County Costs and Funding in North Carolina's Electronic Recycling Program

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Abstract

Senate Bill 887, better known as the "Amend Electronics Recycling Law," banished electronic waste from landfill disposal in 2010. It also set up a system of funding to ensure that manufacturers of electronics sold in the state dedicate resources to electronics recycling. Thanks in a large part to this system, county recycling programs expected to manage electronic material with little cost. However, in FY11/12 and 12/13 local counties reportedly spent large amounts of money to run their electronic recycling programs.

Using survey data from 21 counties in the state, this paper seeks to describe the costs experienced by county electronic recycling programs. It also aims to determine if there is a fault in the funding system with large monetary consequences for counties, or if programs are reacting dramatically to smaller costs based on their original perception that counties should have zero costs to managing this material. Finally, it analyzes the factors in county demographics and program management that predict high costs.

This paper finds that counties are experiencing high costs in the form of fees from their recycling vendors. Vendor fees were made necessary due to an unexpected drop in the value of CRTs and underfunding from the state's producer responsibility system. Prior to FY12/13 many programs had a zero-cost–zero-revenue relationship with their vendors. Many were also saving the annual electronic management funds distributed by The Department of Environment and Natural Resources (DENR). While this indicates a low investment in program infrastructure, the savings may have helped to soften the blow when vendor fees were put in place.

It is unlikely that counties will be able to return to a cost free scenario such as existed prior to 2012. However, there are steps that programs can take to secure themselves against future spikes in cost. The level of capital investment counties made in their electronic programs appears to have positively affected their program's vendor relationships. Programs can also make sure they are getting the best deal possible by shopping for more vendors and noting where else vendors may be collecting material as well as how much manufacturer funding they have received.

The type of material counties collect will be a critical component to county costs in FY12/13 and will likely remain so going forward. Programs may be able to improve on the quality of material by increasing the number of customers served while staying aware of the potential for CRTs to increase with the adoption of schools. Programs can also invest in infrastructure and outreach to minimize the receipt of scavenged material.

For its part, DENR should work to make sure that a market place for purchased TV tonnage is available. DENR can also consider the role that per capita income plays in the type of material county programs receive.

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Rachel Leven

Policy Questions

Are counties in North Carolina (N.C.) experiencing unanticipated high costs in their electronics collection and recycling programs, as indicated by anecdotal accounts? What factors in material, management, and county characteristics are leading to high costs for these electronic recycling programs? How well does the state's system of funding and extended producer responsibility work to cover county costs?[1]

Brief Background

In 2009, the N.C. legislature ratified Senate Bill 887, better known as the "Amend Electronics Recycling Law." The act called for banishing electronic waste from landfill disposal (in coordination with amendments to G.S. 130A-309.10) and a system of funding to ensure that manufacturers of electronics sold in the state are putting resources into recycling. The law specifically and separately addresses TVs and computers/computer accessories, and was implemented in 2010. While electronic recycling is understood to require infrastructure and operating costs, local counties are reportedly spending unexpectedly large amounts of money to build and run their electronic recycling programs in FY11/12 and FY12/13.[2] The N.C. Department of Environment and Natural Resources (DENR) wants to know why and how counties are incurring these costs.

[1] Electronic manufacturers are required to pay fees and give assistance to recycling activities.
[2] Reports are primarily from counties calling DENR with requests for more funding, advice, and general complaints about the costs of the program.

Literature Review

Computers and TVs are growing in complexity, and carry increasing importance in producer and consumer activities. When a product increases in distribution as quickly as modern electronics, concerns about what to do at the end of the material's useful life become critical. In 2009, North Carolina (N.C.) established the Electronics Management Program to address the need for separate collection and treatment of electronic waste in the state. This background and literature review will outline broad concerns about electronic waste before interpreting the N.C. legislation.

The Environmental Need and Markets for Electronic Waste Recycling

The intricate combination of hazardous and valuable material makes electronic recycling particularly challenging. Despite the technological challenges posed by material separation, there are thriving markets for electronic scrap. In October 2012, the industry magazine *Resource Recycling* announced that the average price of printed circuit boards (PCB) passed $8 per pound. This is part of an overall trend that has seen PCB values increase from less than $4 in 2006 (Staff 2012). Some of the individual components of electronics, such as copper and plastic, feed into large, vibrant, and long running secondary resource markets (Leven 2011). Prices for recycled components are a function of the cost for recovery and the demand for secondary resources. In many cases, such as recovered copper, the secondary resource mirrors the market price of virgin materials (Lacoste 2007).

