



WASHINGTON STATE  
DEPARTMENT OF  
E C O L O G Y

# **Implementing and Financing an Electronic Product Collection, Recycling, and Reuse Program in Washington State**

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## **Interim Report to the Legislature ESHB 2488**

December 2004  
Publication No. 05-07-002

Department of Ecology  
Solid Waste and Financial Assistance Program

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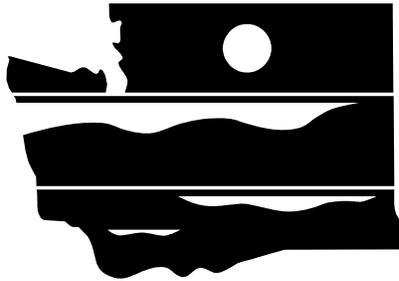
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# **Abstract**

This is the first report to the legislature related to electronic product reuse and recycling. It is an interim report. A complete report containing the recommendations requested will be submitted to the legislature in December 2005. This report provides basic information and background related to the problems associated with end of life management of electronic products and a description of the process being used by Ecology to complete the project.







# Introduction

The information presented herein is that which has been gathered by the Department of Ecology to satisfy its responsibilities identified in ESHB 2488 by the Washington State Legislature. As the process unfolds, discovery of new information may occur. The information will be adjusted accordingly.

This is the first report to the legislature related to electronic product reuse and recycling. It is an interim report. A complete report containing the recommendations requested will be submitted to the legislature in December 2005. This report provides basic information and background related to the problems associated with end of life management of electronic products and a description of the process being used by Ecology to complete the project. The facilitator's interim report is contained in Appendix A.

Ecology retained the services of Agreement Dynamics of Seattle, Washington to facilitate the stakeholder process. We have held one meeting of the stakeholders, now serving the state on the state Solid Waste Advisory Committee, Sub-committee on Electronic Products. The sub-committee represents those stakeholders identified in ESHB 2488. Ecology has also established a Technical Team to assist in research and gather best available data in order to create a solid foundation upon which the recommendation will be built.

There are many factors influencing the systems that exist and are necessary to create an effective electronic product reuse and recycling program for Washington State. Some of those factors are well within the control of state and local governments. Other factors, while not under the control of the governments of Washington, can be within their influence. These factors include federal tax and trade issues. Over the next year, as well as evaluating projects and programs that are currently in operation, developing recommendations for needed infrastructure and identifying effective financing mechanisms, we hope to take a look at functional barriers to successful programs and provide recommendations for correction of those barriers.

Covered electronic products did not exist twenty-five years ago, in the form we know of them today. The IBM PC was introduced to consumers in 1982. Since that time, the composition of disposed waste has changed. As computers and other electronic products have been introduced, they have become a greater portion of disposed waste. Based on sales and use data, this portion of the disposed waste will only increase, using the current systems and infrastructure in place today.

Ecology agrees with the legislature that a system for management of end of life electronic products is necessary in order to assure long term environmental health, conservative use of natural resources and economical reuse and recycling of this equipment. We remain hopeful that this process will bare effective recommendations for the legislature to consider that will create the best "deal" for the citizens of the State of Washington.

# Background

## What are electronic products?

We are surrounded by electronic products today. Electronic products have their primary functions provided by electronics circuitry and components such as integrated circuits, transistors, diodes, resistors, capacitors, inductors, cathode ray tubes (CRTs), liquid crystal displays (LCDs), lasers, sensors and “electronics packaging” (e.g., printed circuit boards, connectors).

The many types of electronics equipment can be categorized by primary functional groups, (see table 1). This study applies only to covered electronics as defined in ESHB 2488. Covered electronic products are: “computer monitors, personal computers, and televisions sold to consumers for personal use...” highlighted in table 1.

**Table 1: Functional Electronic Product User Groups and Product Uses**

<b>Commercial</b> Computers and peripherals Financial Systems Security Systems Entertainment Office equipment	Consumer Video Audio Communications <b>Computers</b> and peripherals Game systems	Military/Defense Weapons control systems Communications systems Navigational systems Security systems Encryption systems
<b>Industrial</b> Telecommunications Equipment Test and Measurement Equipment Medical Equipment Manufacturing Equipment Control Systems	Aerospace On-board control systems Communications systems Navigation systems Radar and traffic control systems In-flight entertainment systems	Automotive Control systems Audio systems Instrumentation Navigation systems Safety systems Diagnostic systems

## Amount of Electronic Products Generated in Washington and Where They Go

### How many covered electronic products become obsolete in Washington state?

Information is sketchy. Our best current estimates indicate that between 2003 and 2010 over 4.5 million CPUs, 3.5 million cathode ray tube monitors, and 1.5 million flat panel monitors will become obsolete. In addition, slightly less than 500,000 laptop computers will no longer be usable. (See Illustration 1).

The US Census Bureau estimates that there are 2.4 televisions per household in use within the United States. That number increases to 2.7 by 2010. Taking those numbers and extrapolating to Washington, we estimate that there are over 6 million televisions in use in Washington State in 2004 increasing to over 7 million by 2010; see table 2 for details.

Information provided by Panasonic, North America that evaluated the recovery of television units in Europe, Japan and Hennepin County Minnesota indicate that

*“Size is the biggest hindrance on a CRTs lifespan. The bigger the image, the brighter the CRTs have to burn. Thus, decreasing their lifespan.*

*Good quality rear and front projection TVs generally have a lifespan of 10-15 years, while direct view TVs can last 10-20 years. With the leaps technology takes, and the desires of consumers to replace their old TVs with the latest and greatest technology, the best bet is that most TVs are replaced before their life ends within 5-8 years.”*

The Televisions of the Future, HT Advise.com, December 2002

product take programs in those areas achieve about .03 units per capita returned for recycling each year. This would indicate that if Washington had comparable programs, there would be about 185,000 televisions recycled in 2004, modestly increasing to 199,000 units in 2010. This would place the end of life age of recycled televisions at 32 years, assuming that those televisions recycled are all that are available to recycle, both of which are highly unlikely.

Data collected from Florida television collection programs indicate televisions being turned in are much newer. Of the total in their sample, 45% were 12 years old or less to 71% are 16 years old or less.

If we use an average age at end of life of 14 years, and .07 units per capita, we would recover about 58% of televisions reaching end of life in 2004 and drop to about 50% in 2010. Illustration 2 demonstrates these data visually.

Other factors that should be considered include replacement of current televisions in use to new high definition and digital sets in order to keep up with the technological changes in broadcasting and cable systems.<sup>i</sup> Not unlike computers, the next several years will bring new technology that is incompatible with most sets in households today. Replacement, rather than renting converter boxes, could be the choice of most American consumers. So, while sets can last 10 to 18 or more years, they, too will be replaced due to obsolescence, or vanity, rather than wear. What consumers will do with replaced sets is unknown. Many find places in children's rooms, dedicated sets for video gaming, or other functions in the household. Some will just sit in storage.

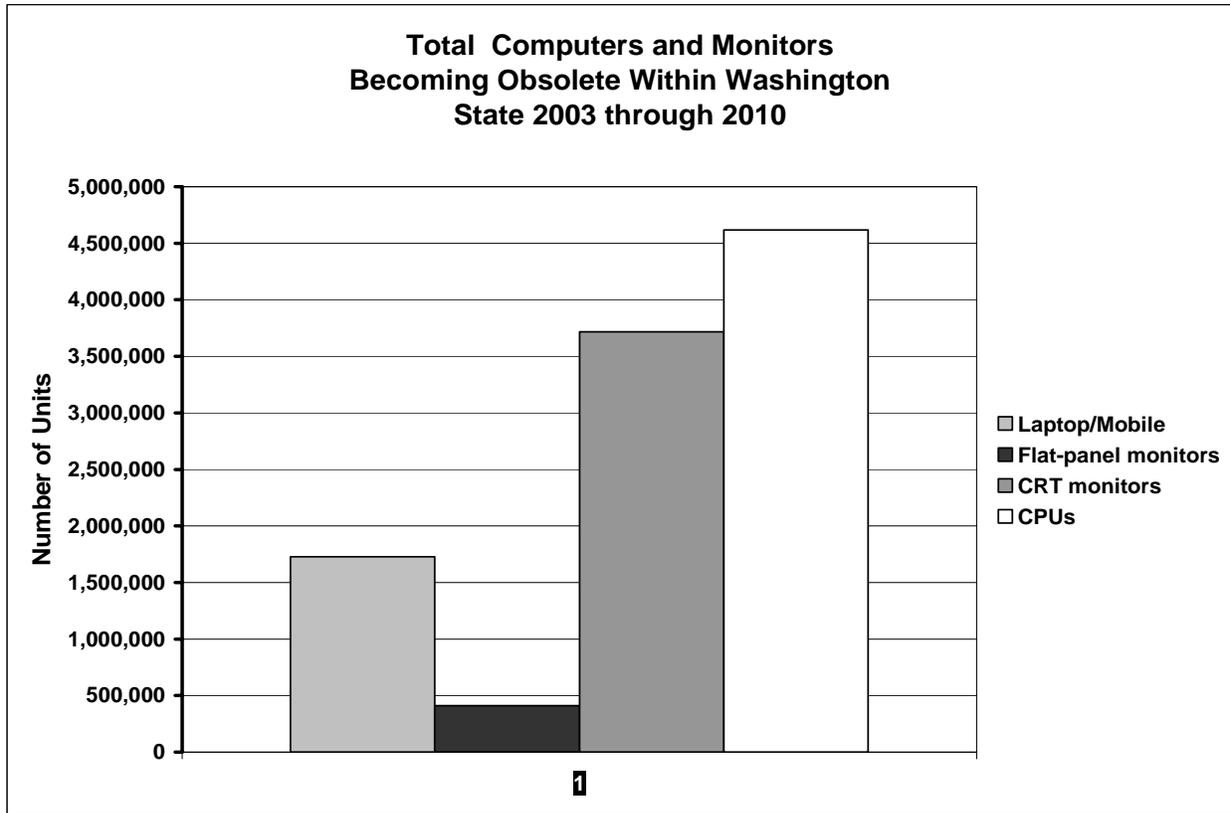
In addition, factors related to new technology development and consumer preference for larger and larger screens should be considered. Larger screens don't last as long as the small television screens of the past.

