



**Benefit-Cost & Least Burden Analysis**  
**Chapter 173-900 WAC - Electronic Product Recycling**

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# Executive Summary

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## Benefit-Cost Analysis

Based on research and analysis required by RCW 34.05.328(d)(e) the Department of Ecology determines:

*The probable benefits of an electronic product-recycling program outweigh the probable costs.*

The rule re-states and implements several of the requirements in the law. Three specific cases trigger further economic analysis. These are definitions, registration procedures for manufacturers, collectors and transporters and Ecology's interpretation of the administrative fee law. The definitions, in and of themselves, do not create costs but define costs by affecting how the rule is implemented.

### **Benefits**

For this program, the estimated benefit is at least \$5.3 million per year. This is a low estimate of benefits, including only current levels of returns, and may eventually be higher.

### **Costs**

The fee cost for Phase 1 is \$475,000 for the first 18 months and \$237,000 annually thereafter. There are two reasons that Ecology expects additional unquantified costs:

1. The largest of these is the potential that manufactures will spend money to provide information that will change their tier assignment for the fee. This first cost is unknown but could be large.
2. The second is that registration will take time. Ecology designed an easy to use electronic registration process. Manufactures can also register over the phone call. Ecology expects registration will take between 5 and 20 minutes per manufacturer. However, if the manufactures have to look up data the cost could be higher. Ecology expects the cost of registration to be small by comparison with the fees.

We also note that this first fee is less than the cost to manufacturers of actually carrying out the program. The added cost from the recycling activity will be determined in the second phase of rule making.

### **Quantified net benefits**

Ecology expects the value of the Phase 1 rule will be \$5 million per year when Ecology adopts Phase 2 of the rule.

## Least Burden Analysis

Based on research and analysis required by RCW 34.05.328(d)(e) the Department of Ecology determines:

*Ecology is adopting the least burdensome version of the rule for those who are required to comply, given the goals and objectives of the law.*

Ecology considered a variety of approaches for the fee structure both prior to rule making and during the rule making process. This rule establishes the administrative fees manufacturers will pay to Ecology. The fee provides revenue to cover Ecology's administrative, oversight and enforcement costs. Ecology hopes the procedures in this rule will allow lower cost but effective implementation of the program.

- The legislature chose cost internalization of the recycling program (manufacturers internalize the costs of the program in their overall costs of doing business) over other financing methods because it would have the least impact on in-state retailers and their customers.

The law directed Ecology to:

*“base this fee on a sliding scale that is representative of annual sales of covered electronic products in the state.”*

- Ecology decided that unit sales would be the basis for the administrative fee rather than dollar sales based on advice from the regulated community about the relative accuracy of unit and dollar sales.
- Ecology decided to use a fee structure composed of tiers. Advice from the regulated community indicated they did not want Ecology to spend a great deal of money to collect detailed data upon which to base the fee, which they would then have to pay for. Rather, they advised that the cost and the amount of data gathered annually would be less if Ecology used a tiered approach based on generally available market share data.

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# 1.0 Introduction

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## 1.1 Background

Chapter 173-900 WAC provides for the recycling of covered electronic products once they are no longer wanted. This law generates benefits by reducing potential damages from hazardous components of discarded electronic products and from conservation of valuable resources that they contain.

Ecology estimates that between 2003 and 2010 more than 4.5 million personal computers, 3.5 million cathode ray tube monitors and 1.5 million flat panel monitors will become obsolete in Washington State. Local governments have been taking action to prevent electronic waste from getting in the landfill.<sup>1</sup>

## 1.2 New law – RCW 70.95N

At the request of Washington lawmakers in 2004, Ecology and the Solid Waste Advisory Committee (SWAC) developed recommendations for how the State can implement and finance a program to collect, recycle, and reuse electronic products. Ecology and the SWAC worked with representatives below:

- Electronic product manufacturers
- Electronic product retailers and waste haulers
- Electronics recyclers
- Charities, cities, counties, environmental organizations, public interest organizations, and other interested parties

Based on the recommendations from Ecology and the SWAC, Washington lawmakers approved a new law - RCW 70.95N, Electronic Product Recycling - that became effective July 1, 2006.

This new law requires computer and television manufacturers to provide consumer-convenient recycling of their covered electronic products throughout our state.

Covered electronic products are defined as:

- computers,
- televisions,
- computer monitors,
- portable or laptop computers

used by households, small governments, small businesses, and charities. Manufacturers must make these services available to these groups by January 1, 2009.

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<sup>1</sup> Some electronic components may contain chromium, lead, beryllium, mercury, cadmium, nickel, zinc, polybrominated diphenyl ether, or other brominated fire retardants. One concern is that cathode rays contain a large amount of lead, which can be harmful to the environment if not disposed of properly through a company that has the facilities to handle such waste.

## 1.3 Rule Making

The new law requires Ecology to design and oversee the electronic products recycling program by adopting and implementing rules. Ecology is writing and adopting the rule in two phases.

For phase one of the rule making Ecology will focus on the topics below:

- **Manufacturer registration process**  
After January 1, 2007, manufacturers of covered electronic products, with legal ownership of the brand name, must register with Ecology before they sell or have a retailer sell their products in Washington State.
- **Manufacturer fee structure and payment schedule**  
Ecology must develop the fee structure and manufacturers must pay their fees by January 1, 2007.
- **Mandatory brand labeling**  
Starting January 1, 2007, any manufacturer (or assembler) of computers, televisions, or monitors must label their products with a brand name. Unbranded products may not be sold in or into Washington.
- **Collector and Transporter registration**  
All collectors, transporters, and processors who offer electronic product recycling services must register with Ecology. Ecology will post a current list of registered electronic product recycling service companies on our web site.