For products that are difficult to disassemble and/or are limited in their reuse applications, demand for the final commercial product is critical. The market for Cathode Ray Tubes[3] (CRTs) is a good example. Historically, secondary CRT glass, which contains a certain amount of lead, was mainly used to make new CRT TV screens. As in N.C., California regulations ban CRTs from any landfill disposal. However, in 2012, California found that a dangerous number of CRTs were accumulating in storage. In September of 2012, California issued an emergency measure allowing the landfill of CRTs. The state argues that the ban of CRTs from landfill disposal is so divorced from the market reality as to be counterproductive to environmental health and safety, because it leads to hazardous stockpiles (Staff 2012). CRT does have a proven market as a feedstock for lead smelters, but that market is restricted to just a few facilities and other uses of CRT glass are small in demand, by comparison. Hence, CRT glass now has a negative market value, which is affecting both collection programs and processors.

The extent of the harm from electronics and the applicability of hazardous waste regulation to electronics is debated. A 2004 report to the EPA, *RCRA Toxicity Characterization of Computer*

[3] CRTs were common elements in TVs and screens prior to the introduction of flat screen technology. CRTs contain lead and other hazardous chemicals.

CPUs and Other Discarded Electronic Devices used the EPA's Toxicity Characteristic Leaching Procedure (TCLP) to test a variety of electronics including computer CPUs and screens, finding that all of these materials leached lead in excess of the national threshold for hazardous regulation (Timothy G. Townsend 2004). A follow up report (Spalvinset al. 2008) indicated that actual lead leachate resulting from landfilling electronic waste may be lower than the TCLP suggests. In general, it is difficult to measure and prove the effect of hazardous substances in landfills because controlled testing in active landfills is nearly impossible and individual hazardous substances like electronics make up only a small portion of the waste that enters a landfill.[4]

Adding to the challenges posed by complicated electronic recycling markets is the international trade in electronic recycling materials. Although difficult to document, it is commonly known that informal vendors in developing countries recycle large portions of electronics from western countries (Leven 2011). For example, Guiyu, China, is the world's largest center for informal recycling. The city's dynamic market for secondary materials and the polluting byproduct of the international trade have been written about in a number of publications (Chung and Zhang 2011). Informal recycling workers are exposed to dangerous conditions and their plight has become a major element in the US domestic debate over electronic waste, as seen in H.R. 2284 (112th): Responsible Electronics Recycling Act, which seeks to regulate the export of discarded electronics.

U.S. Laws and State Recycling Programs

There is no national mandate for electronics recycling. Those electronics that fail the EPA's TLCP test qualify as hazardous under federal law, including color CRT computer monitors and color CRT TV tubes. Hazardous materials must meet a variety of strict disposal requirements, including a rule that bans the material from disposal in a municipal solid waste landfill. However, the EPA exempts CRT computer monitors and color CRT TV tubes from this definition in the hope that recycling and reuse are encouraged. In addition, household wastes, regardless of their chemical make-up, including all household TVs and computers, are exempt from Resource Conservation and Recovery Act (42 U.S.C. §6901 et seq. (1976)). This means that household hazardous waste disposal does not need to be processed as hazardous waste under federal law. A 2007 presentation by the EPA Office of Solid Waste, available on the EPA's website, explains the agency's policy.[5] States are permitted to implement their own laws and enforcement mechanisms in the area of solid waste, so long as state laws and infrastructure are equal to or stricter than the federal standards.

[4] Other hazardous substances found in various electronics include mercury, cadmium, lithium, brominated flame retardants, and phosphorous coatings (Product Stewardship Institute, 2012")

[5] Available at, http://www.epa.gov/epawaste/conserve/materials/ecycling/rules.htm#legis

Twenty-five states, including North Carolina, have enacted legislation addressing the management of end-of-life electronics. In 2004, Maine became the first state to enact legislation to address electronic waste and was followed by other early adopters (California and Maryland) in 2005. The majority of this legislation was enacted between 2007 and 2010. Like N.C., most states placed manufacturer responsibility at the center of electronics legislation. Manufacturer responsibility, also known as extended producer responsibility (EPR), is based on the philosophy that the companies who make and sell their equipment should internalize the cost of proper end of life management (Wiesmeth and Häckl 2011). California's legislation is the only one to levy an advanced recycling fee to fund its electronics waste program. Under California's program, customers are levied a fee upon the purchase of electronics. The fee is then used by the state to fund recyclers directly (Kahhat, Kim et al. 2008). While other theories for management exist, they will not be covered in this review because a comparative analysis of the philosophy at work behind N.C.'s law is beyond the scope of this analysis (See Kahhat, Kime et al. 2008).

