

ELECTRONIC WASTE MANAGEMENT IN VERMONT

January 2004



**Agency Of Natural Resources
Department Of Environmental Conservation**

Table of Contents

DEFINITION OF ELECTRONIC PRODUCTS	3
WHY ARE USED ELECTRONICS A CONCERN?	3
HOW ARE COMPUTERS RECYCLED?	6
STATE AND NATIONAL INITIATIVES	7
VERMONT'S PROGRESS IN REUSING AND RECYCLING ELECTRONIC WASTE	8
VERMONT'S ELECTRONICS COLLECTION INFRASTRUCTURE	9
PILOT PROGRAMS	9
CURRENT STATUS	10
ISSUES AND TRENDS	11
CONCLUSIONS	12
APPENDIXES	13
ENDNOTES	16

Definition of Electronic Products

According to the US EPA, the products that are considered consumer electronics (i.e., discarded electronics) include televisions, computers/computer peripherals, audio/stereo equipment, VCRs, DVD players, video cameras, telephones, fax and copying machines, cell phones, wireless devices, and video game consoles.ⁱ However, for the purposes of electronics management, environmental groups, regulatory agencies and manufacturers have not uniformly agreed on a definition. Most initiatives across the country to manage and/or collect consumer electronics have focused on computer components and televisions. However, audio and video discards exceed the tonnage of computer equipment wastes. Cell phone discards are growing at a rapid rate.

Why are Used Electronics a Concern?

Represent a rapidly growing waste stream

According to United States Environmental Protection Agency (US EPA) estimates, electronic products constitute approximately one percent of municipal solid waste.ⁱⁱ In fact, more than 63 million computers are projected to be retired in the U.S. in 2005.ⁱⁱⁱ Research completed in Europe shows that electronic waste is growing at three times the rate of other municipal waste.^{iv} A study from the National Safety Council reported that most computers are obsolete in 3 years or less. Table 1 lists estimates for the life of selected consumer electronics.

Industry is shifting to new technological advances

Industry is shifting from analog television to digital, high definition TV (HDTV). HDTV is a new way of sending the TV broadcast signal digitally, to provide a sharper image. These technology advances and the replacement of obsolete software and equipment are leading to an increase in the amount of discarded consumer electronic products. Table 2 illustrates the relatively small percentage of electronic discards that are recycled in the U.S. Studies have shown that obsolete or no longer usable electronics, particularly computers, are often placed in storage for considerable periods of time. This prolonged storage may be due to a perceived value of the equipment and/or a lack of disposal opportunities.

Contain hazardous or toxic substances

Many of the components in discarded electronics contain toxic constituents. An average desktop computer (monitor, central processing unit and accessories) is made up of many different heavy metals and plastics. These include lead, mercury, antimony, silver, chromium, zinc, tin, copper, iron, aluminum, nickel, cobalt, and lithium. Table 3 provides a component-based breakdown for various electronic products.

The primary materials of concern are lead, cadmium, chromium, and mercury. These toxic materials can cause kidney, cardiovascular and central nervous system damage. US EPA estimates that currently half of all heavy metals found in U.S. landfills can be traced to discarded electronics.^v Heavy metals cannot be broken down in the environment.

Waste valuable resources

Electronic products are made from valuable resources, including precious and other metals, engineered plastics, glass, and other materials, all of which require energy to source and manufacture. Many electronic products also contain parts that could be profitably refurbished and reused with little effort. Recycling reduces the need for landfills and other disposal facilities. In addition, throwing away old electronic equipment generates additional pollution associated with the need to access virgin materials and manufacture new products.^{vi vii}

Table 1:
ESTIMATED LIFE OF SELECTED CONSUMER ELECTRONICS
(in years)^{viii}

	Range of Primary and Secondary Use (Reuse) Life Expectancy (in years)
Video Products	
Direct View Color TV	13 to 15
Projection TV	13 to 15
LCD Color TV	13 to 15
Videocassette Players	7 to 10
VCR Decks	7 to 10
Camcorders	7 to 10
Laserdisc Players	7 to 10
Audio Products	
Rack Audio System	3 to 15
Compact Audio System	3 to 15
Portable CD	3 to 15
Portable Headset Audio	3 to 15
Total CD Players	3 to 15
Home Radios	3 to 15
Information Products	
Cordless/Corded Telephones	3 to 6
Wireless Telephones	2 to 4
Telephone Answering Machines	3 to 6
Fax Machines	3 to 6
Personal Word Processors	3 to 6
Personal Computers	3 to 6
Computer Printers	3 to 5
Computer Monitors	6 to 7
Modem/Fax Modems	3 to 6

Table 2:

**NATIONAL GENERATION, RECOVERY, AND DISCARDS OF CONSUMER
ELECTRONICS IN THE MUNICIPAL WASTE STREAM 2000
(in tons)^{ix}**

Type of Consumer Electronics	Total Generation	Total Reused or recycled	% Reused or recycled	Total Discards¹
Video Products	859,300	1,200	0.1%	858,100
Audio Products	348,200	0	Neg.	348,200
Information Products (includes computers, etc.)	916,900	192,500	21%	724,400
Total	2,124,400	193,700	9%	1,930,700

¹ Discards include electronics that are stored in basements, attics, garages, etc., and those placed in the trash.