<b>Five Fastest Growing CE Product Categories in 2002</b> (year-over-year growth in units)	
<b>Digital LCD</b>	610%
<b>Plasma Displays</b>	540
<b>In-Dash CD Players/MP3 Players</b>	384
<b>CD-R Disks with Audio Designation</b>	266
<b>Direct View DTVs with 16.9 Aspect Ratio</b>	201
<i>Source: CEA Market Research, 1/03</i>	

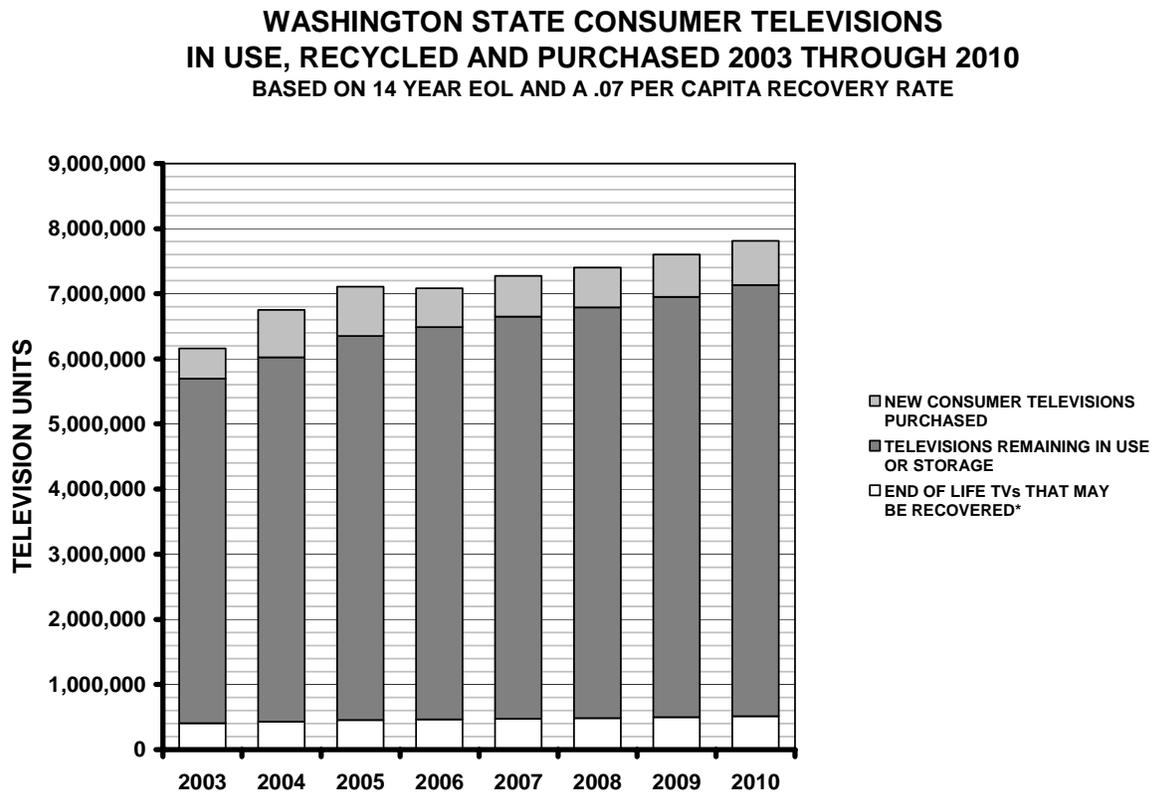
**Table 2. Televisions in use in households in Washington State**

2003	2004	2005	2006	2007	2008	2009	2010
5,694,309	6,020,996	6,350,331	6,489,687	6,651,191	6,788,451	6,954,397	7,135,015

<sup>i</sup> One Digital World, Consumer Electronics Association 2002-2003 Corporate Report. [http://www.ce.org/publications/corporate\\_report/corporate\\_report\\_2003.pdf](http://www.ce.org/publications/corporate_report/corporate_report_2003.pdf)  
 "2002 and early 2003 ... demand for consumer electronics products continues to trend upward. Digital TV (DTV) sales are a success story and continue their ascent as the fastest growing technology of all time. This category, once again, exceeded original forecasts in 2002. By the end of 2003, consumers will invest more than \$15 billion in DTV products."



**Illustration 1. Computers and monitors estimated obsolete between 2003 and 2010.**



**Illustration 2. – Potential Television Units Recoverable 2003 to 2010**

## How much electronic product waste is disposed in Washington State?

Obsolescence does not necessarily equate to products disposed. Many consumer electronics don't show up in the solid waste stream for a number of years beyond their last use. Consumers tend to hold on to these products for some time for reasons not understood. At many consumer electronics collection events, for example, televisions will be turned in that are several decades old.

About 16,615 tons of electronic wastes were estimated as disposed in 2002, according to the most recent waste composition study of municipal solid waste (MSW) in Washington State. That is only .3% of the total of all MSW disposed that year. The study did not discern between types of electronic products such as computers, televisions, electronic games, audio equipment, etc. However, this number is low when compared to the estimated consumption and life expectancy of electronic products. Therefore, we should be able to assume that a great deal of electronic products are stored, given away to family members or charities, or handled in some other way that would not be reported.

## What happens to the rest? Stored? Recycled?

We don't know, exactly. A portion is being recycled. Our annual statewide recycling rate survey indicates that computers began to be reported recycled in a small way in 1999. In 2002, there were over 1,400 tons of computers recycled. (Table 2).

**Table 3. Tons of Computers and Related Components Recycled in Washington**

1999	2000	2001	2002
9	255	317.19	1,414.37

A straight calculation comparing electronics recycled to electronics disposed would indicate a recycling rate of approximately 7.8%. This would accurately reflect a recycling rate of materials handled within the current solid waste management system. This calculation is not comparing “apples to apple.”

Information from the International Association of Electronics Recyclers points out the fact that most of the electronic products processed through their members come from commercial sources, not consumer sources.<sup>ii</sup> We could assume then that the quantities of electronics reported as recycled are from the commercial sector, rather than consumers here in Washington. Electronics disposed at landfills in the state come from all sources, commercial and consumer. In addition, “electronics” as sorted in recent waste characterization studies lump all electronic products together. Sources and types are not broken down in detail. So, the numbers shown above are merely illustrative and probably do not reflect the true material flow of electronics in the state.

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<sup>ii</sup> IAER Electronics Recycling Industry Report – 2003, International Association of Electronics Recyclers, Albany, New York.

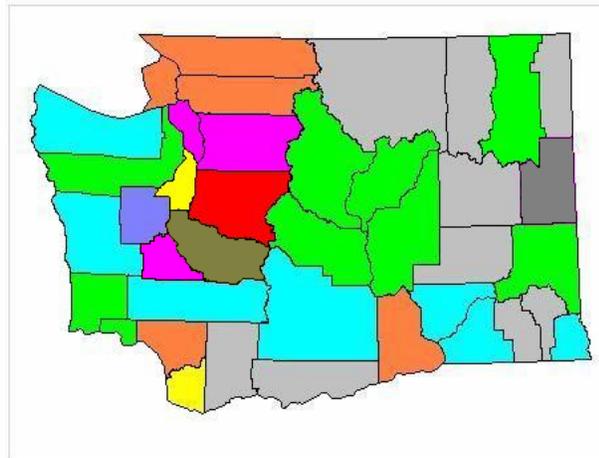


A 3,200 pound load of computers, from a commercial source, being disposed at a transfer station in Washington. September, 2004.

## What is the distribution of electronic products consumed in Washington State?

In order to begin to evaluate electronic product recycling collection options within the state, we need to consider distribution of the products over the landscape. The reason being is that a cost effective program serving a dense population may not be as efficient in a rural area and vice versa. Also, a county with a large area and a similar population to counties with smaller area counties may need to use collection strategies more akin to their neighboring rural counties.

Units per Sq. Mile	Household density	Computer density	Television density
	1 to 5	1 to 5	1 to 10
	6 to 10	5 to 10	10 to 20
	10 to 20	10 to 20	20 to 50
	20 to 30	20 to 30	50 to 60
	30 to 50	30 to 50	60 to 80
	50 to 100	100 to 130	200 to 250
	100 to 150	130 to 175	250 to 350
	150 to 200	175 to 200	350 to 400
	200 to 250	200 to 300	400 to 600
	300 to 350	350 and up	700 and up



**Illustration 3. – Distribution of Covered Electronic Products by County, 2005 Estimate**

This exercise is illustrative of the potential materials recovery within each county. Since local government is responsible for management of solid waste in the state, it is only appropriate to look at the issues of materials collection at a localized level. Illustration 3 graphically represents the television density per square mile within the counties of the state. The state average is 88 units per square mile for televisions. The range between counties is extreme, from three units each per square to over 800 units each per square mile. The computer density is 41 computers per square mile. The computer density would follow the same distribution pattern as televisions, but about half as many. (See Appendix B for detailed table).

## **Recycle-Ability of Electronic Products**

### **What resources are utilized in electronics manufacturing?**

Electronic products material content can be as unique as the types of products and their manufacturers. We can take a general look at covered electronic products and provide a reasonable description.

Electronic products are made of many materials such as steel, aluminum, copper, glass, plastic, precious metals (including gold, palladium, silver, and platinum), and other miscellaneous materials such as rubber and wood. Nearly half of the materials recovered from electronic products are metal, with plastics making up an additional 33%. There can be as many as nine different plastic resins in a mixed load of electronic products recovered for recycling.<sup>iii</sup>

### **CATHODE RAY TUBES**

Most computer monitors and televisions that will be collected for recycling contain a cathode ray tube surrounded by a plastic casing with other wiring, chips and devices. Cathode ray tubes (CRTs) represent the majority of the weight. CRTs are made primarily of silicon at 60%, 10% sodium and barium, 8% potassium and 5% lead. Aluminum and strontium are about 2% each with other materials such as iron, fluorine, antimony, zinc, copper, titanium and magnesium representing less than one percent each of the remainder. The material of greatest concern is lead.