Despite a common reliance on an EPR philosophy, states differ in their implementation. North Carolina's law asks TV manufacturers to fund recycling tons equal to the manufacturer's market share of covered products sold in the previous year. It does not place quotas on computer producers, who instead are required to pay a large registration fee and required to provide for free take-back of their products. The law gives relative flexibility to manufacturers as to how they can achieve their recycling targets. For example, TV producers may create their own take-back programs, participate in agglomerated take-back programs with other manufacturers, or purchase tonnage from independent recyclers. Other states provide less flexibility to the producers in how the program can be funded. For example, Missouri and Pennsylvania require companies to set up direct take-back programs for their products. A few states allow companies to collect and trade credits for recycling product over their required share. Due to the young nature of these programs, no literature exists that comprehensively compares the effectiveness of the various state legislations and management systems.

Maine's program is particularly interesting. Maine's law requires manufacturers to fund recycling consolidation centers where municipalities send the electronics they collect from citizens, in addition to requiring the manufacturers to pay for the actual recycling of the material. Maine also holds companies accountable to their share of disposed product and a portion of abandoned product rather than the company's market share of products sold.

Banning covered electronic waste from landfills is a common accompaniment to state mandated electronics recycling programs.

North Carolina's E-Scrap Legislation Chapter 130A of the General Statutes

The primary purpose of North Carolina's Discarded Computer Equipment and Television Management legislation is environmental protection. The legislation seeks to make the economics of consumer electronic recycling programs feasible by bringing in money from manufacturers to help fund the program.[6] The statute states that televisions and other discarded covered-consumer products (such as computers and computer accessories), "may not contain any valuable products but should nevertheless be recycled to prevent the release of toxic substances to the environment." The legislation seeks to establish, "shared responsibility among manufacturers, retailers, consumers, and the State (§130A-309.130)." The law covers computer equipment such as printers, keyboards, scanners, and TVs. TVs include devices with a broadcast, cable, or satellite tuner with a viewable screen larger than nine inches**.** The law also requires recovery and recycling of products in this category and was accompanied by amendments to G.S. 130A-309.10, a list of materials banned from landfills. Not included are typewriters, servers, ICI devices and systems, professional workstations, mobile telephones and other standalone portable electronics like calculators and tablet devices. Manufacturers of these products share the responsibility for recycling and educating citizens about recycling opportunities.

Both computer and television manufacturers are required to register with the state and place a permanent label on the product identifying them as the manufacturer. Then computer manufacturers can take one of three programmatic actions. In "Level I", the manufacturer can manage a complete take-back program for its discarded products including collection, recycling, and education through mail-ins, onsite collection, and/or collection events. In "Level II," the manufacturer can offer collection for their equipment and the computers of other manufacturers as well as non-covered electronic equipment. They are allowed to charge a "nominal" fee for the collection of non-covered equipment. At this level, the manufacturer is required to collect material from the 10 most populated municipalities in the State and host at least two annual collection events. At "Level III," The manufacturer sets up take-back programs similar to Level I. However, they accept computers and accessories produced by others as well as non-covered electronics, as in Level II. The manufacturer must also maintain collection sites similar to Level II. Manufacturers are not allowed to charge fees for the management of discarded computers. However, they are allowed to build joint recycling plans with other manufacturers.

There are registration and annual registration renewal fees levied at each level. Level I requires a registration fee and annual renewal fee of $15,000 each. Level II requires a registration fee of $10,000 and an annual renewal fee of $7,500. Finally, Level III requires a registration fee of $10,000 and a renewal fee of $2,500.