Table 3:

**MATERIAL CONSTITUENTS OF CONSUMER ELECTRONICS
IN THE MUNICIPAL WASTE STREAM
(In percent of total generation)^x**

Type of Consumer Electronics	Steel	Copper & Brass	Aluminum	Lead	Other Metals	Glass	Wood	Plastic	Other
Video Products	22%	3%	0%	7%	10%	27%	20%	11%	0%
Audio Products	21%	0%	0%	0%	30%	0%	3%	47%	0%
Information Products (includes computers, etc.)	27%	5%	4%	3%	4%	8%	0%	46%	2%
Total	24%	3%	2%	4%	11%	15%	9%	32%	1%

How are Computers Recycled?

COMPUTER RECYCLING

Some products destined for recycling, such as aluminum cans and newspapers, find themselves reborn as like products. But tracing the path of recycled electronic products is considerably more complicated. What follows are some of the steps a typical computer could undergo during recycling:

CIRCUIT BOARDS

Most circuit boards and some hard drives can be marketed for resale as operational parts. Unusable circuit boards are chopped into a powder and separated into fiberglass, metals, and precious metals through a process called fire assay.

PLASTIC HOUSINGS

Plastic housings are separated from the electronic equipment, and materials such as labels and foam insulation are removed through air classification. Unfortunately, plastic housings on computers and monitors will not fit on newer equipment. At present, these plastics are difficult to market because they contain mixed or unmarked resins that cannot be readily identified or separated, as well as some additives such as flame-retardants that complicate recycling. Some near-term uses of these plastics include use in roadbed fill. Efforts are under-way, however, to find higher value applications for these plastics in products such as flooring, computer, and automotive parts.

SMALL PLASTIC COMPONENTS

The small plastic parts inside computers are typically made from uniform-colored, high-density polyethylene (HDPE). This makes them easier to remove, grind, and process. Recyclers must take great care not to mix other materials (e.g., metals) or different resins in with these plastics. Even a small amount of contamination can cause a buyer to reject an entire load. If ground plastic resins appear to have contamination from mixed resins, the recycler can hydroseparate them because of their varying densities.

SCREWS, CLIPS, SMALL METAL PARTS

Screws, clips, and small metal components are sorted and separated magnetically into ferrous and nonferrous groups. The metals are sold as scrap.

MONITORS

Monitors are handed over to a separate demanufacturing line; where workers remove the plastic housings, metal supports, and circuit boards. The cathode ray tube (CRT) itself is a funnel-shaped, leaded glass tube with a metal frame inside. The worker separates the funnel from the front panel glass. The CRT is then crushed, and the leaded glass and metal are separated. The glass is screened, processed, and inspected for contaminants. Much of it can be sold to CRT manufacturers for use in new CRT glass. The metal is sold for its scrap value.

Reprinted from Wastewise Update: Electronics Reuse and Recycling. US EPA. October 2000

State and National Initiatives

Over the past few years, there has been a range of legislative initiatives to reduce electronic waste and to require industry to take more responsibility for the disposal and recycling of the products they manufacture. As a result of growing public concern, manufacturers and retailers have been developing their own programs to manage electronic equipment discards. In addition, state, national and private stakeholders in electronics management have teamed together to negotiate a voluntary agreement that addresses discarded electronics. This effort is known as the National Electronics Product Stewardship Initiative (NEPSI).

Legislative Initiatives

More than 50 e-waste legislative measures were introduced in more than two dozen states in 2003.^{xi} These legislative initiatives offer a wide variety of approaches to e-waste management, including streamlining the regulatory status of cathode ray tubes (CRTs), banning the disposal of CRTs,^{xii} and requiring manufacturers to take responsibility for their waste through collection programs or take back programs. For example, Massachusetts bans the disposal of CRTs from landfills. California also has a ban on CRT disposal in landfills and incinerators. In addition, California passed SB 20 during the 2003 legislative session which would require a recycling fee be assessed on the sales of all televisions and computers at the time of purchase. The fee will fund cost-free and convenient collection and recycling of discarded electronic products. New York has proposed a disposal ban and the establishment of an electronic equipment-recycling program. The program would be funded through the Environmental Protection Fund and include provisions for enforcing against violations.