### **CRT GLASS**

CRTs are made up of three basic components, the faceplate or screen glass, the funnel glass that makes up the bulk of the CRT, and the neck. These parts are all glass, containing different portions of the materials described above. Screen glass does not contain lead. Screen glass can not contain any lead as it would interfere with being able to see the image projected upon it, but does contain high levels of barium oxide. The funnel glass and neck contains lead oxide, which is there to contain the radiant energy within the tube itself. It is estimated that cathode ray tubes contain between 4 and 8 pounds of lead, each.

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<sup>iii</sup> The Role of Economics in Extended Producer Responsibility: Making Policy Choices and Setting Policy Goals, Margaret Walls, March 2003 • Discussion Paper 03-11 Resources for the Future, Washington, D.C. <http://www.rff.org/rff/Documents/RFF-DP-03-11.pdf>

## **LIQUID CRYSTAL DISPLAYS (LCDs)**

LCDs are thin and light making them ideal for applications where portability is desired, for example, laptop computers. They have also found their way into television applications. LCDs are made of layers of various materials including a mirror in back, which makes it reflective; a layer of glass with a polarizing film and an electrode plane made of indium-tin oxide on top which covers the entire area of the LCD; a layer of liquid crystal substance; another piece of glass with an electrode on the bottom and another polarizing film on top. Most LCDs are lit with built-in fluorescent tubes above, beside and sometimes behind the LCD.

Liquid crystal, Cholesteryl Benzoate, is the material from which the display gets its name. It is synthesized by reacting benzoyl chloride ( $C_7H_5ClO$ ), a lachrymator (tear gas), with cholesterol ( $C_{27}H_{45}OH$ ), in a bath with pyridine ( $C_5H_5N$ ), a colorless, flammable, toxic liquid. Pyridine is used as a solvent, as a denaturant for alcohol, and as a starting material in the synthesis of other compounds. In the process, the chlorine atom is released and a new compound is formed.

## **PLASMA SCREENS**

Plasma screens are primarily used in television applications. They contain xenon and neon gas, magnesium oxide, and phosphorous. The screen acts similarly to a CRT, without the bulk of the glass, as photons excite the phosphorus within the gas. Because there is no light gun, as in CRTs, the plasma screen, like the LCD, uses small fluorescent lights, containing tiny amounts of mercury, for illumination.

## **PLASTICS**

It is not practical at this time to quantify the amount of plastics in electronic products. Products vary widely in design and material composition of components. What we do know is the general kinds of plastics used in electronic products.

The following information is provided through a report by the American Plastics Council.<sup>iv</sup> The report stated that approximately sixteen different generic plastic resins were sold into the electrical and electronic manufacturing sectors in 1996. Those resins included:

- Acrylic (mostly polymethyl methacrylate or PMMA)
- Acrylonitrile Butadiene Styrene (ABS)
- Epoxy
- Phenol Formaldehyde (PF)
- Polyacetal (POM)
- Polyamide (nylon) (PA )
- Polycarbonate (PC)
- Polycarbonate/Acrylonitrile Butadiene Styrene blend (PC/ABS)
- Polyethylene (PE)
- Polyethylene Terephthalate (PET)
- Polybutylene Terephthalate (PBT)
- Unsaturated Polyester (UP)
- Polyphenylene Ether/High-Impact Polystyrene blend (PPE/HIPS or PPO)
- Polypropylene (PP)

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<sup>iv</sup> Plastics from Residential Electronics Recycling: *Report 2000*, from the Electrical and Electronics Group of the American Plastics Council [www.plasticsresource.com/reading\\_room/reports/electronics2000.html](http://www.plasticsresource.com/reading_room/reports/electronics2000.html)

- Polystyrene (including high-impact polystyrene or HIPS) (PS)
- Polyurethane (PU)
- Polyvinyl Chloride (PVC)

The six most common resins sold into electronic equipment applications are PS (29 percent), ABS (14 percent), PP (12 percent), PU (9 percent), PC (8 percent), and PF (5 percent). These six plastics make up about 77 percent of total resin consumption.

Actual plastic resin content of consumer electronics collected for recycling can best be described by samples taken from the Hennepin County, Minnesota electronics recycling program.

**Table 4. Resins Found in Hennepin County Plastics Sample (in total and by product category)**

Plastic Resin	Television Plastics	Computer Plastics	Misc. Plastics
<b>H I P S</b>	75%	5%	50%
<b>ABS</b>	8%	57%	24%
<b>PPO</b>	12%	36%	11%
<b>PP</b>	3%		3%
<b>Other</b>	2%	>1%	2%
<b>PE</b>			6%
<b>PC/ABS</b>		2%	
<b>PC</b>			2%
<b>PVC</b>			2%

Only about 35% of plastics contained in collected electronic products are recyclable. Plastics are rejected from recycling for the following reasons:

1. Contains metal coatings or paint;
2. Are made of highly density-variable structural foam;
3. Contained glass filler;
4. Contains greater than 25 percent metal by weight;
5. Contains composite plastics, such as printed circuit board materials;
6. 20 percent of its surface or more covered by labels or lamination that could not easily be removed; and/or
7. Contains more than three types of plastic.

Due to these contamination issues, even the best collection programs will still result in the disposal of a significant amount of plastic materials.

## **METALS**

Electronic equipment, particularly computers, contain significant amounts of metals. Aside from the lead in CRTs mentioned above, the casings, circuit boards and wiring all contain valuable metals. According to information provided by the United State Geological Survey, 1 metric ton of electronic scrap from personal computers contains more gold than that recovered from 17 metric tons of gold ore.<sup>v</sup> In 1998, the amount of gold recovered from electronic scrap in the United States was equivalent to that recovered from more than 2 million metric tons of gold ore and waste.<sup>vi</sup>

According to industry experts, efficiencies in design and production have reduced the quantities of precious metal used in electronic products. Because of this, reclamation of those metals from scrap e-waste may not be as efficient as the USGS reports indicate.

## **INTRINSIC VALUE OF ELECTROINIC PRODUCTS**

It is interesting to imagine that consumers pay in the neighborhood of \$1,000 for a computer these days, some much less, some much more. After 3 to 5 years of use, those computers have lost nearly all value. When recycled, a computer may fetch about \$10 per unit in the recycling market, for its materials after processing at a material recovery center or similar business. Under current conditions, there is so little value in the recycled commodities that these businesses must charge a fee to take used electronic products in for recycling in order to make it cost effective to operate successfully. The cost of a new computer to the consumer is not in the materials the computer is made of, but in the “value added” categories such as research and development, design, marketing, assembly, transportation and profit.

The economics of electronics recycling is visited in greater detail in another section. However, to illustrate the issue of intrinsic value further, it is important to understand “material flow.”

## **Material Flow**

### **What is material flow?**

Material flow identifies the source and distribution of materials within the economy. Illustration 4 provides a simple summary of the concept for electronic products. During a product life-cycle, from beginning to end, there are numerous points of contact where value is added. All consumer products begin with raw materials. Those materials are taken from the source - earth, air, water – and refined into a material suitable to manufacture a product. That material is sent to a manufacturer. For example, petroleum products may be sent to a chemical company that converts it to plastic. Aluminum ingots may be sent to a rolling mill and made into sheets. These materials are then sent to a manufacturer that makes parts. Sheet metal can be stamped into casings for disk drives. Plastic may be sent to an injection molding plant to make keys for keyboards or shells for monitors. The parts are sent to an assembly plant where all the various parts are put together, for example, hard disks, motherboards, cases, and memory chips are brought together in one place to make a CPU. The CPU would then go to a distribution center where it is matched with a monitor and other peripherals and packaged. Packages are sent to wholesalers then to retailers, or directly to customers.

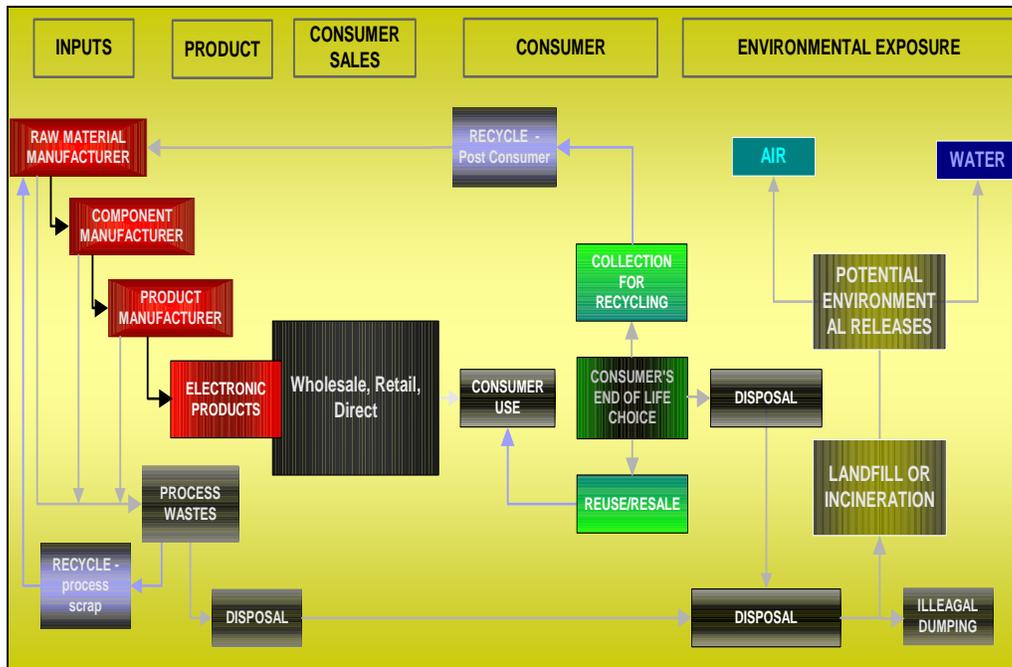
Every step of this process entails investment and waste. The value added to the material is the investment. Waste can include things like packaging materials, air pollution from transportation vehicles, slag from smelters and even mine tailings from the first step in the flow.