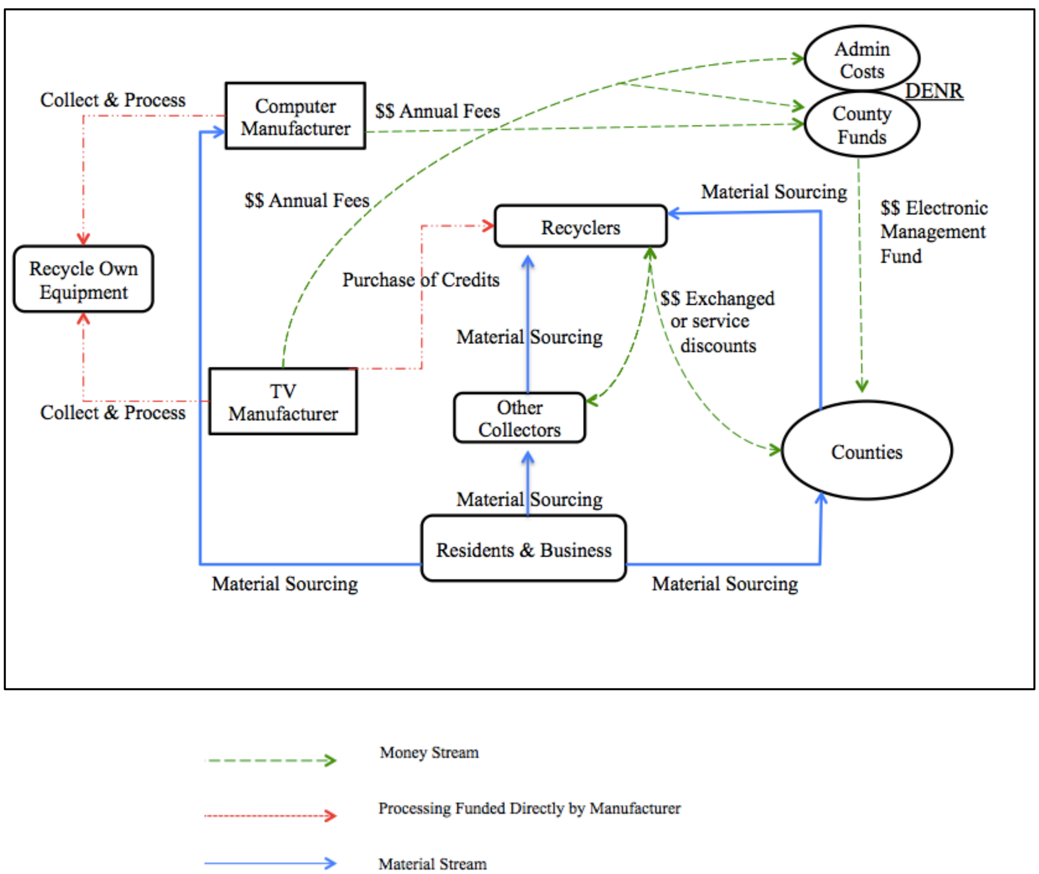
Television manufacturers face stricter regulations. In addition to labeling their product and paying an initial and annual renewal registration fee of $2,500, they are required to recycle their

[6] Consumers are defined as residences and small nonprofit organizations.

market share of televisions sold in the previous year. Television manufacturers may arrange for independent recyclers to cover their market share (a number determined through national statistics). They are also able to form joint plans with other manufacturers and the material they recycle may come from a variety of sources including the charity store Goodwill. According to DENR, Goodwill is a major contributor of recycled TVs.

DENR may use all of the fees paid by television manufacturers and ten percent of the fees paid by computer manufacturers on its own administration costs for the electronic recycling program. The rest of the funds collected are delegated to the Electronic Management Fund. In 2012, DENR's distribution fund totaled $600,000. This money is distributed, based on population, to counties that have, at the least, initiated electronic collection and that use a certified processor. Manufacturers that annually sell 1000 items or less are exempt from fees. [7]

Figure 1. North Carolina's E-Scrap Legislation, Flowchart[8]



[7] http://www.ncleg.net/Sessions/2009/Bills/Senate/HTML/S887v6.html

[8] Solid Waste Management Act of 2007 (S.L. 2007-550, SB 1492 Part 2E, Article 9, Chapter 130A of the General Statutes

Extended Producer Responsibility and State Costs

EPR systems do not guarantee waste reduction. The philosophy argues that when producers are required to pay disposal fees and give assistance to recycling activities, they will have incentive to reduce the impacts of their products at the waste stage (Organisation for Economic Co-operation and Development 2004). In common vernacular this is known as "designing for end of life." By the same measure, these incentives can also lead to new technologies to reduce environmental impacts. The OECD also found that EPR systems can work effectively if there are functioning recycling markets. However, within OECD's collection of essays, Margaret Walls of Resources for the Future argues that EPRs are also a preferred option when there are illegal disposal problems or when there are poorly functioning recycling markets, for example in cases where the cost of recycling is too high to allow a natural market for recycling to emerge.

The OECD does not state that EPR systems alone will create, or help to create, functioning markets. Moreover, it cautions analysts to be aware of recycling market failures that need to be overcome. Sachs (2006) also warns over-reliance on the market mechanisms in EPR systems alone, pointing out that government restrictions and regulations played as important or a greater role in Europe's waste reduction as did EPR market incentives (Sachs 2006). Because EPR systems are a new innovation, consensus has yet to emerge, even within organizations.