Manufacturer and Retailer Take-back Programs

Domestic computer makers, such as IBM, Dell, Hewlett-Packard, JVC Americas, Panasonic, Sharp and Sony have developed their own recycling programs. They range from no-cost recycling with the purchase of a new computer to a fee-based recycling pick-up service. For example, IBM and Gateway charge customers \$30 (including shipping) to mail back their old computers for recycling. The cost of this take-back program may be a disincentive to its use by consumers and others.

Additionally, some of the national retailers are beginning to offer take-back programs. For example, the office retailer, Staples, accepts used cell phones, personal digital assistants (PDAs), pagers, and rechargeable batteries from customers.^{xiii xiv}

Product Stewardship Initiatives

The National Electronics Product Stewardship Initiative (NEPSI)^{xv} consists of a group of stakeholders seeking to reduce and manage waste from electronic products. NEPSI participants include federal, state and local governments, manufacturers, retailers, recyclers, and environmental groups. The stakeholders are currently seeking consensus on a voluntary system to maximize the collection, reuse, and recycling of used electronics, including a viable financing mechanism. At the same time, NEPSI is considering appropriate incentives to design products that facilitate source reduction, reuse and recycling; reduce toxicity; and increase recycled content. Participants in this joint initiative are promoting the idea of product stewardship^{xvi} as a method to address waste electronics. Vermont is participating in this initiative.

Definition of Product Stewardship

Product stewardship is a product-centered approach to environmental protection. Also known as extended product responsibility (EPR), product stewardship calls on those in the product life cycle--manufacturers, retailers, users, and disposers--to share responsibility for reducing the environmental impacts of products.

Vermont's Progress in Reusing and Recycling Electronic Waste**Current Vermont Regulations Affecting Discarded Electronics**

All household-generated waste is categorically exempt from regulation as hazardous waste in Vermont. Most business-generated electronic waste, however, is subject to regulation as hazardous waste. This is due to the lead in circuit boards and cathode ray tubes as well as other hazardous constituents in these wastes. Currently there are no landfill bans or mandatory separation for residential TVs and computers (except for some mercury-containing liquid crystal display (LCD) monitors (see below).

Vermont Hazardous Waste Management Regulations address electronic waste as follows:

- Shredded circuit boards are exempt if they are recycled and managed prior to recycling (according to certain conditions).
- Hazardous waste management regulations are being proposed to include cathode ray tubes (CRTs) as Universal Wastes. If designated as Universal Waste, CRTs could be managed according to standards that are more streamlined than the existing hazardous waste management regulations in order to promote recycling.
- Finally, the Department does not consider electronics that are designated for reuse, or that are dismantled for the purpose of reusing components, to be hazardous waste. However, any hazardous components that are not reused must either be managed as hazardous waste or according to applicable exemptions or alternative standards (i.e., universal waste).

In addition, Vermont's mercury labeling law (10 V.S.A. § 6621 d) requires a visible label for liquid crystal display (LCD) computer monitors prior to purchase due to the presence of a mercury-added fluorescent lamp. Labeled LCD monitors are banned from landfill disposal.

Vermont's Electronics Collection Infrastructure

A 1998 study identified that fewer than six percent of Vermont's electronics were being recycled and that few electronics recycling programs existed in the state. Since 1995, Recycle North has been collecting computers for reuse. Addison County Solid Waste District (ACSWMD) was the first of many districts to begin collections for recycling and reusing discarded computers.

ReCycle North

Recycle North, a non-profit located in Burlington, started its electronics reuse program in 1995. Since that time over 200 people have learned repair skills through its computer and appliance repair training program

In 2002, ReCycle North, repaired, sold or gave away 178 televisions and 223 stereo components. They refurbished and sold 934 computers and computer components. Through these efforts, they were able to reuse 30 percent of the electronics they collected or approximately 107,000 pounds. The non-profit shipped its non-repairable monitors to a recycler in Massachusetts.

Addison County Solid Waste Management District (ACSWMD)

In September 1999, ACSWMD held a one-day electronics collection pilot. This one-day event was a collaboration between the District, Addison County Community Action Group (ACCAG), and a local computer services store, Computer Alternatives.

Approximately 700 computers or 14 tons of electronics were collected and shipped to Massachusetts to be recycled.

The intent was that this would be a sustainable program for ACCAG to help them utilize warehouse space, develop marketable skills for low-income Vermonters and provide them with computer systems.

The District has continued to collect and ship computers and televisions, in large numbers, for recycling. These materials are collected daily at the transfer station. This program has become a sustainable program and continues to grow year after year.

Pilot Programs

Many of these original collection events or programs were partially funded through State of Vermont Solid Waste Management Assistance Fund grants and Supplemental Environmental Project (SEP) monies, resulting from environmental penalties.

In 2001, the Department of Environmental Conservation (DEC) awarded approximately \$68,000 in grants and SEP monies for six projects. The entities included Vermont

Retroworks, Chittenden Solid Waste District, Computer Barn, Windham Solid Waste Management District, Lamoille Regional Solid Waste District, and Mad River Solid Waste Alliance. Some programs have added collection of televisions. These monies were used to develop and establish self-sustaining collection programs for computers through both on-going and seasonal collection events for computers.