For Phase 2 of the rule making we will focus on the remaining requirements of the new law. This includes:

- Recycling plan submittal
- Plan review and content
- Program implementation
- Return share and equivalent share calculations
- Processor registration
- Standards for collectors, transporters, and processors
- Additional topics identified during the public involvement process

We will modify this analysis when we adopt Phase 2 of the rule.

### ***Interpretation of the law***

Most of the rule language is taken directly from the law - Chapter 70.95N RCW. However, Ecology must interpret certain aspects of the law to implement it as required.

We describe these below along with a discussion of the baseline.

The three most significant interpretations are:

### ***Definitions***

- Ecology provides an extensive list of definitions in section WAC 173-900-030.

The rule language includes definitions for a: computer, television, monitor, and video display device. These definitions drive the impact of requirements elsewhere in the rule. <sup>2</sup>

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<sup>2</sup> For example, the definition of a manufacturer has affected how Ecology counts the Covered Electronic Products (CEPs) that are branded by the manufacturer. This affects who will pay fees in each tier.

- The law requires manufacturers, transporters, and collectors to register with Ecology.

The rule language defines the registration process for each type of business in section WAC 173-900-200.

### ***Manufacturer registration***

- The rule defines who is can sign the registration application form.
- As part of the registration process, manufacturers must provide Ecology a color graphic and word description of all brand labels of their products.
- After 2006, Ecology will give all manufacturers a 60-day notice before their registration fee is due.
- Ecology will have a 60-day review period for the manufacturer registration application.
- Manufacturers can submit the registration application by mail or electronically. They can also register by phone. Ecology will not accept registration by FAX.

### ***Transporter and collector registration***

- The rule defines who is can sign the registration application form.
- Transporters and collectors must register by September 1, 2007. They can submit the registration application by mail, electronically, or by phone. Ecology will not accept registration by FAX.
- Once the program is running, transporters and collectors that have previously registered need to resubmit their application form between July 1 and September 1 each year.
- Once the program is running, transporters and collectors that are not registered can submit their registration at any point throughout the year.

### ***Administrative fees***

The Administrative fees are defined in section WAC 173-900-210. Ecology developed the fees according to section RCW 70.90N.230 of the law:

*“Ecology must base the registration and plan review fees for manufacturers on a sliding scale that is representative of annual sales of “covered electronic products” in the State.”  
This economic analysis examines the way Ecology chose to interpret this section of the bill.*

### ***Baseline for analysis***

This is a new rule. Ecology cannot implement the new law without adopting a new rule. Therefore, Ecology used the requirements in the new law, Chapter 70.95N RCW, as the baseline to analyze the impacts of the rule. Ecology has evaluated each section of the new rule and determined which of them are likely to have significant impacts on future applicants. The definitions, most of the registration requirements, and fees clarify the law. Ecology evaluated these clarifications when they affected other requirements of the rule.

## 2.0 Estimated Benefits and Costs

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### 2.1 Summary of benefits and costs

The estimated net benefit that remains after subtracting the costs of Phase 1 is \$5 million. This net benefit will begin to accrue when Ecology adopts Phase 2.

The law generates estimated benefits of at least \$5.3 million per year. The rule generates costs of nearly \$500,000 in the first 18 months. Because Ecology cannot implement the law and because the benefits cannot accrue without this rule, Ecology compared the costs of the rule with the benefits of the law itself.

The benefits quantified below represent the benefits of the law while the costs only represent the costs of Phase 1.

- Phase 1 does not generate any recycling and is simply a prerequisite for Phase 2. Phase 2 will generate recycling and is, therefore, required for the estimated benefits to increase.
- Phase 2 will create a new set of costs to evaluate. Therefore, when Phase 2 rule making starts, Ecology will re-evaluate the net benefits to include both Phase 1 and Phase 2 costs and Ecology may substantially revise this analysis.
- If Ecology does not adopt Phase 2, there will be no increased benefits to the Phase 1 rule. We do not expect this to happen because the law requires Ecology to adopt Phase 2 of the rule.

Registration will create some costs. The total registration costs are likely to be small in comparison to the fee. However, some manufacturers may choose to spend time and money to estimate the units they sell, in Washington, to justify a change in their tier assignment. If they choose to do this, it will increase the costs for registration. Because of the uncertainty around registration costs, we have used a qualitative approach to analyze them.

### 2.2 Estimation of Benefits

Ecology must evaluate the benefits based on the effect of the rule. The law should increase recycling and reduce the number of electronic products that reach landfills. This is beneficial because most electronic products have some contaminants. Recycling should increase because there is no cost at the time of disposal to the landfills and consumers of electronic products. The cost is transferred by the rule to the manufactures. This makes proper disposal of the equipment more likely, which will increase recycling of electronic products.

#### **Methods**

There are four possible methods Ecology can use to analyze the benefits of the law:

1. **Estimate the possible benefits of reduced costs to landfill owners for cleaning up contamination from discarded electronic products.**

In the past landfill cleanups have been very expensive. This method would have produced the highest benefit value. However, we have to examine the likelihood that such cleanups would be triggered.