In the U.S., as state programs using EPR systems for their electronics mature, best practices are beginning to emerge. The Product Stewardship Institute (PSI) suggests that states cast a wide net in the material covered by their legislation, specifically mentioning the need for inclusion of televisions, peripherals, and CPUs. The institute argues that a wider scope increases collection efficiency, leads to a fairer division of financial responsibility, and may help relieve local governments by lowering the management costs. Along these lines, it also suggested that covered material be defined by their function ("video display device") rather than a specific name. PSI supports holding manufacturers responsible for their market share of sales, as opposed to disposal share. Finally, PSI suggests that legislation include both collection and convenience targets as well as a requirement that the program serve residents from all parts of the state. If convenience measures are not included, PSI argues that the government and nonprofits may bear a disproportionate burden of collection costs and rural communities in particular will lack collection options (PSI 2012). This is of note because statewide convenience metrics are not required of any manufacturers in North Carolina's law, where counties are in fact experiencing high costs.

In 2007, researchers interviewed electronic recyclers in the Seattle area. The city has a longstanding e-scrap waste program, which began by covering businesses and has since expanded to include residents. This characterization study of computer monitor recycling observed a large number of CRTs entering the recycling stream, but also forecasted a change in the proportion of CRTs and LCDs based on sales data for computer monitors (Lee, Cooper et al. 2010). Lee underemphasizes a point made by Walker (2009). In Walker's statistical study of product life and production trends, he observed that recycling infrastructure for visual display products must be provided well after these products are phased out of production and retail.

Analytical Goals

The Department of Environment and Natural Resources would like to know where counties are experiencing high costs and how they are spending money in their electronic waste programs. This interest is, in part, a response to community cost concerns as CRT markets deteriorate. DENR is also generally interested in evaluating how well the system is functioning. My analysis seeks to address these questions in three parts:

Approximately how high are the costs? Are county complaints about high costs a long-term concern? Or, are they over-reacting to small unexpected and temporary costs?

What (or where) is the disparity in costs occurring? Are there common factors that predict the cost of a program such as the number of cities or wealth of population? Is the volume of CRTs the primary driver of high costs or do identifiable management practices also play an important role?

Assuming high costs are pressing concerns, where does the solution reside? Should counties change their management practices? Should DENR's electronics fund be distributed differently? Should manufacturers be required to contribute more? Are changes to the legislation necessary?

This analysis does not seek to make an economic argument for why the electronic waste program is good or bad. Nor does it aim to place the electronic waste program in a lifecycle perspective by valuing non-monetary benefits and costs. Instead, this paper focuses on analyzing practical experiences in program management and budgetary expense.

Findings From Background Research

Based on my literature review and conversations with my client, I have identified a number of potential and perceived patterns in the flow of funds and materials through the N.C. system electronic recycling system. Some major themes are:

- While Cathode Ray Tubes (CRTs) can technically be recycled, the market demand for CRTs is currently low and declining. Because of this, counties, who for our purposes are producers of used CRTs, have to pay for CRTs to be recycled. The current scenario of swiftly decreasing demand for and rising supply of recycled CRTs coming into local programs from the public was not fully factored into the original legislation. It's also possible that this price was not factored into the original contracts between TV manufacturers and recyclers. If this is the case, the price that manufacturers are paying recyclers to purchase recycling tonnage does not fully cover the cost of recycling used televisions.

- New electronic recycling programs are likely to attract a lot of old TVs containing CRTs. It is also possible, though less likely, that counties are receiving and sending electronics for recycling that are not covered by the legislation and are therefore also not covered by manufacturer funds. Surveying newer and older counties about the material they collect will allow me to test both of these possibilities. If the older programs (none are more than nine years old) are receiving fewer CRTs than newer programs, this indicates that the heavy influx of CRTs is a short-term problem that will wane in a few years, although DENR may decide the counties require additional support in the meantime. The "other" electronics category is particularly interesting. DENR has no information about the quantity of materials collected in this category. However, if counties are covering the cost of large amounts of these electronics, it may indicate that the EPR law requires expansion.

- Material price, paid by a recycler to a county, is dependent on quality and quantity. So, counties that do not protect their valuable material like computers and/or do not collect very much valuable material may receive less revenue or in some cases may have to incur transportation costs and other expenses that better managed and/or high quantity programs do not. In short, the system may favor larger and wealthier counties. This can be tested by collecting information about the pricing that recyclers provide various counties and analyzing this information along with publicly available information on counties such as average income.