In 2002, four grantees received a total of \$25,000 in grant monies to create and establish computer collection infrastructure. Grant recipients included Central Vermont Solid Waste District, Northeast Kingdom Waste Management District, Recycle North and Rutland County Solid Waste District. These grants were used to establish recycling and reuse of computers through data erasure, computer donation, collection and the establishment of a computer repair job-training program.

Additionally, that same year, Vermont was part of a US Department of Agriculture (USDA) grant project to develop, implement and establish a self sustaining reuse and recycling program for computers. The Northeast Recycling Council (NERC) managed the *Rural Community Electronics Recycling Project*^{xvii} that focused on residences and municipal governments in towns with populations under 10,000. The Town of Springfield and the Central Vermont Solid Waste Management District (CVSWMD) participated in this project by holding and establishing on-going computer collection events.

Current Status

Due to the lack of Vermont-specific data, DEC extrapolated data on Vermont’s projected generation, recovery and discards of consumer electronics from the national data taken from Table 2. Table 4 is based on Vermont being 0.21% of the national population^{xviii}. National figures for computer/information product recycling are somewhat lower than current Vermont estimates (21% vs 23%). As is the case with any extrapolation, these numbers do not reflect the differences between Vermont and national consumption, use, recycling/reuse and disposal options. Extrapolations may over or under estimate actual Vermont amounts.

**Table 4:
ESTIMATED VERMONT GENERATION, RECOVERY,
AND DISCARDS OF CONSUMER
ELECTRONICS IN THE MUNICIPAL WASTE STREAM (Year 2000).
(In tons)**

Type of Consumer Electronics	Total Generation	Total Recovery	% Recovered	Total Discards ¹
Video Products	1804	0	Neg.	1804
Audio Products	731	0	Neg.	731
Information Products (includes computers)	1925	453 ²	23%	1472
Total	4460	453	10%	4007

¹ Discards include electronics that are stored in basements, attics, garages, etc and those placed in the trash.

² This total represents mostly computers and computer related equipment and a small percentage of TVs (less than 10%). It does not include direct recycling by businesses (i.e., from a business to a demanufacturer or a recycler).

For the purposes of this legislative report, an electronics collection and reuse survey was sent to all of the Vermont municipalities, alliances, solid waste districts, non-profits and for-profit

electronics collection entities. The summarized survey results (Appendix 2) show that the majority of electronics collections were started in 2000. Recycling fees for these collection programs ranges from \$5 to \$15 per unit. To date, there are approximately 19 entities collecting discarded electronics for reuse and recycling. These entities collected approximately 453 tons of discarded electronics in 2002. This survey also shows that the majority of these collections handle only computers and computer-related equipment, while a few handle televisions (less than 10%). The survey shows that Vermont closely mirrors the national trend in discarded electronics management. This includes collection of mainly computers and televisions, with about 10% recovery of the total estimated amount of the electronic waste stream. This 10% collected represents solid waste districts, alliances, municipal and private collections of computers (and a few TVs). In addition, Vermont is also collecting approximately 23% (21% nationally) of the information products generated. In stating this trend, it should also be noted that this 23% does not take into account large businesses or direct recycling by businesses to recyclers.

The accompanying map in Appendix 3 shows the collection services for discarded electronics (mostly computers) available by town in Vermont. The map shows that these collection programs are available in 175 towns to 462,121 Vermonters (out of 255 towns and 608,827 population estimate ^{xvi}), or roughly 76 % of Vermonters. The map also shows that some areas in northern, central and southern Vermont have no access to electronic recycling programs. Collection of discarded consumer electronics varies throughout the state. Some areas have one or two special collection events per year, other areas have on going, and year-round collection systems and still other areas have no collection available (other than putting them in the trash).

Issues and Trends

Discarded electronics have become a high profile waste problem nationally due to the sheer volume of this material, its toxic constituents, and the loss of resource recovery potential when electronics are placed in landfills, and the ever-growing nature of the waste stream. This increased volume of discarded electronics is due to obsolescence, shifts in technology, such as from analog TV to High Definition TV and the growing popularity and sales of many different varieties of consumer electronics (e.g., computers, TVs, phones, VCRs, etc.)

As a result, many states, environmental groups, and governments (national and international) are beginning to address proper management of discarded electronics. Actions have included: legislative initiatives (such as Massachusetts' Cathode Ray Tube landfill ban, etc.); promoting take back or Extended Product Responsibility (EPR), such as the NEPSI stakeholder initiative; increasing reuse and recycling opportunities; and streamlining regulatory processes (exempt electronics from hazardous waste laws when reuse/recycled).