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<sup>v</sup> “Obsolete Computers, “Gold Mine,” or High-Tech Trash? Resource Recovery from Recycling” U.S. Department of the Interior, U.S Geological Survey, USGS Fact Sheet FS-060-01, July 2001 <http://pubs.usgs.gov/fs/fs060-01/fs060-01.pdf>

<sup>vi</sup> ibid

While the product is now in the consumers hands, it is still very much part of the economy. While in use, the consumer may use the product as a tool in investments or part of their business. When the consumer decides that the product no longer serves their needs, the consumer makes a choice as to what happens to the product. The choices are store, sell, redistribute within the consumers activities, donate, dispose, or recycle. When stored, the product is taken out of the economy temporarily. The rest of the choices are choices to keep the product within the economy for various amounts of time. Disposal is the shortest. The consumer pays someone to transport and dispose of the product in an incinerator or landfill. Reuse alternatives keep the product in use, but ultimately a decision will be made to dispose or recycle. When the recycling choice is made, the product is place back into the manufacturing and distribution cycle.



**Illustration 4. Material Flow**

### **How much electronic waste is exported from Washington?**

We are still researching this question. The International Association of Electronics Recycler report that a survey of their members indicates that export of electronic products is no longer practiced. However, the IAER does not represent all electronics recyclers. There remains cause to believe that export still occurs. However, detailed data on export of recycled material, much less specific electronic products, has not been found. We will continue to pursue credible information sources to answer the questions posed in ESHB 2488 related to the export of hazardous electronic waste products and how they are handled in receiving countries.

### **What are the problems associated with unwanted electronic products received by charities?**

We are still researching this question. Our understanding of the problem is that obsolete and non-functioning electronic products are being left at charity donation stations. Because these products no longer serve their original purpose, they must be disposed. Several counties within the state

have banned the disposal of certain electronic products, specifically cathode ray tubes, in landfills. Due to this ban, charities pay a premium to dispose of these products through other methods.

Roughly, a third of the products received at donation stations are not salable. Those products are disposed of as solid waste. In large charity organizations, this disposal cost is a significant portion of their operating budget, possibly breaking into the seven figure range statewide.

The valuable reuse service provided by charity organizations within our communities is being severely impacted by “night dumping” of goods at donation stations. Paying for disposal of these unusable items reduces the ability of these organizations to achieve their charitable missions. The added cost associated with disposal of electronic products further compounds the problem.

Major charity organization active within Washington will be surveyed to determine the impacts of disposal of unusable electronic products upon their work.

## **Process and Next Steps**

The first meeting of the Washington State Solid Waste Advisory Committee – Subcommittee on Electronic Products occurred on October 29, 2004. A meeting summary is contained in Appendix A, Attachment II. The background information contained above in this report was presented, discussions about the process occurred and expectations were voiced.

Ecology is planning on three more meetings of the Sub-committee. Meeting outlines are contained in Appendix C. The scheduled meetings are designed around the specific questions asked in ESHB 2488. They are sequenced in an order to come to conclusions and make recommendations well in advance of the 2006 legislative session.

Meeting 2 is scheduled for March 19, 2005; meeting three will occur on May 10, 2005. The last meeting remains to be scheduled.

In order to carry out the necessary research required by ESHB 2488, Ecology has formed a Technical Team. This team is focused on finding facts upon which to base recommendations. The role then is not around policy development per se, but assuring that the policy recommendations that are made are based on good science.

The intention of the Department of Ecology is to provide the legislature with recommendations that are in the best interest and are the best deal of the citizens of the state of Washington – the people we work for; our voters, taxpayers and neighbors. The set of recommendations that will be submitted for legislative consideration will include a description of alternatives that could be used for collection of electronic products and financing mechanisms that could be used with associated economic, social, political and environmental implications of each.

# Appendix A

## Washington State Department of Ecology Electronic Wastes Project

### Facilitator's Interim Report

*Submitted by  
Dee Endelman, Senior Associate  
Agreement Dynamics, Inc.  
November 30, 2004*



## Introduction

The Washington State Legislature, through ESHB 2488, directed the Department of Ecology is to submit to the Washington State Legislature an interim report on its progress in recommending ways to implement and finance a statewide electronic product collection, recycling and reuse program. The interim report is due by no later than December 31, 2004.

This report, prepared by Ecology's contracted facilitator, documents Ecology's efforts thus far and provides some initial thoughts on the current status of the project.

A second and final report to the legislature, including Ecology's recommendations, will be submitted no later than December 31, 2005.

### Work Accomplished To Date

During its first six months of work on the ESHB 2488 task, Ecology has designed the process by which it will develop its recommendations; assembled both a policy level committee and a technical committee; prepared for and held its first full day session with the committee and has begun work to follow up this introductory session, both from a technical and policy perspective.

Specifically:

1. Summer 2004: During this time period, Ecology staff developed a four-meeting process at which it could prepare and present technical information and receive feedback from diverse stakeholder groups. Ecology then issued a Request for Proposals to obtain the services of a process facilitator and assembled a hiring team comprised of stakeholders from the business, regulatory and environmental communities. After review and interviews with final candidates, Ecology hired Agreement Dynamics, Inc. to facilitate the process and provide meeting documentation and report writing services.

During this same time period, Agency staff brought together a Technical Committee to provide research on the issue of electronic waste including the scope and nature of the problem as well as alternative solutions to it. The Agency also assembled a Subcommittee to the State Solid Waste Advisory Committee (SWAC) to provide consultation to Ecology as the Department develops its recommendations, using Technical Committee research. The sub-committee members represent the stakeholders identified in ESHB 2488.

SWAC Subcommittee members include representatives from all stakeholder groups called out in ESHB 2488:

- Nancy Atwood, American Electronics Association, Washington Council;
  - Vicki Austen, Washington Refuse and Recycling Association;
  - Jan Gee, Washington Retail Association;
  - Erick Hulscher, Tacoma Goodwill;
  - Sejo Jackson, Snohomish County Solid Waste Management Department;
  - Craig Lorch, Total Reclaim;
  - Suellen Mele, Washington Citizens for Resource Conservation;
  - Grant Nelson, Association of Washington Business;
  - Bill Smith, City of Tacoma Solid Waste; and
  - Frank Warnke, Advocates, Inc. (representing a consortium of electronic manufacturers).
2. Fall 2004: During the months of September and October, Ecology and its facilitators worked to prepare for the first meeting of the SWAC Subcommittee. In preparation for the process, the facilitator held interviews with each Subcommittee member to understand and document the issues and interests from the perspective of the stakeholder group s/he represents. Attachment I to this report is a list of the interests articulated by Subcommittee members, as amended during the first meeting.

The first meeting of the Subcommittee was held on October 29, 2004. At this meeting, the Subcommittee discussed the project purposes; its roles; process agreements; using interest-based discussions to obtain agreements when possible; and discussed the technical committee's first two presentations: on amounts of e-waste and the economics of reuse, recycling and disposal. Attachment II to this report contains the notes from the first SWAC Subcommittee meeting.

At this meeting, the Subcommittee set its second and third meetings: for March 19, 2005 and May 10, 2005. Although Ecology had hoped that the second meeting could be held sooner than March, several Subcommittee members had scheduling difficulties due to legislative session. Indeed, the Subcommittee is meeting on a Saturday in March, not wanting to delay the process further.

## Initial Thoughts on this Process

Most Subcommittee members pronounced the first meeting a good beginning. However, as discussed below, I believe we will need to make some key changes if we hope to have a relatively high level of agreement among Subcommittee members in their ultimate consultation with Ecology.

Although it is far too early to suggest that we have an analysis of the Subcommittee's thinking with respect to the e-waste question, we can make several observations about the current "lay of the land" and have some suggestions for proceeding.

The members of the Subcommittee – and the stakeholder groups they represent – have a history with respect to the issue of e-waste disposal, reuse and recycling. Many of the people at the table were involved in a position driven process lobbying unsuccessful legislation which would have mandated producer responsibility. The resulting legislation, hammered out through the good will of all concerned, represents a compromise among the stakeholders. Due to this process, positions were not satisfied, desires postponed and underlying interests remain unaddressed. Needless to say, beginning afresh together is difficult task.

Not surprisingly, many of the parties enter this process with a position<sup>1</sup> on the e-waste issue. Those with positions appear to be primarily, although not exclusively, focused on the financing mechanisms: whether the financing should be front-end or in the manner of a disposal fee; whether front-end financing should be externalized (e.g., an Advance Recovery Fee) or internalized (through some form of producer responsibility).

There are positions with respect to other aspects of the system: whether prison labor should be used in recycling e-waste; whether the current system of exporting e-waste as a form of recycling is acceptable; whether there are public health issues with respect to e-waste, given the high level of environmental security at State landfills. With Subcommittee members on all sides of these issues, early consensus is unlikely.

## Suggestions for Next Steps

In making the following suggestions, I am assuming that both Ecology and the legislature would greatly prefer to see input from the Subcommittee which has a fairly high level of agreement. To increase the chances of this outcome, I would suggest the following steps be taken:

1. Work to focus Subcommittee members on the interests of their constituents. “Interests” are motivators or needs in a given situation. There are usually many ways to satisfy an interest, only one way to satisfy a “position”, i.e., my way. If we can truly hold interest-based discussions, helping people understand that they will only succeed ultimately if they listen to the needs of other stakeholder groups, then I believe that this group has the possibility of agreeing on creative solutions to assist Ecology in its recommendations.
2. Spend some time before the second meeting talking to stakeholders about how we can solve this problem together. Find out whether there is an ability to “get out of the box”, in light of the positions being taken nationwide. Grant Nelson’s suggestion to focus on long-term goals and short-term solutions may hold a key to creative problem solving. We may be able to agree on a long-term goal and develop short-term steps that could meet many of the interests articulated to date.
3. At the upcoming meeting, ask the Subcommittee to spend some time really listening to one another’s interests and analyzing the problem together, not from a technical perspective but also from an economic and social perspective: What are the forces driving discussions of the e-waste issue? What are the complicating factors making the discussion difficult? Which parts of this problem are immediate? Which parts are long-term? How can we address the immediate problems in a way that will support solution of the long-term ones?
4. Integrate the Technical Committee work with the Subcommittee work so that the conversations at the table and the Technical Committee’s research and analysis work better together.

