



## **WEPSI PROPOSED E-WASTE INFRASTRUCTURE STUDY**

### **BACKGROUND:**

WEPSI's policy/regulatory subgroup determined that an infrastructure study to determine the needs and the kinds of business models that work best was the necessary first step in designing an economic development project. WEPSI's reuse/recycling subgroup concluded that an infrastructure study was necessary for maximizing reuse options and determining how to improve the e-waste processing infrastructure in our region. The two groups have worked together to create this study proposal of the infrastructure for reuse and recycling of electronic hardware originating in the Pacific Northwest, as described below.

### **ELECTRONIC HARDWARE INCLUDED:**

Computer CPUs, monitors, peripherals and televisions,

### **PURPOSE OF STUDY:**

- Provide the base information necessary to make recommendations about infrastructure improvements needed to handle the defined e-waste stream within the study region. This includes steps from collection through processing, and identification of end markets
- Identify opportunities for development of local small businesses.
- Identify a system that maximizes reuse of this material (supporting reduce-reuse-recycle hierarchy).

### **OUTCOME OF STUDY:**

- A summary of existing services for the reuse and processing of this e-waste, including materials processed, current quantities, projected capacity, the products resulting from this processing, and their destination.
- A map of how and where the various product streams, originating from the study region's e-waste, are being processed
- An understanding of the end markets for the various recovered materials (plastics, metals, circuit boards, CRTs, etc.) from the Northwest.
- A recognition of the different types of business profiles that make up the infrastructure.
- A recommendation for improving the NW infrastructure.

### **GEOGRAPHIC FOCUS OF STUDY:**

- The study will include organizations that handle e-waste originating in Washington, Oregon, Idaho, and Alaska (EPA Region 10). Thus in cases where some part of the recycling process takes place at facilities outside of this region, those facilities will be included.

## **TASKS INCLUDE:**

1. Identify collectors, handlers, processors and end markets that fall within the stated geographic focus of study. Summarize existing research and fill in gaps as they are identified.
2. Collect sufficient data from organizations identified in task (1) in order to:
  - Identify materials streams accepted and activities performed, per attached “Key to Material Types” and “List of Hardware Reuse and Recycling Activities”.
  - Determine whether they have a mechanism to facilitate reuse.
  - Identify outgoing material streams per attached “Key to Material Types”, and whether these streams go to Northwestern U.S., Southwestern U.S., Mid-Western U.S., Eastern U.S., Canada, Mexico, or overseas.
  - Assess current capacity based on existing processing equipment and space.
  - Assess anticipated capacity increases in existing facilities, as well as barriers to capacity increase.
  - Assess whether they have some type of environmental management system in place.
3. Estimate existing regional capacity as accurately as possible, based on the above information.
4. Estimate regional capacity needed to meet future levels of e-waste generation.
5. Compare capacity needs with existing capacity. Determine what infrastructure pieces need to be expanded or added.
6. From the entities identified in task (1), define general business profiles. Analyze these for viability, effectiveness and need, such that they could provide models for proposals to expand the infrastructure. Include reuse/recycling operations outside of the study area, to the extent they provide additional business models that might be useful in our region.
7. Assess what new types of electronics items, materials and designs are on the horizon, and whether they can be reused/recycled within the existing infrastructure processing capabilities.
8. Make recommendations about how to fill the infrastructure needs identified in task (5).

## **ASSUMPTIONS:**

1. End market development is not part of this study.
2. Assessment of processors for environmentally sound recycling practices is not included with this study, except to determine whether they have an EMS in place.

## **LIST OF HARDWARE REUSE AND RECYCLING ACTIVITIES**

Each organization that we identify within the study region will be asked which activity(s) they perform. Activities will be identified with the following numbers.

1. Collection: Collect used electronics equipment from residences, small business, and large business. These could be both passive (i.e., drop-off site) and active collectors (take back programs, etc.).
2. Triage: Perform triage to identify equipment as dead, need to repair, or live.
3. Brokering: Move or facilitate movement of e-waste, as-is, from one party to another without processing it. This could include consolidation of like materials.
4. Reuse: Facilitate reuse of whole units or individual components via distribution, sales, and refurbishment.
5. Deconstruction: Break the intact units down into marketable components and materials, which might be reused or processed for recycling.
6. Shredding: Material streams are shredded to facilitate recycling
7. CRT densification
8. Glass to glass recycling
9. Smelting
10. Process plastics from electronics
11. Process metals from electronics
12. End Market: The commodity created in the recycling operation is used as a feedstock for a new, value-added product.
13. Incineration
14. Stockpiling
15. Landfill

## KEY TO MATERIAL TYPES

This list will be used to designate the material accepted by a handler or processor, as well as their outgoing product(s).

1. Whole computer systems
2. Whole TVs
3. CPUs
4. Whole monitors
5. Peripherals (identify)
6. CRTs with yoke
7. CRTs without yoke
8. 2" or larger broken CRT glass pieces
9. Crushed CRT glass
10. Circuit boards, populated, high-grade
11. Circuit boards, populated, low-grade
12. Circuit boards, stripped
13. Chips
14. Casings, metal
15. Casings, plastic
16. Plastics without visible BFR coating, bulk and shredded (identify resin types)
17. Plastics with visible BFR coating
18. Metals: ferrous, non-ferrous, with copper and mercury singled out (maybe)
19. Fluff ( mixed boards, wires, cables)

### RESOURCES THAT MIGHT BE OF USE:

- CIWMB baseline study
- Oregon DEQ studies on CRTs, CPUs and TVs done by Sound Resource Management
- Currently proposed Metro study
- WEPSI's list of reuse/recycling businesses
- Electronic Product Recovery and Recycling Baseline Report, NSC
- Northeast Recycling Council Collection Survey, 2001
- Best Buy collection event report
- Oregon State Waste Characterization Study
- Florida's Strategy for the Management of End of Life CRTs, Computers and Other Electronic Equipment, 1999