Vermont has no landfill ban or mandatory separation requirement for discarded electronics (except for liquid crystal display computer monitors which are labeled for mercury content). Non-residential generators of electronic wastes cannot landfill any electronic products that are a hazardous waste – cathode ray tubes are the only electronic waste component consistently identified as meeting the definition of hazardous waste. The Vermont Department of Environmental Conservation (DEC) has been promoting the collection of residential computers since 2000. Vermont solid waste districts, non-profits and private businesses currently collect approximately 23 percent of discarded computers for reuse or recycling. In addition, 76 percent of Vermonters have access to a discarded electronics

collection outlet (public, private, etc.). Many of these programs are a direct result of solid waste district, alliance and municipality initiatives to reduce the volume of waste they generate. These waste reduction initiatives are usually a part of their overall Solid Waste Implementation Plans (SWIPS). SWIPS must be consistent with the State's revised Solid Waste Plan.

Vermont has adopted the revised Solid Waste Management Plan to establish statewide goals and action plans addressing the management of all types of solid waste, including electronic wastes. As a result of this plan, Vermont is currently in the process of reviewing updated SWIPS for solid waste districts, alliances and municipalities for conformance with this plan. The requirement of the SWIPS is that they are consistent with the revised solid waste plan. With these on-going SWIP reviews, DEC anticipates the number of collection programs will increase along with the percentage of Vermonters who have access to management programs for discarded electronics.

Conclusions

The Department expects to see an increase in participation rates due to improvements in municipal electronics collection programs, in part established through DEC grants and Vermont's municipal Solid Waste Implementation Plan requirements. DEC believes that pilot programs helped establish permanent programs, as three-fourths of the population currently has access to computer recycling. Additionally, consumers and businesses have shown a willingness to pay a reasonable recycling fee because most collection programs are fee-based. DEC is also working to streamline regulations to make it easier to recycle computers and other electronic equipment with hazardous components. Nevertheless, municipal collection programs are currently largely restricted to computers.

Vermont's capture rate of electronic waste is near the national average (10% overall, 23% computers). The computer recycling rate is likely to increase somewhat without implementing additional programs as the existing infrastructure is more fully used. But without some additional actions, it is unlikely the capture rate for computers will move towards even the 50% overall recycle rate goal in the State Solid Waste Management Plan. Also, without additional actions, it is unlikely the recycling of other electronic wastes will show significant improvement. While the state cannot point to data showing significant environmental impact from the disposal of electronics, the potential exists for some air and groundwater contamination from landfilling or incinerating these devices. The toxic nature of some of the constituents should be considered in making the determination of whether to take actions to increase the capture rate of electronics, which is largely resource conservation, and landfill space issue.

Appendixes

Appendix 1
Electronics Legislation Summary

Appendix 2
Fall 2003 - Electronics Survey

Appendix 3
State of Vermont 2002 Discarded Electronics Management Map

APPENDIX 1



United States Electronics Legislation – Summary March 27, 2003

State	Bill # Status	Advisory Committee	ARF	Bans: Export or Prison Labor	CRT ban in landfill/incinerator	Education	Electronic recycling grants	Labels	Producer Responsibility	Toxics Reduction	Trust Fund or Recycling Fund
AR	SB 807 Enacted 4/9/01				● Optional		●				●
CA	SB 20 Placeholder 2003				● already in place				●		
CO	HB 010116 Signed 6/6/01					●	●				●
FL	SB 674 2003	●	●		●	●	●		●		
FL	SB 678 2003										●
GA	HB2 Signed 5/14/02	●									
MA	HB 4716 2003				● already in place	●			●		
ME	LD 743 2003	●		●	●	●		●	●	●	
ME	LD 590 2003				●						
MI	HB 24					●					
MI	SB 147				●						
MI	HB 4296	●			●						

*University of Massachusetts/Lowell • Pinanski Hall, Room 303 • One University Avenue • Lowell, MA 01854
Telephone: (978) 934-4861 • Fax: (978) 934-3050 • www.ProductStewardshipInstitute.org*

♻️ News-Release Recycled / 100% Post-Consumer Recycled Paper / Soy Ink

State	Bill # Status	Advisory Committee	ARF	Bans Export or Prison Labor	CRT ban in landfill/ incinerator	Education	Electronic recycling grants	Labels	Producer Responsi- bility	Toxics Reduction	Trust Fund or Recycling Fund
MN	SF 838				•	•			•		
NE	LB301 2003	• discretion of state	•		•	•	•		• voluntary		•
NC	HB 1565 2003		•		•		•				•
NH	HB 73	•									
NJ	A 607 2002					•	•				
NJ	A 2550				• on cell phones						
OR	SB 867 2003	•			• optional	• lg. cities	• as available				
OR	SB 2971 2003		•		•	•					•
OR	SB 3563 2003		•			•					•
SC	HB 148 2003 Session	•	•		•		•				•
TX	HB 595		•		•	•	•				•
UT	HB 67					•					
VA	HB 2375	•			•	•					
VA	HB 2376				•						
WA	HB 1942 2003	•		•	•	•		•	•	•	•
U.S.	HR 1165		•				•				
CTBC		•		•	•	•		•	•	•	