The facilitators and Ecology’s project manager have already begun discussing these steps and will implement at least some of them over the coming months.

## **Attachment I**

### **Draft: Interests Articulated by Subcommittee Members** *(As edited based on Subcommittee feedback at 10/29/04 meeting)*

*What are your organization, member or client needs, interests and concerns regarding solutions to the e-waste issues?*

#### **Sego Jackson (Snohomish County Solid Waste Management)**

- Finance system that covers collection through processing costs without reliance on government taking over costs/taxing
- Environmentally and financially sustainable system that leads to smart private sector decisions
- Manufacturer responsibility
- Solution that solves environmental problems here without creating them elsewhere
- Easy and convenient collection System

#### **Suellen Mele (Washington Citizens for Resource Conservation)**

- No system that creates disincentives to recycling
- Environmentally and financially sustainable system that leads to smart private sector decisions
- Manufacturer responsibility
- System that leads to convenient, effective and responsible recycling
- System that is environmentally just
- Solution that examines financing options for schools, government and small businesses as well as individuals
- System that promoted design for environment

#### **Eric Hulscher (Tacoma Goodwill)**

- Solution that enables us to continue accepting electronic items without the liability Goodwill currently has
- System in which we will not lose money when we recycle items we can't sell
- Financially sustainable system

#### **Grant Nelson (Association of Washington Business)**

- Decisions based on sound and balanced assessment of facts
- Solution that does not pit one sector of business community against another
- Solutions that keep businesses in Washington competitive in bigger markets
- Solutions that include existing infrastructure

#### **Craig Lorch (Total Reclaim)**

- Level playing field for e-waste recyclers: Regulatory certainty regarding exporting materials
- System that supports conservation of natural resources
- Financially sustainable recycling system

#### **Mo McBroom (WashPIRG)**

- System that serves the public interest, rather than special interests
- Manufacturer responsibility
- Environmental protection and the prosperity that allows for it
- System that promotes clean design and responsible recycling

**Bill Smith (City of Tacoma Solid Waste)**

- E-waste should not be an unfunded mandate on Tacoma’s rate payers
- Cities reimbursed for costs of collecting and transporting materials
- No competitive disadvantages (level playing field across the State)
- Shared responsibility—manufacturers and consumers

**Nancy Atwood (AeA, Washington Council)**

- Level playing field that doesn’t disadvantage one company against another
- Shared responsibility: manufacturers should participate but not have the system completely on their backs
- National solution so that businesses can operate in Washington State as well as other states
- Decisions based on sound and balanced assessment of the facts

**Dennis Durbin (Stevens County Public Works)**

- System that is financially viable for businesses
- Program that encourages legal recycling
- No system that requires government to bear the costs of recycling with current resources or forces them to increase fees to cover costs

**Frank Warnke (Advocates, Inc., representing a consortium of manufacturers)**

- Decisions based on sound and balanced assessment of the facts
- Shared responsibility: one segment of the industry shouldn’t have to pay the entire cost
- System that will result in a long-term solution
- Solutions that are financially viable for manufacturers

**Vicki Austin (Washington Refuse and Recycling Association)**

- Decisions based on sound and balanced assessment of the facts
- System that includes our current infrastructure (both haulers and landfill operators)
- No “one size fits all” solution (rural counties and urban centers require different delivery systems)
- Financially sustainable recycling
- No landfill ban of electronics without another solution

**Jan Gee (Washington Retail Association)**

- Decisions based on sound and balanced assessment of the facts
- No requirements for retailers to take back and hold products
- No complex, bureaucratic bookkeeping
- Compensation for administrative costs to retailers
- System that educates consumers regarding e-waste
- Solution that does not penalize Washington businesses/brick-and-mortar retailers versus e-commerce

## Attachment II

### Washington State Department of Ecology SWAC Subcommittee Meeting E-Waste Project - Meeting #1 October 29, 2004

#### Final Notes

On Friday, October 29, 2004 Agreement Dynamics, Inc. facilitated the first of four meetings on the Washington State Department of Ecology E-Waste Project.

**SWAC Subcommittee Members Present:** Nancy Atwood, AeA, Washington Council; Vicki Austin, Washington Refuse and Recycling Association; Jan Gee, Washington Retail Association; Eric Hulscher, Tacoma Goodwill; Sejo Jackson, Snohomish County Solid Waste Management Dept.; Craig Lorch, Total Reclaim; Suellen Mele, Washington Citizens for Resource Conservation; Grant Nelson, Association of Washington Business; Jay Shepard, Washington Dept. of Ecology; Bill Smith, City of Tacoma Solid Waste; Cullen Stephenson, Washington Dept. of Ecology; Frank Warnke, Advocates, Inc. Also present were members of the Agreement Dynamics' facilitation team: Dee Endelman, facilitator; Mary Cabaniss, note taker; Ginny Ratliff, project manager. Subcommittee members Dennis Durbin (Stevens County Public Works) and Mo McBroom (WashPIRG) were absent.

Attachment 1 to these notes is a list of all participants, including audience members, many of whom are members of the project's Technical Team.

#### WELCOME AND INTRODUCTIONS

Cullen Stephenson welcomed the group on behalf of the Department of Ecology (Ecology). He reviewed the goal of this project: to determine how we can be more effective at conserving our resources and to find solutions to the electronic waste situation, taking into account the interests represented by the Subcommittee members. He noted that Ecology will submit two reports to the State Legislature during the course of this project. The first will be an interim report, submitted by the end of December 2004. The second report, to be submitted by the end of December 2005, will provide an evaluation of alternatives and recommendations.

Cullen then introduced Dee Endelman as the project meeting facilitator. Dee introduced the two other members of the consulting team, Mary Cabaniss and Ginny Ratliff. The SWAC subcommittee and stakeholders then introduced themselves and the organization/stakeholder group with which they are affiliated.

Dee reviewed the purpose, desired outcomes and agenda for Meeting # 1 (Attachment 2). After getting agreement from the Subcommittee with respect to the agenda, she reviewed suggested meeting guidelines (Attachment 3).

## SETTING UP THE PROJECT: PURPOSE, ROLES AND GROUND RULES

Jay Shepard then reviewed the background and purpose of the project with a Power Point presentation on legislative bill ESHB 2488 (Attachment 4).

ESHB 2488 requires the Department of Ecology to conduct research and develop recommendations for implementing and financing an electronic product collection, recycling and reuse program. The legislative report outline is divided into three sections, with questions to address in each section. The three sections with pertinent questions for each are:

1. Background & analysis

“What are electronic wastes and why are they a problem?”

Review of the problem

Review of projects and programs

2. Evaluation

“What programs and projects are the best models?”

3. Recommendations

“What are the best options to establish and finance a statewide collection, reuse, and recycling program for covered electronic products?”

The law requires that Ecology consult with a diverse group of stakeholders, as represented by the Subcommittee members. Ecology hopes to address the legislative requirements in four meetings. The topics for the four meetings are:

Meeting #1: Review of the problem

Meeting #2: Review of projects and programs

Meeting #3: Evaluation of projects and programs effectiveness in addressing the problems

Meeting #4: Discussion and development of recommendations.

Subcommittee members asked Jay to address how Ecology would respond if there were no consensus recommendations from the Subcommittee. Jay indicated that Ecology would report on options with pros and cons and that Ecology would recommend options based on their environmental, financial, social, political, and economic implications. The Subcommittee also began a brief discussion of the scope of the recommendations with respect to whether only consumer electronics for personal use are covered or if consumer electronics from other generators (such as agencies and businesses) are to be covered to address portions of the legislation.

The facilitator then reviewed the roles of the participants:

- Ecology is responsible to develop recommendations to the legislature. Ecology representatives will sit at the table with the Subcommittee but will not participate

in giving their opinions. Rather, they will listen to all participants' ideas, ask questions, and provide technical information and support.

- The facilitator is a neutral party and will keep the discussion moving forward. The facilitation team will also write meeting notes to be reviewed by both Ecology and Subcommittee members for accuracy. The facilitation team is also responsible for working with Ecology to draft reports to the legislature.
- The Subcommittee's role is to provide input to Ecology for its recommendations. Subcommittee members will do this by reviewing and discussing information provided by the Technical Team, sharing interests and views, and working on mutually acceptable solutions based on those interests and views.
- The Technical Team's role is to provide research on the issue of electronic waste, including information on the problem, programs designed to address the problem, and the like.

The facilitator noted that the facilitation team had set up two ways for audience members to provide input:

1. Comment sheets: Any participant can complete a "SWAC Subcommittee on E-Waste Comment Card" for any comments or questions for Ecology; and
2. At designated times, as determined by the Subcommittee, the stakeholders will have an opportunity to express their ideas and opinions.

Any questions or comment sheets will be included as an addendum to the Meeting Notes.

Dee then reviewed proposed Draft Group Agreements and procedural ground rules designed to assure a common understanding of how the project would be completed (Attachment 5). Subcommittee members made two changes to the suggested draft:

1. Subcommittee members who cannot attend a meeting can provide a substitute. The group decided that designated alternates who are kept fully informed of the work and issues would be better than sending ad hoc substitutes; and
2. During meetings, unless conversations are designated for Subcommittee members only, audience members may ask questions and make comments as time allows.

Dee will amend and redistribute the agreements.