- Recyclers may be concentrating on certain counties (based on geography or material quantity and type), and providing them with the benefits from recycling units purchased by manufacturers while charging other, less profitable counties. A related possibility is that the geographic location and transportation costs of the recyclers' affects how much revenue counties are able to collect. If the recyclers receiving funds are located near municipal centers, this would imply that rural counties are working against geographic constraints.

- Management practices of counties can affect capital costs as well as the revenue potential of the electronic material. For example, a county that carefully packages its electronics prior to transferring the material to a recycler may be offered more money for material (or be charged less for negative-value materials). Or, a county that leaves its electronics outside in the elements while collecting enough material to transfer is lowering the value of the material. This implies that counties who have a history of proactive recycling and waste management will have lower net costs to their electronic recycling programs.

Methodology

Data Sources

My data includes primary information collected through surveys and follow up interviews with 21 counties. To analyze the survey results and further examine trends across the state, I draw on annual solid waste reports filed by each county as well as 2012 reports filed by manufacturers of computers and electronics. My analyses may also draw on information collected during meetings with DENR staff and stakeholders. Correlation is used as a demonstration of trends. However, tests for significance of correlation were not carried out, as the number of sample counties is too small.

County Survey Overview

My survey seeks to build an accurate picture of county financing and material management. The primary method for analysis is side-by-side comparisons of county programs to recognize unusual costs as well as management, geographical, and/or other program characteristics that lead to budget stress.

My survey questions collect as much detail about the revenues, costs, and management of county electronic waste programs as possible. Specifically, I collect the following information about county electronic recycling programs:

- Budget allocated for the program
- Capital costs for building the program
- Operating costs for running the program
- Revenues and costs from selling or transferring electronic material to recyclers
- Management practices
- The quantity and type of material collected
- Additional information as requested by my client in order to help them better understand the county programs

Most counties do not record specific information about the various programs within their budget. Therefore, the accuracy of the survey relies on the careful participation of interviewees. While writing my survey questions, I closely consulted with Rob Taylor, Team Leader for Local Government Recycling in DENR's Division of Environmental Assistance and Outreach. Rob was most recently Orange County's Recycling Programs Manager. He provided me with feedback on wording, content, and probability of response.

For the full survey see Appendix B.

Results

County Participants

I distributed the survey in late 2012 to representatives from solid waste departments in all of North Carolina's 100 counties. 21 counties, listed in the table below, returned the survey. Follow up with counties consisted of phone calls averaging 10 minutes each.

In distributing my survey I sought first and foremost, to collect a diverse list of counties, based on factors that I believe are predictors of program structure and success (listed in the following table). 67 percent of the participating counties are located in the central region of N.C. The Western and Coastal region programs are each 19 percent. Eight of the top ten most populous counties surveyed are located in the central region, reflecting state patterns. Wake and Mecklenburg are both included in the survey. These two counties are by far the largest populations in the state as a whole as well as a two out of the six oldest electronic recycling programs in my survey. It is possible that some of the answers these counties provide will not give a realistic representation of the state as a whole. However, these counties are powerful policy drivers within the state and are likely to receive the most benefit from the legislation, so it is beneficial to have their answers included in my data. There is a good representation in the age of county programs, with 43 percent older programs (started in 2003-2005) and 38 percent recent programs (started 2010-2011), with the remainder in the middle. The older programs tend to serve larger county populations with high urban density.

Figure 2. Sample Counties

County	Region	Percent of NC Population See Annual Estimates of the Resident Population for Counties of North Carolina: April 1, 2010 to July 1, 2011	Population Density (Persons/sq mile, 2010) http://quickfacts.census.gov/qfd/states/37/37117.html	First year Electronics Collection Program appears in state records cited below	Program Type 1- Drop off site 2- Periodic events 3- HHW program	Sector Served by recycling program 1- Residential 2- Commercial 3- Industrial	Total Number of Drop Off Sites in Recycling Program	Staffed Sites	Number of Education Initiatives in SW progam	Cost/Ton of All Material Managed As provided on Annual Report	Tonnage TVs and Electronics 2011_2012
Alamance	Central	1.59%	356.5	2010	1	1	3	1	7	108	120.2
Guilford	Central	2.29%	418.8	2005	1;2;3	1	1	1	6	N/A	55.1
Lee	Central	0.61%	227	2003	1	1	6	6	6	154	56.18
Mecklenburg	Central	9.78%	1,755.50	2003	1	1;2	14	4	13	24	503.98
Moore	Central	0.93%	126.5	2010	1	1	7	0	2	65	102.25
Nash	Central	1.01%	177.3	2007	1	1	9	9	6	55	94
Northampton	Central	0.23%	41.2	2010	1				0	167	8.82
Orange	Central	1.41%	336.2	2003	1	1;2	10	5	10	69	188
Stokes	Central	0.49%	105.6	2011	1;2	1;2	8	8	5	118	32.5
Vance	Central	0.47%	179.2	2011	1	1	9	9	7	148	109.2
Wake	Central	8.03%	969.40	2003	1	1;2;3	15	15	11	100	1140.22
Gaston	Central/North	2.14%	578.8	2003	1	1;2	6	6		25	130.33
Madison	Central/North	0.22%	46.2	2003	1	1	11	11		144	58.04
Brunswick	Coastal	1.14%	126.8	2005	1;2	1;2	14	5	13	132	152.32
Carteret	Coastal	0.70%	131.3	2007	1;3	1	11	11	4	117	29.95
Chowan	Coastal	0.15%	85.8	2007	1	1;2	4	4	6	130	12.6
Currituck	Coastal	0.25%	89.9	2010	1	1	8	8	8	141	37.7
Burke	Western	0.94%	179.3	2011	1	1;2	6	6	5	60	135.35
Rutherford	Western	0.70%	120.2	2006	1	1	10	10	7	91	143.19
Transylvania	Western	0.34%	87.4	2005	1	1;2	4	4	9	51	28.3
Watauga	Western	0.53%	163.4	2008	1	1	10	10	8	82	22