© Product Stewardship Institute 2003
U.S. Electronics Legislation Comparison
March 27, 2003

APPENDIX 2

2002 DISCARDED ELECTRONICS MANAGEMENT SURVEY RESULTS

Organization Name	Contact	Currently Collect	Date started	On-going/Single day collections	Pilot Project/for how long	2002 Pounds collected	Business or consumer	Cost for consumer	Cost for Business	Planned improvements
Solid Waste District/Alliance										
Addison County Solid Waste Management District	Don Magneleti	most electronics	2001	on-going	1 day event/2001	124275	both	Computers \$11/system, \$6 per piece, \$.227 per pound, TV's \$15 console, \$7 regular, \$.257 per pound	Same	Increase public awareness
Bennington County regional Commission	Lissa Luke	No	NA	NA	NA	NA	NA	NA	NA	NA
Central Vermont Solid Waste Management District	Ela Abrams	most electronics	2001	Both	yes/one year	26500	both	\$20/Console TV/large printers, \$10/computer system, TV (large), VCR, \$5 individual computer component, telephones, faxes, etc.	Same	Prices may decrease and may have on-going collections at many of our depots.
Chittenden Solid Waste Management District	Nancy Plunkett	Computers	May-01	On-going	Yes/still considered a pilot	90120	Both	\$10/unit or 6 or more units 22 cents a pound	\$10/unit or 6 or more units 22 cents a pound	hope to add TV's and other electronics
Greater Upper Valley Solid Waste Management District	John Fay	Computers & TV's	NA	Both	2000/4 days	34260	Both	\$7-\$10 per system, \$4-\$5 per monitor, \$5 per printer, \$10 per TV	\$7-\$10 per system, \$4-\$5 per monitor, \$5 per printer, \$10 per TV	Two special collections, plus on-going seems to be sufficient

Lamoille Regional Solid Waste Management District	Joyce Majors	Computers	2000	On-going	2000-2001	24511	both	\$10 per computer, \$5 per printer	\$.191/pound	Expand to TV's and other electronics. No room right now.
Londonderry Group	Claire Traske	No	NA	NA	NA	NA	NA	NA	NA	Short on space would be interested in how to do this.
Mad River Solid Waste Alliance	John Malter	All items with cords, mainly computers, printers, and TV's	2000	On-going	yes/2 weeks	3960	Both	\$12 per computer, \$15 per TV's	Same	More publicity, Encourage collection of more types of electronics
Northeast Kingdom Solid Waste Management District	John Hurd	Computers/TV's	Apr-00	On-going	2000/1 year	14273	Both	18 cents per pound	18 cents per pound	more special collections in remote locations of district to increase participation
Northwest Vermont Solid Waste Management District	Mike Loner	Computers	2000	Single day	No	36000	Both	\$10 per unit, \$5 per individual piece	\$10 per unit, \$5 per individual piece	2 day collections (Target audience businesses)
Rutland County Solid Waste Management District	Jim O'Gorman	anything with a cord	2000/monitor	On-going	2001	21980	Both	\$10-\$15 per unit or \$5-\$7.50 per component	25 cents a pound	advertise more and watch the manufacturing sector
Solid Waste Alliance Communities	Pam Clapp	Computers	2002 with Rutland	On-going	Yes	Included with Rutland	Both	\$10-\$15 per unit or \$5-\$7.50 per component	\$10-\$15 per unit or \$5-\$7.50 per component	We may expand collection to TV's and other electronics.
Southern Windsor/Windham Solid Waste Management District	Dawn Purdham	No	NA	NA	NA	NA	NA	NA	NA	Might be getting a waste coordinator to oversee these projects
White River Alliance	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Windham Solid Waste Management District	Cindy Sterling									
Individual Towns										