Dee reviewed with the group the behaviors, skills and methods to hold interest-based discussions. The key to an interest-based approach is to understand the key needs and concerns (interests) of different stakeholders and to seek solutions that respected those interests. (Attachment 6 includes handouts related to behaviors, skills and methods discussed.)

After a break, the group reviewed a draft list of interests of various Subcommittee members, which Dee had compiled following telephone interviews with each (Attachment 7). The group members added and amended their list of interests. Dee will make the changes and publish a revised interests list.

The group discussed the following aspects of the Interests reviewed:

1. They noted that many of the Subcommittee's core interests are complementary. There are more similarities than differences represented among the members;
2. One of the core interests articulated by all Subcommittee members is the desire to implement a financially sustainable e-waste recycling system; and
3. The value in articulating interests, rather than discussing positions, lies in the possibility of finding solutions that respect diverse interests, rather than spending all of our energy arguing over which position is right.

At this point, one participant asked why association representatives, rather than manufacturers themselves, are on the Subcommittee. Jay explained that the Technical Team includes manufacturers who actively contribute their input. However, as association representatives at the table explained, their job is to represent an industry point of view that has balanced the sometimes-differing interests of their various members. The group talked about the need for association representatives to bring ideas from the Subcommittee to their respective clients as this promotes two-way communication and results in more productive contributions to the conversations. Dee also reminded everyone of the Subcommittee's decision to have audience members (some of whom are manufacturers) give input during the course of the meeting.

## **CRITERIA FOR PROJECT SUCCESS**

Each Subcommittee member defined their criteria of success based on the question: "What would make this a successful project?" Following were the responses given:

- Some short-term solutions and policy options while thinking of medium and long-term goals; our short-term solutions may amend our thinking about long-term goals.
- Short-term, viable solutions that the legislature will accept.
- Solutions that will allow Goodwill to continue to be a proponent of re-use
- A solution that leads to a highly successful result for all sectors, is environmentally sound, and promotes job creation.
- A consensus of the definition of the problem with measurements of what constitutes success.
- A solution that is financially viable for all and avoids revisiting the issue with the legislature over and over.
- A short-term solution and a long-term system that includes the collection, transportation, and recycling of all e-waste and provides an incentive for manufacturers to design products that are cleaner.
- A system that makes it as easy to recycle a computer as it is to buy one.
- A system that influences product design, is environmentally sound and environmentally just.
- An accurate and complete report identifying both the pro's and con's.
- Solutions that create a level playing field for manufacturers and one in which consumers realize their responsibility in buying and disposal decisions.
- Solutions that ensure the viability of an electronic recycling industry and which support the reuse and recovery of materials.

- Responsible response to the legislature and environmentally viable solutions which are responsive to all citizens.
- A Washington State solution that becomes a nationwide e-waste policy
- A solution that allows us to all go downtown and lobby together.

## **DEFINING THE E-WASTE PROBLEM**

### Technical Presentation

On behalf of the technical team, Jay Shepard gave a PowerPoint presentation regarding the e-waste situation (Attachment 8). The presentation extrapolated, based on available data, the number of consumer electronics (primarily computers and television sets) which are currently in Washington State households and their expected rate of increase. The research showed that the numbers of TV's and computers due to reach end of life over the next 5-7 years represent a potentially significant e-waste problem. Following are some key points:

- Although there are many categories of electronics, which create e-waste, the focus of this project's research is on consumer electronics (primarily computers and television sets).
- Based on extrapolated data, there may be an average of 2.4 televisions in Washington State households. Televisions will increase from 5.6 million in 2003 to 7 million in 2010.
- Based on data from the state of Florida, it appears that television sets have an average life of 14 years. With advances in technology (HDTV, etc.), consumers may purchase sets before their current sets' useful life is over.
- Based on extrapolated data, there may be an average of three computers per household in Washington State.
- Using current census information, national data suggest that household computers are steadily increasing. Washington State has a higher number of computers/household than the national average.
- Between 2003-2010, it is anticipated that 1.5 million laptops and approximately 500,000 desk top computers will reach their end of life. This data is from studies of 16,615 tons of electronic waste.
- There are differences in rural and urban electronic use. An annotated state map showed significantly higher numbers of computers/household on the West side of the mountains and between and among counties in both Eastern and Western Washington. In designing a statewide system, the cost effectiveness will vary from county to county.

Following the presentation, Subcommittee members and audience members asked clarifying questions. In addition to the topics noted above, questions were asked in the following areas:

- Exports: Who is collecting? Where is the e-waste being sent? Is it shipped as a product or waste? How do we ensure the condition of the e-waste is in compliance with environmental laws?

- Charity Disposal: What organizations are included when we talk about “charity disposal”?
- Existing Programs: How are curbside E-waste programs in place in Washington already doing? Are there statistics?

### Economic Presentation

Dave Reich, an economist with Ecology and a member of the Technical Team, then gave a presentation on the economic issues associated with e-waste (Attachment 9). Dave’s presentation framed economics in terms of internal costs (i.e., the “hard” costs associated with various methods of electronic end-of-life options) as well as external costs (i.e., the costs less easy to quantify such as environmental degradation or public safety). Although drawing no conclusions regarding the most overall cost effective end-of-life options, Dave reviewed the areas that the Technical Team still needed to review.

### **Group Discussion**

The group was then asked to comment on what they agreed with in the presentations; what they disagreed with; and what they would like the Technical Team to consider further. Following are some of the comments made by Subcommittee members as well as Technical Team and other audience members:

- There will be revisions to the reports as more information surfaces.
- Data on repair shops should be included with the charities.
- What is the number of pounds per capita that is being deposited at the drop-off programs?
- More information on the recycling market would be helpful.
- There is a large market for residuals. How can this be utilized?
- Look at manufacturer take back programs, such as the recent Office Depot/HP program.
- Look at programs that engage manufacturers in developing the appropriate markets. Panasonic is a good example of a company with strong CRT glass recycling program.
- Let’s get a solid understanding on the current situation in Washington State. Is this an immediate and urgent problem?
- What is a good definition of export? Need more quantitative detail and a solid understanding of the legal issues.
- Let’s look at the costs of local programs.
- NEPSI has a report on costs. It will be out in December. Let’s look at it.
- We need to get more local data. For example, what about manufacturing and retail sales locally? (Sometimes this data is difficult to obtain due to competitive concerns. Jay Shepard is gathering more information in his database, however. There will be a national database available on the electronic programs and the retail programs will be included.)
- Manufacturer requirements impact product-design improvements. Some industries acknowledge that manufacturer participation is an advantage. Television manufacturers do not have an incentive due to the 14-year life span

- of televisions. If the goal is to design products that are environmentally sound, there could be environmental labels on the product.
- Are there other studies besides Florida?
  - With respect to toxicity levels, there is data indicating that American women have high levels of polybrominated diphenyl ether (PBDE). Are we looking at this information?

SWAC Subcommittee members then shared their perspective on defining the e-waste problem;

- City of Tacoma: Cities now have a new waste stream that has to be handled separately from other solid wastes. Hence, it is an immediate and costly problem for local governments, which have no resources to handle it effectively.
- Washington Citizens for Resource Conservation: This is a long-term problem. Funds for handling problems at landfills are required for 30 years after closure, but e-waste lasts much longer. In addition to being an environmental problem, it is a human health problem due to the presence of toxic substances in equipment from its manufacture through use through end of life. It is also a resource issue—we don't want to keep extracting resources when we can be reusing them. Finally, it is an issue about creating safe jobs.
- AWB: Hearing from others that this issue is about human health, mining of resources and government costs. The human health problem may be addressed by means such as increased worker safety. It is important not to overstate the problem.
- Advocates, Inc.: This is a short-term problem since manufacturers will provide their own expertise regarding environmental systems that work economically.
- Goodwill: This is an immediate issue for us. We are losing money and opportunity.
- Snohomish County: Currently, the proper management system for these wastes is creating costs for local government and those providing e-waste recycling options that need to be recouped, such as through fees. There are inherent inefficiencies in our current system. Those actively dealing with the system are not fully recouping costs with fees. The public's perception is that there is a problem, based on their phone calls and demands for solutions, where they have been informed of the issues. This makes it an immediate problem and long-range problem that will grow.
- Retail Association: This is a transitional period where the collection program for these materials is out of sync with the needs. We are on our way to successful solutions. How to pay for the collection is the issue.
- WRRRA: The biggest problem is taking all of these issues into account in producing a good result.
- AEA: The issue is how to handle electronic wastes at end of life. We need to go further to understand the quantity of the problem. We need better data in the assumptions of the scope of the problem, i.e., projections regarding the number of computers per household.
- Total Reclaim: The problem is lack of certainty regarding regulations, processing methods and management of residuals. One of the questions is how to build a solid recycling industry over the long term.

- Consumer education is part of the issue. We all share responsibility for the e-waste problem.

The group began to discuss the laws governing e-waste and how these laws, including international law, would affect the issue in the long run. The Subcommittee asked Ecology to put together a matrix of the laws to help them understand their implications.

## **COMMUNICATIONS PLAN**

Dee asked the Subcommittee to consider how they would communicate information from these meetings to others. The Subcommittee agreed that publishing the notes from the Committee on Ecology's website, along with keeping the interested stakeholders informed, would be sufficient at this time.

Some suggestions were raised on how to respond to the media if the opportunity comes up:

- Know you're not speaking on behalf of the group.
- Don't try to paraphrase or give opinion of the group.
- Be judicious about posting information on the list serve.

Ecology has set up a "Work Room" (secured site) for the Technical Team and another for the Subcommittee members to communicate with each other and post questions. Dee suggested that, if the Subcommittee chooses to use this work room between meetings, all members agree to use the same ground rule on this site as practiced in the meetings.

## **NEXT STEPS**

The Technical Team will begin work on existing projects and programs.

The group agreed on and scheduled the next two meetings, to be held at the Holiday Inn Express on the following dates:

Meeting #2: Sat., March 19: 9:00 a.m. – 3:00 p.m.

Meeting #3: Tues., May 10: 9:00 a.m. – 3:00 p.m.

