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Review

Exploring e-waste management systems in the United States

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Abstract

Quantities of end-of-life electronics (or e-waste) around the world keep growing. More than 1.36 million metric tons of e-waste were discarded, mainly in landfills, in the U.S. in 2005, and e-waste is projected to grow in the next few years. This paper explores issues relating to planning future e-waste regulation and management systems in the U.S. It begins by reviewing the existing U.S. recycling systems in the U.S. to establish the importance of developing public responses. Other countries and regions around the world have already legislated and implemented electronic takeback and recycling systems. To establish the context of existing experience, e-waste management systems in the European Union, Japan, South Korea and Taiwan are explored. The paper then discusses what specific conditions are expected to influence the acceptability and implementation in the U.S. A key consideration is the cultural imperative in the U.S. for market-driven solutions that enable competition. Given this context, a solution is proposed that is designed to ensure a proper end-of-life option while at the same time

proposed that is designed to ensure a proper end-of-life option while at the same time establishing a competitive market for reuse and recycling services. The solution, termed *e-Market for Returned Deposit*, begins with a deposit paid by consumers to sellers at the time of purchase, electronically registered and tracked via a radio-frequency identification device (RFID) placed on the product. At end-of-life, consumers consult an Internet-enabled market in which firms compete to receive the deposit by offering consumers variable degrees of return on the deposit. After collection of the computer by the selected firm, the cyberinfrastructure utilizes the RFID to transfer the deposit to the winning firm when recycled. If the firm chooses to refurbish or resell the computer in lieu of recycling, the transfer is deferred until true end-of-life processing. Finally the paper discusses the domestic and international consequences of the implementation of the proposed design.



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Keywords

E-waste; Collection; Recycling; Reuse; Takeback; Earth system engineering and management; Deposit-refund

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