First, some share of the benefit from reducing contamination is already being handled by the landfill operators. In order to protect the landfill areas, the local governments and landfill owners

have already taken action to separate electronic products from the waste stream. Some comments indicated that landfill owners could continue to handle these costs. However, as the costs for product separation increase, the landfills have shifted some of these costs to the consumer by refusing to take the discarded products or by charging extra for them. Unfortunately, this has made it harder for consumers to dispose of electronic equipment properly.

Second: Now that landfills are lined, the high cost cleanups should be rarer. Given that the contamination the needs for high costs cleanups have declined.

Given the reduced likelihood of these high cleanup costs, we did not choose this method to estimate the benefits of the law.

**2. Estimate the possible benefits should the average cost of recycling go down.**

Sometimes an activity becomes cheaper per unit if the volume of recycled material increases. Because the rule may increase the participation in the processing of recycled electronics, the average cost per unit of recycling may fall. At this time, Ecology does not have an estimate for this possible cost reduction. This may be possible for Phase 2 if data is available from Maine. This possible benefit cannot be quantified. Therefore, we did not choose this method to estimate the benefits of the law.

**3. Estimate the possible benefits to local governments/landfill owners for reduced costs for separating electronic products from the waste-stream.**

It is possible that some local governments/landfill owners will have lower separation costs. Separation costs may or may not be affected because other resources are sometimes recovered. This possible benefit cannot be quantified. Therefore, we did not choose this method to estimate the benefits of the law.

**4. Estimate the *Willingness to Pay* for recycling electronic products.**

Willingness to pay means that people like something because it is beneficial for them and they are therefore willing to pay for it. It is one measure of how much a thing is worth to them. In this case, willingness to pay is defined based on what people are paying a variety of programs in order to be able to recycle.

Because methods 1, 2, and 3 above cannot be quantified, Ecology has chosen to base our analysis on the willingness to pay for recycling electronic products. The other methods may be used for Phase 2

***Estimate of willingness to pay***

To estimate *Willingness to Pay*,<sup>3</sup> Ecology analyzed the prices that individuals and businesses are currently paying, in Washington, to recycle electronic products. We also took into consideration the results of A Consumer Electronics Association survey that found 42% of households recycle their electronic waste.<sup>4</sup>

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<sup>3</sup> One commenter misunderstood the meaning of willingness to pay. This method does not measure the cost to the landfills because the service may be heavily subsidized in order to reduce the probability of contamination. It is merely what people have been paying, on average, to recycle.

<sup>4</sup> One commenter indicated that Ecology had misread the article cited here. This is the quote: "Likewise, though 69 percent of the survey respondents say they recycle household trash all or most of the time, 42 percent say they recycle electronics and 43 percent say they recycle appliances with the same frequency." The commenter indicated that most electronics go to charity or to friends and family. The article shows that 88% do. The question for this analysis is, what

Using this information Ecology came up with an average that represents the lowest amount a consumer is *Willing to Pay* for an electronics products recycling program.

Ecology estimates the current willingness to pay for electronic product recycling by Washington citizens is \$5.3 million. The results are displayed in Table 2a. Details of the data are located in Appendix B.

\$5.3 million dollars is a conservative estimate of the benefits of this rule for the following reasons:

1. A person who pays a price for a one-time-only service is willing to pay at least that amount but might have been willing to pay more.
2. The cost of contamination may have been higher than we estimated. This is because the analysis does not count the benefit of proper disposal or the cost of improper disposal by individuals who were unwilling to pay a fee. This latter cost would be the cost of proper disposal, which is imposed on others, or the potential cost of the contaminants not captured by the current system.
3. The recycling program provides a convenient way to dispose of electronic products at no cost to the owners. This provides an incentive to dispose of the products responsibly. Therefore, Ecology expects the recycling rate for electronic products to increase. The result of a higher recycling rate of electronic products is less contamination in the waste stream and better environmental protection.
4. As Ecology and manufacturers implement the recycling program, there will be more locations for individuals to turn in the equipment. The increase in locations will reduce any previous travel costs associated with the taking the obsolete or unwanted electronic product to a recycling center.
5. Due to time constraints, it was not possible to evaluate two other possible cost savings: reduce cost of recycling product and reduced separation costs. Information on these costs may be available in October 2006 from Maine's new program.

**Table 2a. Average recycling fees, unit returns, and willingness to pay (WTP)**

	<b>Monitors</b>	<b>Desktop Computers</b>	<b>Laptops</b>	<b>Televisions</b>	<b>Total</b>
<b>Recycling fees in WA (per item)</b>	\$10.84	\$10.20	\$8.97	\$20.52	
<b>Amount Disposed Annually</b>	206,105	120,416	59,182	425,910	
<b>Amount Recycled Annually</b> (Assumed 42% recycling rate) <sup>5</sup>	86,564	50,575	24,856	178,882	
<b>Estimated WTP for Electronic Recycling in WA</b>	\$938,147	\$515,918	\$223,069	\$3,669,768	\$5,346,862

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happens when they are finally discarded. Recheck of article 10/18/06,  
[http://www.findarticles.com/p/articles/mi\\_m0KWH/is\\_12\\_43/ai\\_n15978785/print](http://www.findarticles.com/p/articles/mi_m0KWH/is_12_43/ai_n15978785/print)

<sup>5</sup> CEA Study Finds Most Unwanted Electronics Go To Secondary Users, Recycling Today.

## 2.3 Estimation of Costs

### ***Administrative fees and registration cost***

Ecology estimates the primary costs for Phase 1 of this rule are the administrative fees that Manufacturers must pay Ecology for registration and recycling plan review. Companies that collect, or transport the electronic equipment will also incur registration costs. The law requires Ecology to establish registration and plan review fees based on a sliding scale that represents the amount of electronic products a manufacturer sells each year in Washington.