(or Groups)										
Albany	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Athens	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Barton	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Bennington	Stuart Hurd	No	NA	NA	NA	NA	NA	NA	NA	NA
Bristol	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Brownington	Cheryl Perry	No	NA	NA	NA	NA	NA	NA	NA	NA
Buels Gore	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Burke	Sam Sanderson	PC's, TV's, and printers	NA	On-going	No	3400	both	\$.18 per pound	\$.18 per pound	More advertising to Town residents.
Canaan	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Charleston	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Corinth	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Coventry	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Derby	Nicole Daigle	No	NA	NA	NA	NA	NA	NA	NA	NA
Fairfax	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Fairlee	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Georgia	Doug Williams	No	NA	NA	NA	NA	NA	NA	NA	NA
Glastenbury	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Glover	Nicholas Ecker-Raez	No	NA	NA	NA	NA	NA	NA	NA	NA
Grand Isle	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Greensboro	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Hartford	Gary Stumpf	No	NA	NA	NA	NA	NA	NA	NA	NA
Highgate/Franklin	Lisa Larivee	No	NA	NA	NA	NA	NA	NA	NA	NA
Jay	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Lemington	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Lowell	Nanette Bonneau	No	NA	NA	NA	NA	NA	NA	NA	NA
Mount Holly	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Newbury	NA	No	NA	NA	NA	NA	NA	NA	NA	NA
Newport City	John Ward Jr	No	NA	NA	NA	NA	NA	NA	NA	No plans, we believe private recyclers will

											handle problem.
Newport Town	NA	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Norton	NA	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Randolph, Braintree & Brookfield	NA	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Salisbury	Pedie O'Brien	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Searsburg	NA	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shaftsbury/Pownal	Dennis McCarthy/ Trevor Mance	Yes		on-going			Both	\$5/item	\$5/item		Store them inside and keep breakage down, will build a shed.
Somerset	NA	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
St. Albans Town	Ken Barkyoumb	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
St. Johnsbury	Mike Welch	No	NA	NA	NA	NA	NA	NA	NA	NA	Might look into in the future as part of HHW days
Swanton	Dick Thompson	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Topsham	NA	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Troy	Lucille Cadieux	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wardsboro	NA	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Westfield	NA	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Woodford	NA	No	NA	NA	NA	NA	NA	NA	NA	NA	NA
Private Organizations											
Budget Computer	Steve Blais										
Childrens Computer Center Limited	Neil Horgan	Yes	Nov-98	On-going	No	20000	Both	Free	Free		Discontinue due to lack of support
Computer Barn	Fred Wildt	Yes	1999	On-going	No	100000	Both	\$10/system	\$.22/pound		Bigger facility, taking larger volumes and E-bay sales
Computer Exchange	Paul McNamara										

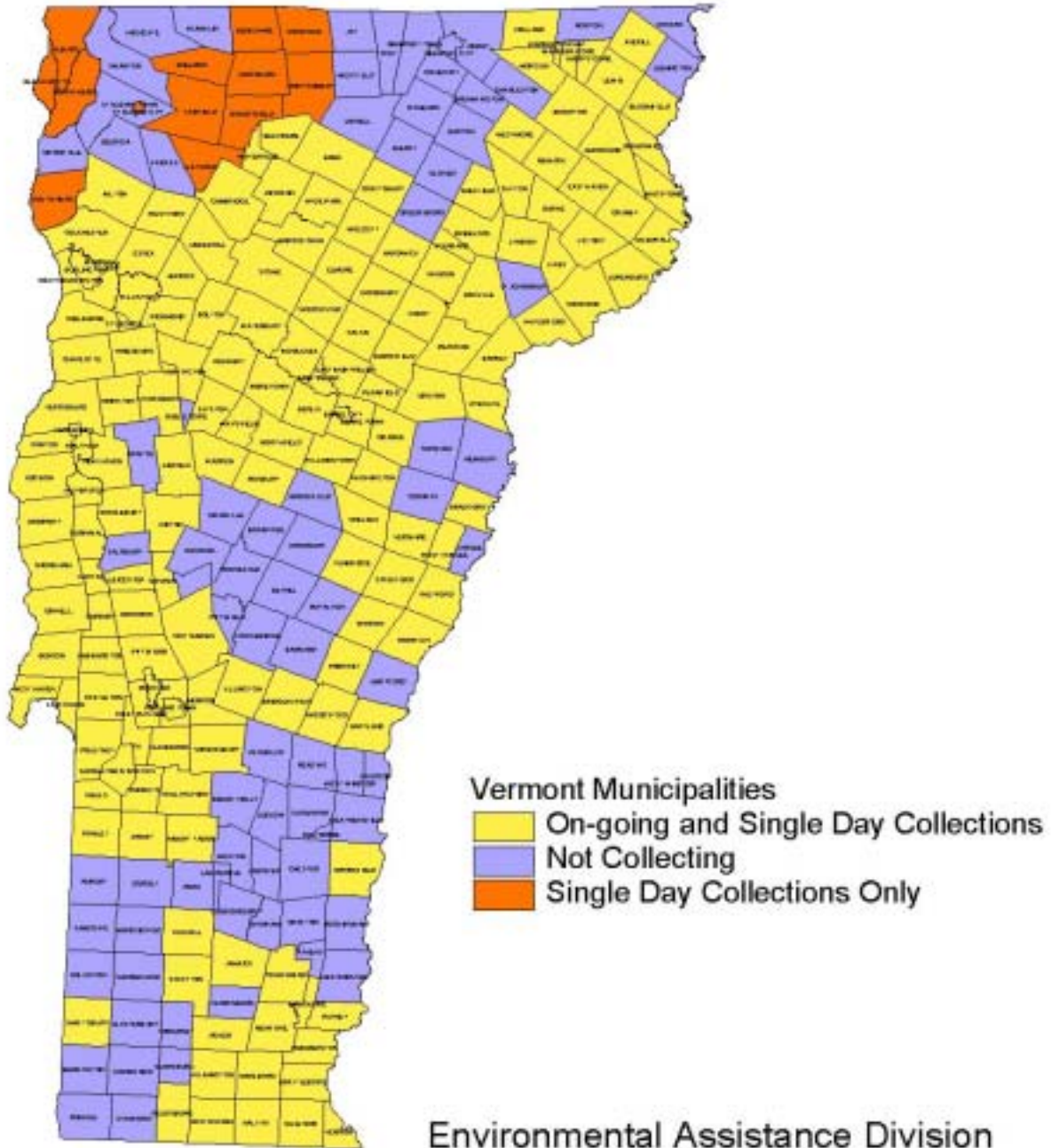
Good Point Recycling	Robin Ingenthron									
Recycle North	Tom Longstreth	Computers, TV's, Microwaves, stereo equipment, VCR's, small kitchen appliances, etc.	1999	On-going	NA	359142	Both	\$5 per monitor for any item judged to be reusable	\$5 per monitor for any item judged to be reusable	improve internal capacity to process and repair
Retroworks	Jean Montross									