Audience comments are Attachment 10 to these notes.

## **ACTION ITEMS FROM THIS MEETING**

1. Jay will send the Technical Team work plan to the Subcommittee.
2. Jay will include the names of the SWAC Subcommittee members and interested parties on Ecology's website. This list will include e-mail addresses.
3. Dee will revise the "Draft Group Agreements" to reflect the changes under "Participants," to include the use of substitutes and audience participation. Subcommittee members will e-mail Ginny Ratliff the name of their substitutes within the next week.
4. Dee will make changes to the Subcommittee Interests List and re-distribute it.

5. Jay will post the Technical Team PowerPoint presentation on the Ecology Website.
6. Jay will assemble a matrix of laws related to e-waste, including international laws, for Meeting #2.
7. Jay and Lisa will set up a resource section on the web site.
8. ADI will write up notes from this meeting and send them to Ecology within approximately one week of the meeting. Once Jay has reviewed them, ADI will send them out to all Subcommittee members for review. Subcommittee members will give input within one week of receiving notes. They will then be posted on Ecology's Website.

**Attachment 3****SWAC Subcommittee E-Waste Meeting  
Participant Sign-In Sheet  
Date 10/29/04 Time: 9:00-4:00**

1. Nancy	Atwood	American Electronics Association
2. Vicki	Austin	WA Refuse and Recycling Association
3. Mary	Cabaniss	Notetaker, Agreement Dynamics
4. Dan	Coyne	Hewlett-Packard
5. Frank	Dick	Sharp Electronics
6. Kim	Ducote	CCA Consulting for Rabanco Co.
7. Dee	Endelman	Facilitator, Agreement Dynamics
8. Lori	Evans	Evans Capitol Consulting
9. Jan	Gee	WA Retail Association
10. Dave	Godlewski	Teck Cominco American
11. Jerry	Hardebeck	Waste Management
12. Tiffany	Hatch	Seattle Goodwill
13. Eric	Hulscher	Tacoma Goodwill
14. Sego	Jackson	Snohomish County
15. Larry	King	Hewlett-Packard
16. Craig	Lorch	Total Reclaim
17. Suellen	Mele	WA Citizens for Resource Conservation
18. Brian	Miller	Apple Computer
19. Grant	Nelson	Association of Washington Business
20. Jeff	Olsen	WA House of Representatives
21. Angela	Rae	WA State Recycling Association
22. Ginny	Ratliff	Project Manager, Agreement Dynamics
23. Dave	Reich	Ecology
24. Lisa	Sepanski	King Co. Solid Waste
25. Jim	Sheire	Philips
26. Jay	Shepard	Ecology
27. Jerry	Smedes	Smedes and Assoc.
28. Bill	Smith	City of Tacoma Solid Waste Management
29. Gary	Smith	Independent Business Association
30. Cullen	Stephenson	Ecology
31. David	Stitzhal	NWPSC
32. Dale	Swanson	Matsushita Electronics-Panasonic
33. Frank	Warnke	Advocates, Inc.
34. Sarah	Westervelt	Basal Action Network
35. Nancee	Wildermuth	Attorney at Law
36. Jill	Will	Jail Industries Board

## Attachment 4

### Agenda Washington State Department of Ecology E-Waste Project Meeting # 1: October 29, 2004

Purpose: To talk about how we will carry out this project and to review the current condition of electronic product reuse and recycling in Washington

Desired Outcomes:

- Understanding of project scope and subcommittee's role
- Agreement on procedural ground rules
- Understanding of the interests of each stakeholder group
- Initial discussion of research on reuse and recycling of electronic products
- Action plan for and scheduling of future meetings

Time	Topic
9:00 a.m.	Welcome <ul style="list-style-type: none"><li>• Welcome by Ecology</li><li>• Agenda review and ground rules</li><li>• Group introductions—subcommittee members and audience</li><li>• Discussion of feedback and evaluation forms for subcommittee and audience use</li></ul>
9:30 a.m.	Setting Up the Project <ul style="list-style-type: none"><li>• Review of project purpose and general timeline</li><li>• Role of Subcommittee</li><li>• Draft procedural ground rules for subcommittee discussion and approval</li></ul>
10:30 a.m.	Break
10:40 a.m.	Taking an Interest-Based Approach to these Discussions <ul style="list-style-type: none"><li>• Review of interest-based problem solving method</li><li>• Facilitator summary of interests heard while interviewing subcommittee members</li><li>• Discussion of interests</li></ul>
Noon	Lunch
12:45 p.m.	Criteria for Project Success: What is your picture of a successful project?
1:15 p.m.	Defining the E-waste Problem <ul style="list-style-type: none"><li>• Technical team presentation on e-waste issues</li></ul>
2:00 p.m.	Break
2:10 p.m.	Defining the E-waste Problem (continued) <ul style="list-style-type: none"><li>• Questions and answers</li><li>• Initial discussion of research presented</li></ul>
3:00 p.m.	Next Steps <ul style="list-style-type: none"><li>• Research to be done</li><li>• Communicating these meetings to interested people</li><li>• Agenda for Meeting # 2</li><li>• Meeting Scheduling</li><li>• Action items</li><li>• Meeting evaluation</li></ul>
4:00 p.m.	Adjourn

## Attachment 5

### **Suggested Guidelines for this Meeting**

- Audience members are welcomed as observers. Feedback forms have been provided for your ideas and there will some time for questions and comments at designated times.
- SWAC Subcommittee Members will be the primary participants in discussions.
- Use airtime appropriately (don't withhold your opinions but remember to "share the air").
- Speaking honestly and respectfully.
- Don't interrupt a speaker.
- Focus on interests rather than positions.
- Stay on time and on task.
- Other suggested guidelines?

## **Attachment 6**

PowerPoint presentation on Ecology's Website - see "Meeting 1 Documents":  
<http://www.ecy.wa.gov/programs/swfa/ewaste/index.html>

## Attachment 7

### Washington State Department of Ecology E-Waste Project SWAC Subcommittee Group Agreements

*Edited based on Subcommittee discussion of October 29, 2004*

<b>Goal</b>	To provide consultation to Ecology as the department develops its recommendations to the legislature pursuant to Engrossed Substitute House Bill 2488.
<b>Process</b>	Collaborative, interest-based discussions, hopefully leading to points of agreement.
<b>Participants</b>	SWAC Subcommittee members are to be involved in active discussions as representatives of their constituency. Each Subcommittee member will designate an alternate to be present if the Subcommittee member cannot be and who will be kept current on committee work and issues. Other interested parties attending the meeting may be asked to give their input during some of the discussions, as agreed to by the Subcommittee.
<b>Schedule and Timeline</b>	The group has agreed to meet at least four times between October 2004 and December 2005. There will be a final report to Ecology for purposes of its recommendations no later than December 2005. A status report will be submitted to the legislature in December 2004.
<b>Records</b>	The record of this group will be the official notes taken at these meetings. These notes will be reviewed and approved by the group via e-mail after each meeting.
<b>Communications</b>	Participants will agree on a communications plan and this plan will be used for all communications to interested parties and others not involved in these meetings.
<b>Decision Making</b>	While consensus on advice provided to Ecology is desirable, we recognize the potential of disagreement among Subcommittee members. We agree in this collaborative effort that, if after interest-based discussions, we are unable to reach agreement on some points, Ecology will be provided our various concerns to consider when formulating its recommendations.
<b>Meetings</b>	There will be four one-day meetings to be held in the Seattle-Tacoma area. The Subcommittee may schedule an additional meeting or two, if necessary, complete the work.

**Attachment 8**

Agreement Dynamics, Inc. copyrighted PDF artwork not included in this file

## **Attachment 9**

### **Draft: Interests Articulated by Subcommittee Members** *(As edited based on Subcommittee feedback at 10/29/04 meeting)*

*What are your organization, member or client needs, interests and concerns regarding solutions to the e-waste issues?*

#### **Sego Jackson (Snohomish County Solid Waste Management)**

- Finance system that covers collection through processing costs without reliance on government taking over costs/taxing
- Environmentally and financially sustainable system that leads to smart private sector decisions
- Manufacturer responsibility
- Solution that solves environmental problems here without creating them elsewhere
- Easy and convenient collection System

#### **Suellen Mele (Washington Citizens for Resource Conservation)**

- No system that creates disincentives to recycling
- Environmentally and financially sustainable system that leads to smart private sector decisions
- Manufacturer responsibility
- System that leads to convenient, effective and responsible recycling
- System that is environmentally just
- Solution that examines financing options for schools, government and small businesses as well as individuals
- System that promoted design for environment

#### **Eric Hulscher (Tacoma Goodwill)**

- Solution that enables us to continue accepting electronic items without the liability Goodwill currently has
- System in which we will not lose money when we recycle items we can't sell
- Financially sustainable system

#### **Grant Nelson (Association of Washington Business)**

- Decisions based on sound and balanced assessment of facts
- Solution that does not pit one sector of business community against another
- Solutions that keep businesses in Washington competitive in bigger markets
- Solutions that include existing infrastructure

#### **Craig Lorch (Total Reclaim)**

- Level playing field for e-waste recyclers: Regulatory certainty regarding exporting materials
- System that supports conservation of natural resources
- Financially sustainable recycling system

**Mo McBroom (WashPIRG)**

- System that serves the public interest, rather than special interests
- Manufacturer responsibility
- Environmental protection and the prosperity that allows for it
- System that promotes clean design and responsible recycling

**Bill Smith (City of Tacoma Solid Waste)**

- E-waste should not be an unfunded mandate on Tacoma's rate payers
- Cities reimbursed for costs of collecting and transporting materials
- No competitive disadvantages (level playing field across the State)
- Shared responsibility—manufacturers and consumers

**Nancy Atwood (AeA, Washington Council)**

- Level playing field that doesn't disadvantage one company against another
- Shared responsibility: manufacturers should participate but not have the system completely on their backs
- National solution so that businesses can operate in Washington State as well as other states
- Decisions based on sound and balanced assessment of the facts