The amount of fees Ecology can collect is limited by a legislated appropriation. It sets the total cost of all the fees. The appropriated budget for the initial 18 months is \$475,000. The subsequent year, the appropriated amount drops to \$237,000 and will increase by the fiscal growth factor in succeeding years. Table 2b below shows the total Ecology will collect each year for the administrative fee.

**Table 2b – Total Fee Collections Authorized by Appropriation**

	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Appropriated to collect</b>	\$475,000	\$237,000	\$250,000
<b>Fiscal growth factor</b>			5.25%
<b>Adjusted budget collection</b>	\$475,000	\$237,000	\$250,000

### ***Manufacturers' market share***

Ecology created a tiered fee schedule based on the number of units each manufacturer sold, each year, in Washington State. The reason Ecology interpreted yearly sales in terms of units is detailed in the Least Burden Analysis.

Each year, Ecology will use available low-cost data to determine each manufacturer's unit market share and base the tiered fees accordingly. See Table 2c below for the current tiered structure.

**Table 2c - Percentage of manufacturer market share**

	<b>Manufacturers' Market Share</b>
Tier 1	5% or greater
Tier 2	1% to <5%
Tier 3	0.1% to <1%
Tier 4	0.03% to <0.1%
Tier 5	0.01% to <0.03%
Tier 6	Below 0.01%
Tier 7	No sale of products only returns.

## **Registration costs**

Ecology has tried to develop a simple registration process for the transporters, collectors, and manufactures. We estimate it will take between five minutes and two hours, for each manufacturer to fill out the registration form. If we assume a cost of \$50 per hour, we can expect it will cost between \$4 and \$200 for companies to register. Manufacturers who have many brands will need more time to fill out the form. Small manufactures that have small fees of \$100 or less may have more costs from filling out forms. For large manufactures with higher fees, the cost of the fee dwarfs the cost of registration.

## **Costs for using brand names**

There may be some initial confusion between manufactures that own a brand and companies licensed to produce the equipment. Some manufactures license other companies to use a brand name in a setting where the royalty will not cover the cost of fees or recycling. In this case, the parties may have to develop additional contracts to allocate the costs between them. This additional contracting is an uncounted cost.

Some manufactures have complained that they may no longer have easy access to brand logos used years ago. This is an unknown cost.

## **Tier assignment**

Tier assignment has been difficult. To create the Tier Schedule Ecology tried to get market share data from each manufacture. Multinational manufactures are very guarded about sharing their information so only three gave us data. Some large manufactures indicate that they sell to distributors and wholesalers who may or may not ship into Washington. Therefore, these manufacturers may not know where the product goes. Large manufactures indicate that they do not know whether the final buyer is a covered entity or not. Other manufactures did give us detailed data for which we are grateful.

Ecology also tried to make sure each manufacture was aware of where they might fall within the tier structure to give them an opportunity to give us data that might change their Tier assignment. Some manufactures told us they would stay where they are in the tier structure because they do not want to tell us about their market share.

Given the difficult time Ecology had getting data, for this analysis, we used a distribution in order to estimate the number of manufactures that will remain in each tier and the range of fee. Ecology was also able to use several data sources to estimate the market share of manufactures that sell electronic products within Washington.<sup>6</sup>

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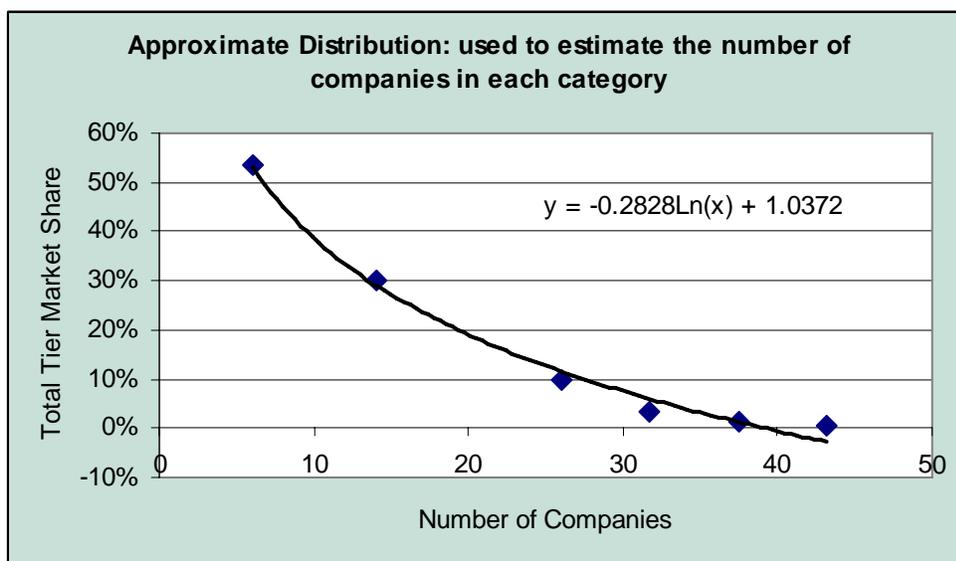
<sup>6</sup> **TVs:** NPD data was combined with the market shares of manufacturers that do not report to NPD to estimate television sales: *Formula = [AdjustedNPD share x Estimated Units sold per household x (market share adjustment)]*. Where: the units sold in Washington is based on the average of Washington's share of the US population and Washington's share of gross domestic product (1.9%), the adjusted NPD share is a function of the missing shares that may be sold at Costco, Wal-Mart and Sam's Clubs, where the market share adjustment is reversed out for those manufacturers that do sell at Costco, Wal-Mart and Sam's Clubs using  $1/(1-\text{missing share})$  for brands sold by Costco, Wal-Mart, and Sams Club based on Twice.Com retail data. Early criticism from Philips indicated that NPD.com data does not include sales from these entities and they generally sell to covered entities. NPD concurs. Ecology has adjusted the estimates accordingly.

