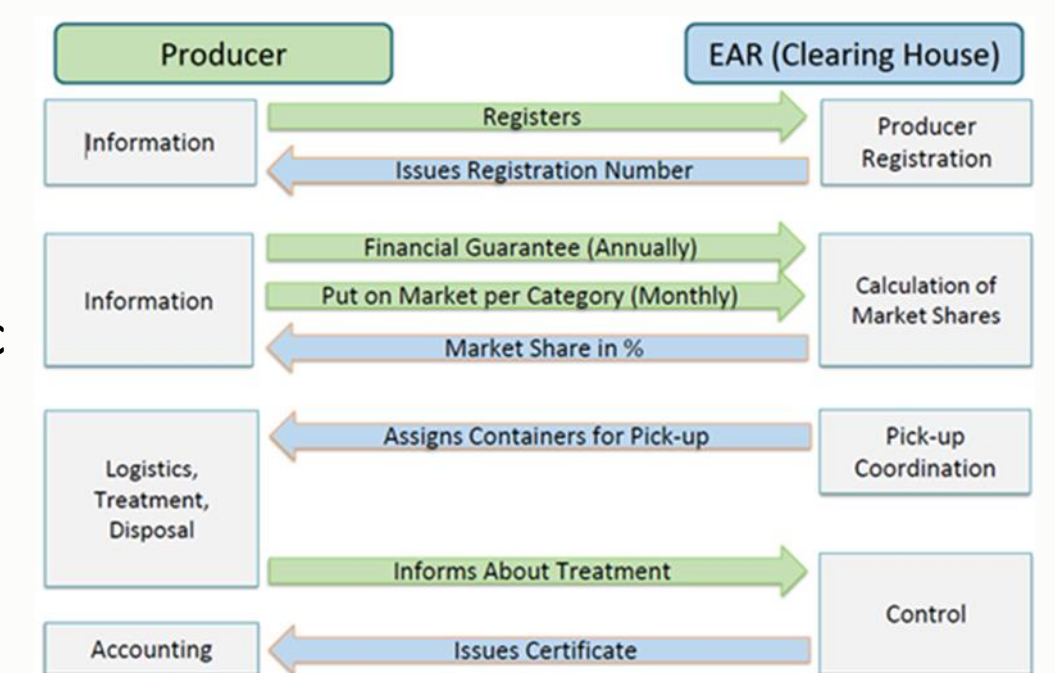
### Sweden as a representative case of a compliance system with a cooperative approach

- The cooperative approach does not require a common body.
- Manufacturer organization (= system provider) manages the collection and recovery itself or uses a subsidiary.
- El-Kretsen is a nationally recognized collection system that works with 290 municipalities in Sweden.
- Electric and electronic appliances are registered by the Swedish Environmental Agency – Naturvårdsverket.
- El-Kretsen is the only compliance scheme operating and it has exclusive access to municipal collection sites.



### Germany as a representative case of a compliance system with a competitive approach

- Several service providers operate and compete;
- Electronics industry founded a private regulatory authority (EAR foundation act as a registration body and clearing house)
- Registers the producers of electrical and electronic equipment and coordinates the provision of containers and the pick up of electrical and electronic waste equipment at the öRE (public waste disposal authorities)



## RESULTS AND DISCUSSION

The following table shows the key differences between the approaches in e-waste management implemented in Germany, Sweden, and Serbia.

Table 1. Comparison of the framework important for WEEE collection

	Registration of EEE	Compliance scheme	Collecting from households	Responsible for financing of collection	Responsible for financing of recycling	Method of financing	Collection on a 1:1 basis	Control of results
Sweden	Env. Agency	El-Kretsen (only one collection system)	Municipalities	Producers/importers	Producers/importers	Product-specific fees	Not required	Env. Agency
Germany	EAR	EAR (Multiple collection systems)	Municipalities	Municipalities	Producers/importers	Market share	Not required	Federal Env. Agency
Serbia	Env. Agency	There is none	Informal sector and occasionally collection and recycling companies	Producers/importers	Producers/importers	Product-specific fees	Required	MEP

In the competitive approach, due to the own logistics of each producer, increased logistics effort is required.

In the cooperative approach, the logistics are carried out via one producer's organization and thus leading to optimization in logistics and reducing the costs of collection.

The competition in the competitive approach results in a constantly changing market for suppliers of collection systems and disposal companies. This leads to an increase in actors and a lack of transparency in the collection chain.

Collecting systems with the highest level of transparency can advantageously influence the collection of WEEE and the exchange of experience between manufacturers and disposal companies leads to the ongoing optimization of the collection system.

Cooperative approach, can be rated as the most cost-efficient system.

The disadvantage in a cooperative system is its lack of competitive impact.

Table 2. Main variables used to compare different collection schemes

Variables	Cooperative approach	Competitive approach
Logistics efficiency	High	Low
Level of complexity	Low	High
Impartiality	Absent	Present
Level of Competition between schemes	Absent	High
The overall effectiveness of the collecting system	High	Low
Economies of Scale	Yes	No

## CONCLUSION

The adoption of the WEEE Directive in Serbia underlined a weak political capacity and inadequate technical expertise to understand the complexity of the policy. Serbia, as a developing country, when transposing the WEEE Directive, should harmonize its national WEEE regulations with existing policy instruments and norms, which would ensure greater cooperation between different entities and available infrastructures. However, there is a lack of some essential provisions necessary for establishing a functioning WEEE management system in Serbia. Inadequate implementation of adopted legislation and partially adopted or omitted key parts of the WEEE Directive, which relate to the implementation of the EPR, have resulted in a limited collection outcome. Strong coordination of EPR and waste policy is needed to implement an adequate e-waste management system. In the first place, it is necessary to establish a national register for waste electrical and electronic equipment by the WEEE Directive, responsible for the coordination of money, information and material flows through the system. Based on a previous analysis of different e-waste collection systems, it is concluded that municipalities have a key role in e-waste collection from households. According to examples of good practices from developed EU countries, municipalities must collect household waste, but no obligation to establish collection infrastructure. Since e-waste collection from households is performed by municipalities, i.e. public services it is necessary to clearly define their role in the national legislation.

Key learnings from the analysis of current implementation practice are summarized in policy design recommendations that guide the development of a better e-waste management system in Serbia:

