

Technology Brief

WASTE CHARACTERIZATION PROFILE OF THE ELECTRONICS INDUSTRY

The U.S. Congress' Office of Technology Assessment has cited lack of information on industrial wastes as a major systemic problem for solid waste management and the development of new recovery and recycling options. This technology brief reports the results of a study to develop a profile of waste generated in the electronics industry as a means of identifying opportunities for the recovery and recycling of industrial by-products. The project participants, members of the Washington State Chapter of the American Electronics Association, are looking for ways to improve their recycling programs and saw the study as an opportunity to help them in their efforts.

Study Methodology

Ten Washington companies, representing a broad range of electronics manufacturing operations, participated in the study. Three techniques were used to collect data: a dumpster sort, a series of sorts of by-product collected over a week-long period from individual process areas, and an on-site survey. In a dumpster sort, the contents of a facility's dumpster or compactor were systematically sorted according to predetermined material categories and weighed. For the process area sorts, temporary receptacles were placed to capture all of the by-product (waste and recyclables) associated with defined processes. The survey provided information on current recycling and reuse practices. The data were then aggregated to provide an industry profile of materials generated, recycled, and disposed.

Findings

Table 1, on the reverse side of this fact sheet, lists the major types of discarded waste found in the dumpster sorts. Over 40% of the disposed material consisted of packaging waste

Key Words

Materials: Industrial by-products; paper and plastic packaging.

Market Goals: Identify recovery and recycling opportunities for electronics industry by-products.

Abstract: Results of study to characterize by-products typical of electronics industry.

ranging from cardboard boxes to plastic bubble wrap. Three of the six waste categories listed in Table 1 are readily recyclable, that is, a well-developed collection infrastructure and markets exist for these materials. In the cases of plastic film and food wastes, recycling services currently are very limited. A coordinated effort between recycling services and interested manufacturers could help to spur the development of the necessary infrastructure to make recycling of these materials wide-scale and cost-effective.

The final major waste category, plastics combined with other materials, are product discards from which precious metals are sometimes recovered but their materials complexity hampers full-scale recycling. Table 2 presents the process area sort findings. On a volume basis, plastics molding and cutting operations generated the largest quantity of disposed by-product, followed by shipping and receiving. On a generation rate basis, (where generation equals the volume of materials disposed, recycled, and reused), the metals milling process area produced the most by-product, followed by the plastics cutting/molding area. Note that these figures represent the average for the companies participating. Each company participated in only six of the nine possible area sorts, whereas all companies participated in the dumpster sorts.

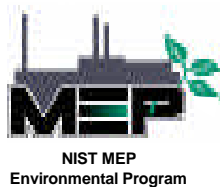


Table 1: Largest Components of the Electronics Industry Waste Stream

Component Category	% of Waste Stream	Ease of Recycling
Low Grade Recyclable Paper	20.4%	Readily Recyclable
OCC/Kraft (Cardboard)	18.4%	Readily Recyclable
Plastic Film and Bags	9.8%	Infrastructure Being Developed
Food Wastes	7.3%	Infrastructure Being Developed
Plastic Combined with Other Materials	6.1%	Difficult to Recycle
High Grade Printing Paper	6.0%	Readily Recyclable

Table 2: Disposal Volumes and By-Product Generation Rates by Process Area

Process Area	Weekly Disposal (lbs./wk)	Generation Rate (lbs./wk/employee)	Most Prevalent Material
Plastics Molding/Cutting	320	1.22	Plastic Scrap
Shipping and Receiving	93	0.91	Cardboard
Circuit Board Assembly	92	0.53	Non-recyclable Paper
Metals Milling	73	2.79	Non-recyclable Paper
Sub/final Assembly	71	1.06	Cardboard
Surface Mount	69	0.39	Plastic Reels
Transformers/Magnetics	39	0.38	Cardboard
Soldering Operations	9	0.04	Paper Towels/Tissues
Coating and Potting	5	0.03	Miscellaneous Metals

Recovery and Recycling Practices

The survey of current practices found that:

- Payment for recyclables motivates recovery.
- Source separation at the point of generation results in higher diversion levels.
- Clearly marked containers generate higher volumes and less contamination.
- Packaging specifications decrease discards.
- Sharing disposal and recycling cost and quantity information motivates employees.
- Just-in-time delivery and change orders contribute to increased packaging waste.
- Space limitations affect recovery levels.
- Selection of a recycling service provider affects recycling rates.
- Interest in reusable shipping containers and packaging material was high.

Conclusions

Electronics manufacturers have already realized the benefits of recycling but many could do more to maximize their cost savings. Packaging wastes present the greatest opportunity to increase recycling in the industry. The manufacturing processes themselves generate relatively little by-product, possibly reflecting an emphasis on scrap reduction in the industry, but key opportunities exist for recovery and recycling of select by-products, such as plastics scrap.

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For More Information

For a copy of the report, *Waste Characterization Profile of the Electronics Industry*, use the CWC Publication Order Form or call (206) 443-7746. For more information call CWC at (206) 443-7746, email info@cw.org, or visit the CWC Internet Website at www.cw.org.

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