**Computers:** EtForecast was used to estimate computer sales: *Formula = Market Share x estimated unit sales for Washington*. Some retailers reported on their sales of their own brands. Small manufacturers reported on their sales of their own brands. A few of the large manufactures reported unit sales. Given the level of uncertainty Ecology felt this

Ecology expects the number of manufactures in each tier will continue to change as new data becomes available, between now and the November 9 deadline. The reader should note that the data on the web shows tier assignment based on the data as of October 18, 2006. Ecology derived the numbers below based on an estimated curve (see Figure 1 below). The curve uses market share for manufacturers for which market share data is available.

**Figure 1: Estimating the number of manufactures in each tier.**

Each blue diamond represents the expected combination of number of manufactures and market share for the tiers 1 through 6 moving from left to right.



### Estimated Fees by Tier

- Tier 1** - Ecology estimates that each member in Tier 1 covers at least 50% of the Washington market at the time of this writing. All of these manufactures produce two or more of the three different types of covered electronic products: TVs, Monitors, and Computers. Ecology estimates if three manufactures end up in Tier 1 the fees could be as high as \$76,000. If four or five manufactures end up in Tier 1, the fees may be between \$45,000 and \$64,000. There is some small possibility that only two manufactures may be in Tier 1

The fees may increase or decrease based on new data on monitors.

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reported data was better than extrapolated data and used it. Unknowns were automatically placed in Tier 4 and assigned a mean estimate based on the sales for manufacturers in the tier for which the market share was already provided. National CEA data on sales was used to estimate the total units initially.

**Monitors:** The quality of the extrapolations for TVs and Computers is better than the monitor data. Monitors are extrapolated based on the number of computers purchased assuming 86 monitors per 100 computers. 2003 data indicates that for every computer, 108 monitors are purchased. This is problematic because it is older data and the market was more heavily affected by desk tops. More recent data for a single manufacture indicates that for every 100 computers, 43 monitors are purchased. This is problematic because this manufacture produces lots of lap tops. Another manufacture produces only lap tops with no monitors. Another manufacturer indicates 106 monitors are sold per computer. CEA data indicates that for every 100 computers purchased (which may or may not come with a monitor), 38 after market computers are purchased. This is problematic because there is no indication what share of the listed computers come with a monitor.

- **Tier 2** - The 13 to 19 manufactures who qualify for tier 2 are responsible for about 40% of the market share. Ecology estimates these manufactures will pay \$11,000 to \$14,500 in 2007 and \$6,000 to \$7,200 in 2008.

There is a mix of multinational, national, and local participation in Tiers 3 and 4. Ecology identified many of the larger manufactures through the same data sources as Tiers 1 and 2. However, many manufactures also provided data directly on either the number of units or the number of covered units they manufacture.

- **Tier 3** - Ecology estimates that between 20 and 35 manufactures will cover about 10% of the market. We estimate these fees to be between \$2,200 and \$1,500 for 2007 and \$1,100 to \$700 for 2008. Most of these manufactures produce only one of the three types of covered electronic products: TVs, Monitors, and Computers. Most of these manufactures are very guarded about sharing information about their market share. Ecology has some national data for many of these manufactures; however, brand ownership remains a difficult issue.
- **Tier 4** - Ecology assigned many manufactures for whom the market share was unknown to Tier 4. More than half of the 70 manufacturers manufactures currently in the tier had not reported to Ecology in any form at the time of this writing. Many may choose not to report their unit sales at all. If that is the case, they will stay in Tier 4. Ecology currently estimates between 20 and 32 manufactures will remain in Tier 4 until after November 9. These manufactures will cover less than 2% of the market and we estimate the fees to be between \$100 and \$300 for 2007 and between \$50 and \$150 for 2008. Ecology based the estimated number of manufactures in the table below on an assumption that the distribution from tier 1 to tier 6 can be estimated based existing data. This data is displayed in figure 1 above.
- **Tier 5** - Small manufactures and manufactures that do other kinds of business dominate this Tier. Manufactures that do other work include repair shops, software companies, federal contractors, and other retail. With less than half of the manufactures reporting in, the number of manufactures that will stay in Tier 5 is unclear at the time of this writing. Ecology estimates that between 30 and 47 manufactures will be in Tier 5 and that they cover 0.5% of the market. We estimate these fees will be between \$50 and \$120 for 2007 and between \$20 and \$50 for 2008.
- **Tier 6** - Manufactures that generally do other work dominate Tier 6. Manufactures that do other work include repair shops, software companies, federal contractors, and other retail. With less than half of the manufactures reporting in, the number of manufactures that will stay in Tier 6 is unclear at the time of this writing. Ecology estimates that between 30 and 43 manufactures will be in Tier 6 and that they cover 0.1% of the market. We estimate these fees will be between \$10 and \$20 for 2007 and \$7 to \$10 for 2008.