****Unit or system equals monitor, keyboard, CPU, mouse and cables.**

Total Electronics Collected in Solid Waste Districts or Alliances	375879
Total Collected in Independent Towns	3400
Total Collected by Private Sector and Non-profits	479142
Total Electronics Collected Statewide From All Sources Reported	858421

APPENDIX 3

STATE OF VERMONT 2002 Discarded Electronics Management



November 2003

Endnotes

- ⁱ Electronics: A New Opportunity for Waste Prevention, Reuse and Recycling, US EPA Publication 530-F-01-006, June 2001
- ⁱⁱ Electronics: A New Opportunity for Waste Prevention, Reuse and Recycling, US EPA Publication 530-F-01-006, June 2001
- ⁱⁱⁱ Electronics: A New Opportunity for Waste Prevention, Reuse and Recycling, US EPA Publication 530-F-01-006, June 2001
- ^{iv} Electronics: A New Opportunity for Waste Prevention, Reuse and Recycling, US EPA Publication 530-F-01-006, June 2001
- ^v Do the Right Thing- Reuse and Recycle your old computer this weekend in Barre, VT. US EPA. Robert W. Varney. September 17, 2002.
- ^{vi} EPA Waste Wise Update: Electronics Reuse and Recycling, October 2000, page 3,
<http://www.epa.gov/wastewise/pubs/wwupda14.pdf>
- ^{vii} Northeast Recycling Council – *Environmental Benefits of Recycling* Fact Sheet <http://www.nerc.org/fsheets/vt-factsht11-03.html>
- ^{viii} Municipal Solid Waste in the United States: 2000 Facts and Figures. US EPA Office of Solid Waste and Emergency Response. June 2002, Pages 150-160.
- ^{ix} Municipal Solid Waste in the United States: 2000 Facts and Figures. US EPA Office of Solid Waste and Emergency Response. June 2002, Pages 150-160.
- ^x Municipal Solid Waste in the United States: 2000 Facts and Figures. US EPA Office of Solid Waste and Emergency Response. June 2002, Pages 150-160.
- ^{xi} Resource Recycling, The Heated World of Electronics Recycling, August 2003, page 26
- ^{xii} Resource Recycling, The Heated World of Electronics Recycling, September 2003, page 24
- ^{xiii} Electronics Industry Alliance and the Northwest Product Stewardship web pages on national reuse and recycling opportunities
http://www.eiae.org/reuse_recycle/national_index.cfm &
<http://www.productstewardship.net/productsElectronicsBizProgramsManufactureTakeback.html>
<http://www.productstewardship.net/productsElectronicsBizProgramsRetailTakeback.html>
- ^{xiv} Resource Recycling, The Heated World of Electronics Recycling, September 2003, page 24
- ^{xv} National Electronics Product Stewardship Initiative web site <http://eerc.ra.utk.edu/clean/nepsi/index.htm>
- ^{xvi} U.S. EPA's web site on product stewardship
<http://www.epa.gov/epaoswer/non-hw/reduce/epr/about/index.html>
- ^{xvii} Complete report of the Rural Community Electronics Recycling Pilot can be found on the Northeast Recycling Council web site at: <http://www.nerc.org/documents/rlcmelrec1102.html>
- ^{xviii} State population estimates: April 1, 2000 to July 1, 2002. US Census Bureau, Population Division, Dec 2002.