**Dennis Durbin (Stevens County Public Works)**

- System that is financially viable for businesses
- Program that encourages legal recycling
- No system that requires government to bear the costs of recycling with current resources or forces them to increase fees to cover costs

**Frank Warnke (Advocates, Inc., representing a consortium of manufacturers)**

- Decisions based on sound and balanced assessment of the facts
- Shared responsibility: one segment of the industry shouldn't have to pay the entire cost
- System that will result in a long-term solution
- Solutions that are financially viable for manufacturers

**Vicki Austin (Washington Refuse and Recycling Association)**

- Decisions based on sound and balanced assessment of the facts
- System that includes our current infrastructure (both haulers and landfill operators)
- No "one size fits all" solution (rural counties and urban centers require different delivery systems)
- Financially sustainable recycling
- No landfill ban of electronics without another solution

**Jan Gee (Washington Retail Association)**

- Decisions based on sound and balanced assessment of the facts
- No requirements for retailers to take back and hold products
- No complex, bureaucratic bookkeeping
- Compensation for administrative costs to retailers
- System that educates consumers regarding e-waste
- Solution that does not penalize Washington businesses/brick-and-mortar retailers versus e-commerce

## **Attachment 10**

PowerPoint presentation on Ecology's Website - see "Meeting 1 Documents":  
<http://www.ecy.wa.gov/programs/swfa/ewaste/index.html>

**Attachment 11**

PowerPoint presentation on Ecology's Website - see "Meeting 1 Documents":  
<http://www.ecy.wa.gov/programs/swfa/ewaste/index.html>

**Attachment 12**

*This comment card was received at the 10/29/04 meeting.*

**SWAC Subcommittee on E-Waste Comment Card**

Please use this card to jot down any comments or questions you have for Ecology.

Topic: *Vision of Success*

What is your comment/question?

*Fair and Equitable shared responsibility among all stakeholders along the recycling continuum; and shared responsibility that is appropriate for each stakeholder; i.e., no one stakeholder bears the burden.*

Name:

*Angela Rae, WA State Recycling Association*

Name/contact information (Optional):

*Angela Rae, WA State Recycling Association*

**Attachment 13**

**At the 10/29/04 E-Waste Meeting, Agreement Dynamics received 10 Meeting Evaluation Forms. The Results are compiled below.**

**SWAC Advisory Subcommittee on Electronics Waste  
Meeting Evaluation**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Comments
The meeting facilities were adequate.	<b>4</b>	<b>5</b>	<b>1</b>			<ul style="list-style-type: none"> <li>• <i>To cold or to hot! Need balance!</i></li> <li>• <i>More hot water, please.</i></li> </ul>
The facilitator was helpful in keeping the discussions on track.	<b>6</b>	<b>4</b>				<ul style="list-style-type: none"> <li>• <i>Thank you for helping us end early.</i></li> </ul>
The E-Waste presentations gave me a better understanding of the issues.	<b>3</b>	<b>6</b>		<b>1</b>		<ul style="list-style-type: none"> <li>• <i>Still very unclear on the core problem.</i></li> </ul>
Opportunities for Q&A and feedback to the SWAC Subcommittee were adequate.	<b>5</b>	<b>4</b>		<b>1</b>		<ul style="list-style-type: none"> <li>• <i>Build public input into agenda</i></li> </ul>
Suggestions for improvement:	<ul style="list-style-type: none"> <li>• <i>Great job!</i></li> <li>• <i>Great Location. Convenient. Parking very good.</i></li> <li>• <i>Handout with slides needs to be more readable. Having "Interest" document ahead of time would have been useful.</i></li> <li>• <i>Microphones for subcommittee, more structured input time for guests.</i></li> <li>• <i>Cookies at lunch OK. PM break is OK too.</i></li> <li>• <i>Lunch was good- Thanks! Good work on the meeting.</i></li> </ul>					

# APPENDIX B

## Distribution Source Data Table

### Computer and television density per square mile within Washington counties

(Note: totals may not equal due to rounding).

County	Population 2005	AREA	Population Density	Households (Estimated 2005)	Household Density	Computers In Use	Televisions In Use	Computer Density	Television Density
<b>State of WA</b>	6,233,345	66,544	93.7	2,442,435	36.7	2,738,947	5,861,844	41	88
Adams	17,458	1,925	9.1	5,584	2.9	6,262	13,402	3	7
Asotin	21,466	635	33.8	8,829	13.9	9,901	21,190	16	33
Benton	151,522	1,703	89.0	57,262	33.6	64,214	137,429	38	81
Chelan	71,169	2,921	24.4	26,908	9.2	30,175	64,579	10	22
Clallam	64,969	1,740	37.3	27,843	16.0	31,223	66,823	18	38
Clark	391,264	628	622.8	146,648	233.4	164,451	351,955	262	560
Columbia	3,914	869	4.5	1,688	1.9	1,893	4,051	2	5
Cowlitz	98,764	1,139	86.7	38,540	33.8	43,219	92,496	38	81
Douglas	36,257	1,821	19.9	13,207	7.3	14,810	31,697	8	17
Ferry	7,901	2,204	3.6	3,211	1.5	3,601	7,706	2	3
Franklin	52,642	1,242	42.4	15,929	12.8	17,863	38,230	14	31
Garfield	2,436	711	3.4	1,033	1.5	1,158	2,479	2	3
Grant	82,397	2,681	30.7	28,066	10.5	31,473	67,358	12	25
Grays Harbor	66,490	1,917	34.7	26,834	14.0	30,092	64,402	16	34
Island	74,738	208	358.6	29,929	143.6	33,562	71,830	161	345
Jefferson	28,308	1,814	15.6	12,935	7.1	14,505	31,044	8	17
King	1,786,803	2,126	840.5	740,296	348.2	830,168	1,776,710	390	836
Kitsap	236,403	396	597.0	90,998	229.8	102,045	218,395	258	552
Kittitas	34,314	2,297	14.9	13,908	6.1	15,596	33,379	7	15
Klickitat	20,338	1,872	10.9	8,108	4.3	9,092	19,459	5	10
Lewis	73,005	2,408	30.3	28,215	11.7	31,640	67,716	13	28
Lincoln	10,095	2,311	4.4	4,202	1.8	4,712	10,085	2	4
Mason	53,789	961	56.0	21,186	22.0	23,758	50,846	25	53
Okanogan	41,458	5,268	7.9	16,299	3.1	18,278	39,118	3	7
Pacific	20,957	933	22.5	9,373	10.0	10,511	22,495	11	24
Pend Oreille	12,679	1,400	9.1	5,190	3.7	5,820	12,456	4	9
Pierce	740,838	1,679	441.3	282,282	168.1	316,551	677,477	189	404
San Juan	15,480	175	88.5	7,330	41.9	8,220	17,592	47	101
Skagit	113,136	1,735	65.2	43,153	24.9	48,392	103,567	28	60
Skamania	10,483	1,656	6.3	4,109	2.5	4,608	9,862	3	6
Snohomish	666,735	2,089	319.1	253,255	121.2	284,000	607,812	136	291
Spokane	441,068	1,764	250.1	175,065	99.3	196,318	420,156	111	238
Stevens	42,105	2,478	17.0	16,435	6.6	18,430	39,444	7	16
Thurston	234,053	727	321.9	94,744	130.3	106,246	227,386	146	313
Wahkiakum	3,906	264	14.8	1,624	6.1	1,821	3,898	7	15
Walla Walla	57,475	1,271	45.2	20,485	16.1	22,972	49,164	18	39
Whatcom	180,463	2,120	85.1	70,628	33.3	79,202	169,507	37	80
Whitman	40,445	2,159	18.7	15,227	7.1	17,076	36,545	8	17
Yakima	225,622	4,296	52.5	75,877	17.7	85,088	182,105	20	42

# APPENDIX C

## Planned Meeting Outlines

### Meeting one: Review of the problem

<b>Subject/Issue</b>
<b>Amount of electronic waste and where they go</b>
How much electronic waste is generated in Washington State?
How much is being disposed?
How much is being recycled?
How much is exported from Washington subject to reporting under 40 C.F.R. part 262 -STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE?
How much is exported and not subject to reporting under 40 C.F.R. part 262?
Are exported electronics handled in compliance with national laws of export destination countries?
<b>What are the problems associated with unwanted electronic products received by charities?</b>
<b>What is the suitability of lined and unlined facilities for the disposal of covered electronic products?</b>

### Meeting two: Review of projects and programs

<b>Subject/Issue</b>
<b>What programs and projects are being used to collect, recycle or reuse electronic products?</b>
Existing and new pilot collection, recycling, and reuse projects with associated costs and results
Existing programs and infrastructure for reuse and recycling of electronic waste with associated costs and results
Electronic product manufacturers' programs for covered electronic product collection, recycling, and reuse with associated costs and results
Other models that are being considered for covered electronic product collection, recycling, and reuse with associated costs and results
<b>What is the effectiveness of the projects and programs?</b>
Costs and results of collection, recycling and reuse projects and programs

### Meeting three: Evaluate projects and programs effectiveness to address the problem

<b>Subject/Issue</b>
What programs and projects are the best models?
Do any of the existing projects or programs stand out as models?
What improvements need to be made to the existing projects or programs to improve their effectiveness?

<b>Subject/Issue</b>
Are there other alternatives that should be considered based on the analysis of existing projects and programs?
What is the potential of voluntary programs?
What, if any, financial incentives to develop business opportunities and jobs in electronics collection, reuse and recycling work?
What are the best recycling services and financing options available for charities, school districts, government agencies, and small businesses?
<b>Unwanted electronic products – what are the options?</b>
What are the potential impacts of recycling or reusing electronic waste on jobs, recycling infrastructure, and economic development?

## **Meeting four: Develop recommendations**

<b>Subject/Issue</b>
What are the best options to establish and finance a statewide collection, reuse, and recycling program for covered electronic products?
How would they be funded?
What regulations or legislation will be required to establish and finance the statewide program?
Performance measures - how will we know we are succeeding?