### **Cost Shift**

Over time, the cost of the program will shift due to the following:

- Despite repeated notices, many manufactures are not responding. This is in part due to lack of interest from small manufactures located outside of Washington and the complexity of brand name ownership and licensing. In many instances, the entity Ecology initially understood to be the owner of the brand name was in fact a licensee.
- In the first months of 2007, while the program is being set up, the small manufactures that are unaware of the new recycling program are more likely to miss deadlines and have their product listed as a non-compliant product.

- In other instances, there are multiple owners of a brand name but for diverse purposes (i.e. TVs vs. Computers).

At the time of this analysis, these are still being corrected at a rate of one or two per week. Some corrections have involved negotiations between multiple manufactures.

In the long term, new manufactures with a zero return share will have a temporary advantage because they will not have to pay for recycling until their equipment shows up in the recycling or waste stream. Some small brand name manufactures may find it advantageous to rearrange their brand licensing relationships in order to avoid responsibility. Thus, the program may increase market entry and exit at the low end of the market.

Washington is only 2% of the national market and 5% of the world market. Further, other markets are growing more rapidly. Therefore, it is unlikely that the Washington program by itself could have a substantial impact on national and multinational corporate behavior. However, the Washington program is the third in the country and the industry is seeing a trend. The prospect of a national recycling program or multiple state programs creates a basic change in the long-term cost of each electronic unit and will affect both branding and market entry and exit.

## **2.4 Uncertainty and Analysis Results**

The following variables probably generate costs that this analysis does not address.

### **1. Cost of Requesting Tier Reassignment**

The main uncertainty around the estimated costs of this rule is from tier reassignment requests. Manufactures can do research to find out how many covered electronic products they sell into Washington to determine which tier they belong in. However, it is unclear how much money manufactures will spend to do this. We do know they are only willing to do this if it will save them money.

Ecology estimates that the most a manufacture is willing to spend on tier assignment is the amount they would save in paying fees. See Table 2d, Column “Rounded” which shows a hypothetical set of fees and subtracts the tier a manufacture would like to be reassigned to. For the scenario below, this means that a manufacture that wants to move from Tier 1 into Tier 2 would be willing to spend up to \$44,000 if they could convince Ecology their original Tier assignment was wrong.

In the extreme, if every manufacture requested a tier reassignment, the cost of the rule could nearly double. However, since the categories are broad, it is unlikely that all the manufactures would spend the maximum on tier reassignment. So far, only a handful of large manufactures have been willing to spend money to generate the data they need to move them out of one tier and into another.

Many small manufactures have been able to estimate how many units they sell into Washington based on their own knowledge of their operations.

### **2. Change in Fees**

Data changes for large manufactures may change the tier status for several manufactures. Each time the data changes for a large manufacture, that change also changes the total. Market share equals a given manufacture’s units divided by total units for all manufactures. Thus if a large

manufacturer shows that a large share of its units were sold to uncovered entities, the divisor (total units for all manufactures) falls. This increases everyone else's market share.

The fee for each tier equals total market share for all manufactures in the tier divided by the number of manufactures in the tier. As manufactures move into and out of tiers, the fee for each tier changes.

Sources of tier uncertainty include:

- The share of product sold to covered entities. In some cases, a company knew that a certain share of its product was sold to commercial enterprises but did not know whether this was large corporations or small covered corporations. In this case, Ecology assumed that 50% of the commercial share was covered because 100% of commercial share is probably wrong and 0% of commercial share is probably wrong.
- The number of monitors sold with a computer and the lack of data on total monitors sold.
- The share of TVs sold by Wal-Mart and Costco which are not included in the NPD data.
- Manufactures with no unit data available must automatically go into Tier 4. Their assigned number of units based on the average number of units manufactured by manufactures for whom the number of units was known. At the time of this writing, Ecology is assigning this average number of units to over half of the tier 4 manufactures.

Given the data as it stood on 10/18/06, the expected fees for the first two years are displayed in Table 2d below. The reader should note that manufactures have until November 9, 2006 to provide data on their number of units. Changes in data will change both tier assignments and fees.

**Table 2d – Example of Fee Breakdown**

<b>Scenario with 6 tiers</b>						
Initial year						
Tier	# Companies	% of Sales	# Units	Units Cutoff	Total Collection	Fee
1	4	47.4%	678,437	71,500	\$225,329	\$56,300
2	15	40.4%	578,452	14,300	\$192,121	\$12,800
3	30	9.6%	137,495	1,430	\$45,666	\$1,500
4	52	1.7%	24,399	429	\$8,104	\$200
5	35	0.7%	10,215	140	\$3,393	\$100
6	31	0.1%	1,164	1	\$387	\$12
<b>Total</b>	<b>167</b>		<b>1,430,163</b>		<b>\$475,000</b>	
Second year						
Tier	# Companies	% of Costs	# Units	Units Cutoff	Total Collection	Fee
1	4	47.4%	678,437	71,500	\$112,427	\$28,100
2	15	40.4%	578,452	14,300	\$95,858	\$6,400
3	30	9.6%	137,495	1,430	\$22,785	\$800
4	52	1.7%	24,399	429	\$4,043	\$80
5	35	0.7%	10,215	140	\$1,693	\$50
6	31	0.1%	1,164	1	\$193	\$10
<b>Total</b>	<b>167</b>		<b>1,430,163</b>		<b>\$237,000</b>	

## 3.0 Least Burden Analysis

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Ecology has determined that this version of the rule is the least burdensome for those who are required to comply.

The fee is in law therefore most of the cost reductions for this rule making came from changes to the registration and fee reporting processes. During development of this rule, Ecology considered several alternatives.

### 3.1 Process savings

Ecology has created a simple way to register on the web. Manufactures will be allowed to turn in the number of units as part of the electronic registration or to simply call staff and give staff the number over the phone. This is less cumbersome than the reassignment forms and certifications required in the proposed rule.

### 3.2 The fee

The fee revenue is outline in the law for 2007 and 2008. The general structure of the fee is defined in 70.95N.230 of the law.

*Ecology must base the registration and plan review fees for manufacturers on a sliding scale that is representative of annual sales of “covered electronic products” in the State.*

Ecology and many others have put effort into creating fair sliding scale fee structure. Based on suggestions by an advisory committee, Ecology defined broad tiers so that expensive data would not be required. In the long term, data collection for smaller tiers could have requires manufacturers to buy expensive data, which could have substantially increased the fees.

### 3.3 Ecology’s previous work before the new law

Before the Legislature created the new law, Ecology considered several alternative rulemaking processes. In addition to the fee charged to manufacturers (which is being implemented in this rule), Ecology also considered consumer advanced recovery and end-of-life fees. The legislature decided the manufacturers should be responsible for the full life cycle cost of the product, including a safe and responsible disposal. Therefore, manufacturers will be allocated a portion of the administrative fee based on their market share. These fees are expected to be embedded in the initial cost of the products and will allow covered entities to recycle the products conveniently and responsibly for “free” at the end of their useful life.

### 3.4 Suggestions from the advisory panel

An advisory panel of stakeholders including representatives for manufacturers, processors, collectors, retail groups, environmental non-governmental organizations, and local governments shaped Ecology’s interpretation of the law. The panel strongly indicated that the most equitable way to interpret “annual sales” would be by unit sales rather than annual dollar sales. The panel’s reasoning was:

- Basing the fee on annual dollar sales would penalize units with a higher price, which are often smaller, more easily recycled, less toxic and more durable products. Environmentally sound products can be a little more expensive to produce. Therefore, using sales dollars creates a disincentive to produce environmentally responsible products. One component of Governor Christine Gregoire’s veto message for this law stated that she directs Ecology

*“To evaluate alternatives for managing legacy e-waste products in a manner that does not create competitive differences between existing and new companies, including a way to distribute costs of recycling past products more fairly among all affected parties and to evaluate the use of product toxicity in lieu of, or in addition to, product weight, when determining equitable cost shares.”*

- Data on dollar sales, available from information vendors, is generally based on unit sales rather than actually collecting information on dollars of sales. Therefore, the data on unit sales may be more reliable if Ecology uses units sold rather than sales dollars.
- There are more companies providing data on unit sales.

### **3.5 Alternatives for the administrative fee structure**

- Charging each manufacturer based on a separate market share of both televisions and computers: It became clear this method would require a highly detailed level market share study in Washington State as no reliable data source could be agreed on for this information. Detailed market studies are so expensive they would have increased the long-term fees.
- Charging a simple per unit fee: This was expected to generate an incentive for every party to protest fees each year. Some stakeholders argued that this method would have created a need for even more expensive market survey data and could have had the effect of significantly increasing everyone’s fees.
- Tiered category approach: The discussion indicated that this approach would generate less debate over what fee a manufacturer would be charged.

Ecology decided that unit sales will be the basis for the administrative fee rather than dollar sales and that the fee structure will use tiers to reduce both the cost and the amount of data gathered every year. These decisions provide a lower cost fee in the long term.

### **3.6 Equity changes**

When Ecology initially proposed the rule the fee structure had a large upper Tier (Tier 1) that covered manufactures with a market share of 1% or more. This meant that the market share varied within the tier by more than an order of magnitude. Ecology received several comments to the effect that this was unfair so we split the Tier at the 5% market share level. The 5% split was selected because the law allowed those companies with a 5% return share to write independent recycling plans. Ecology tried to find a natural breaking point or large gap for the new tier but could not.

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## 5.0 Appendices

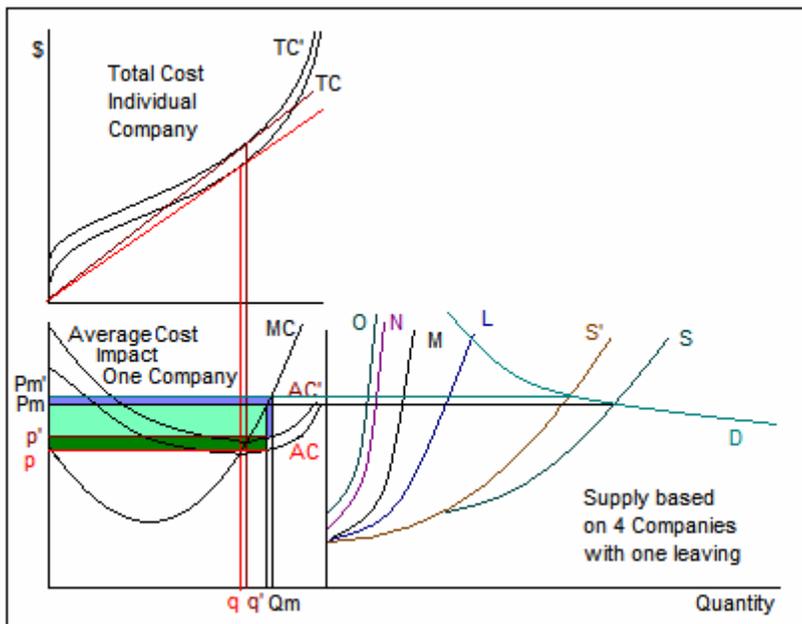
### Appendix A: Effects of a Competitive Market

One commenter indicated that Ecology does not understand the market because manufactures are price takers (in other words, they have no control over market prices). The commenter described actions by other sectors and major retailers over which the company had no power. The law gives Ecology a model that places the cost on the manufacturer. However, *through the competitive market some of these costs will be shifted to the consumer.*

It is normal in a competitive market for an individual manufacture to experience market actions that indicate it has no market power. The electronics market is extremely fluid with multiple new entrants, new products, reduced prices for old products given market saturation, and major players merging every year. These factors generate significant price and quantity shifts in every reported time period.

Costs imposed on industry, especially one this fluid, will tend to be shared with the consumer. It may not appear to be so, given that demand for old product drops each year with market saturation. However, the change does take place if demand is taken as a separate phenomena, that is quality driven and unaffected by the fee. Within the theoretical structure that supports this statement that the fee will be shared with the consumer, it is important to note that the fee is not a marginal cost. It is a flat amount of cost added to the total cost. This flat cost adds to the average cost but does not affect the marginal cost of any additional unit unless the manufacture grows sufficiently to shift into another fee tier. Thus, in the very short run, the profit margin for a given manufacture drops. Graphic A1 below represents one scenario.

Graphic A1: Theory of Cost Allocation and Price Changes



Note: If you print this in black and white, the bright green prints as light gray, the dark green prints as dark gray, and the purple prints as medium gray.

Key:

- Graphically the profit margin drops from the bright green plus dark green areas to just the light purple area. If all manufactures stay in the market then this is the primary effect.
- Manufactures represented by supply curves labeled “N”, “M”, and “L” have lower average costs and remain in the market. “O” represents manufactures that have an insufficient profit margin to pay the fee. These manufactures may decide not to sell their product in Washington. Ecology expects these manufactures will leave the market to produce something else, then the supply at each price level will decrease, shifting from S (the original total supply curve) to S’ (the total supply curve after the one company leaves). This would cause a price increase (P<sub>m</sub> to P<sub>m</sub>’), giving the manufactures that remain a profit increase represented by the light purple area. In terms of the net profit impact for the individual firm represented in the graphic above, it would depend on whether the pale green area is larger than the dark green area. When this happens in a market that is experiencing falling prices, such as electronics, any price increase due to a fee would merely reduce the speed with which prices fall.

## Appendix B: Current Electronic Recycling Rates

	Locations	Monitors	Computers (Desktop PC's)	Laptops	TV's
<b>King County website</b>					
Trashbusters	Seattle	\$13.00	\$10.50	\$13.00	\$27.50
3RTech, LLC		\$15.00	\$3.00	\$0.00	\$15.00
Computer Bank Charity		\$10.00	\$2.00	\$10.00	
Computer Equipment Resources	Carnation	\$10.00			
Computer Giveaway Project		\$5.00	\$9.10		
George Electronix	Bellevue	\$7.50	\$10.00	\$0.00	\$37.50
Happy Hauler	Seattle	\$12.00	\$7.80		\$21.50
InterConnection	Seattle	\$10.00	\$5.00		
Micro-Recycle		\$10.00	\$10.00		
PC-Recycle	Bellevue	\$10.00	\$1.00	\$40.00	
PC-Salvage	Tacoma	\$10.00	\$9.10		\$14.70
Philip Services Corp	Tacoma	\$12.40	\$10.40		\$19.60
Rabanco	Seattle	\$15.00			\$35.00
Re-PC	Seattle	\$10.00	\$2.50		\$30.00
	Seattle, Tacoma, Bellevue, Bothell, Issaquah, Redmond,				
Staples	Burien, Kent	\$12.00	\$8.00	\$8.00	
Total Reclaim	Seattle	\$10.00	\$9.10	\$2.80	\$14.70
<b>Snohomish County website</b>					
County Recycling and Transfer Stations		\$14.00	\$10.00	\$10.00	\$23.50
<b>City of Tacoma website</b>					
Centerforce		\$10.00	\$10.00		
Philip Services Corp	Tacoma	\$12.40	\$10.40		\$19.60
PC Salvage	Tacoma	\$10.00	\$5.00	\$5.00	\$10.00
Staples	Tacoma	\$12.00	\$8.00	\$8.00	
<b>Spokane</b>					
Earthworks Recycling	Spokane	\$15.00	\$10.40	\$3.20	\$34.00
<b>Thurston County website</b>					
Thurston County Recycling Days	Thurston County	\$10.00	\$10.00	\$10.00	\$10.00
Thurston County Waste and Recovery Center	Thurston County	\$15.64	\$15.64	\$15.64	\$15.64
<b>Clark County</b>					

	Locations	Monitors	Computers (Desktop PC's)	Laptops	TV's
CREAM Recycling Program	Vancouver, Washougal	\$0.00	\$0.00	\$0.00	\$0.00
<b>Nationwide</b>					
Apple Computers			\$30.00		
Dell			\$15.00		
HP			\$23.50		
IBM			\$29.99		
<b>Average End of life estimates (2005)</b>		\$10.84	\$10.20	\$8.97	\$20.52
<b>Average weight (lbs)</b>		31	26	8	49
<b>Quantity recycled WTP (assuming 42% electronic recycling)</b>	42.00%	86,564	50,575	24,856	178,882
<b>Estimated WTP</b>		\$938,147.09	\$515,918.34	\$223,068.79	\$3,669,768.33
					<b>\$5,346,903</b>