See	R:\Electronics\2009 Local Government Electronics Survey\County\County Electronics Collection Survey Results 6-2
	R:\Electronics\DATA\2003 survey of local governments\e-programs
	R:\Electronics\DATA\2005 LG survey\Results
	R:\LG_DATA\Local Government Reports\10-11 Reports
Notes	Greensboro and Cary are removed from population statistics because their programs are managed separately
	* Gaston and Northampton included monitors under TVs in their annual reports. This is adjusted for in the percents they provided in the Survey.

Trends in Materials Received

Population

Figure 3 below confirms that tons of TVs collected is closely related to population (Wake and Mecklenburg were removed for scale). Figure 4 shows there is a similar relationship between urban density and TV tons (Wake and Mecklenburg were removed for scale). These observations confirm the argument that the more people are present in a county, the more material programs receive. Figure 5 shows that the relationship between county population and the portion of TVs in a recycling program is not strong, indicating that population may be a reasonable metric to distribute state funds. Survey respondents reported the percentage of TVs, computers and computer equipment, as well as other electronic material present in their recycling programs.

Figure 3. Tons of TVs and Population

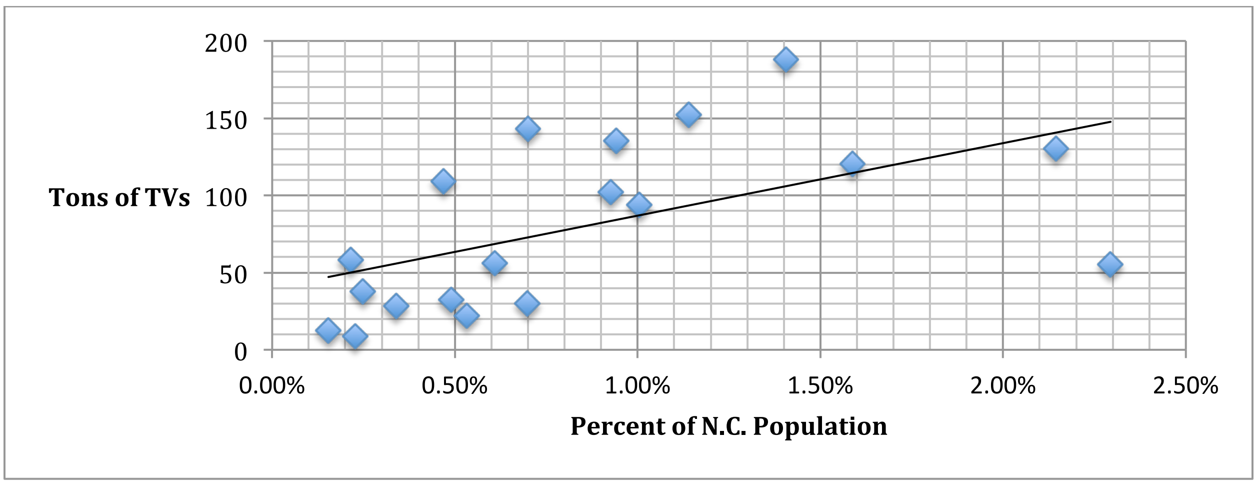


Figure 4. Tons of TVs and Population Density

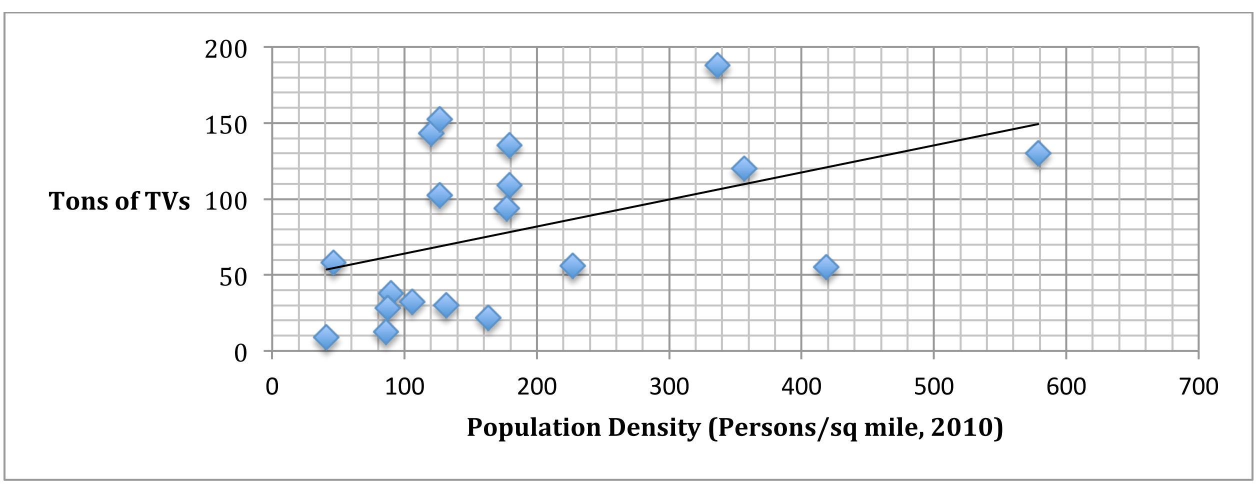
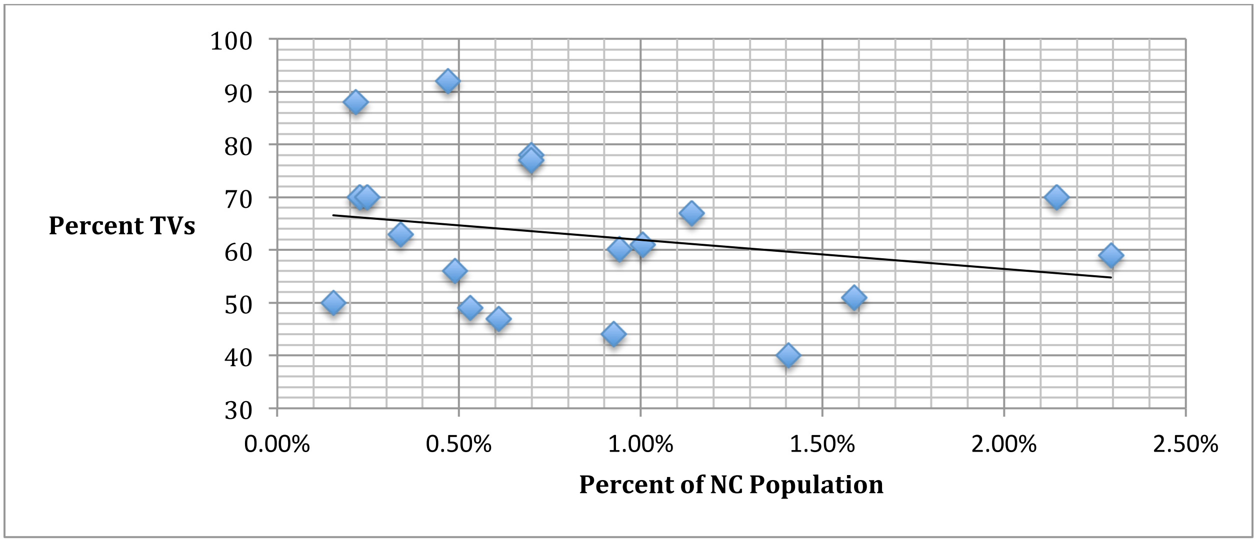


Figure 5. TVs as a percent of All Material in Electronic Recycling Program and Population



Program Age

There appears to be little association between the start date of a program and the number of TVs and other material collected as a percent of all electronic material. For my analyses I used self reported information from the survey and divided counties into oldest, middle aged, and newest programs as seen in Figure 6 below.

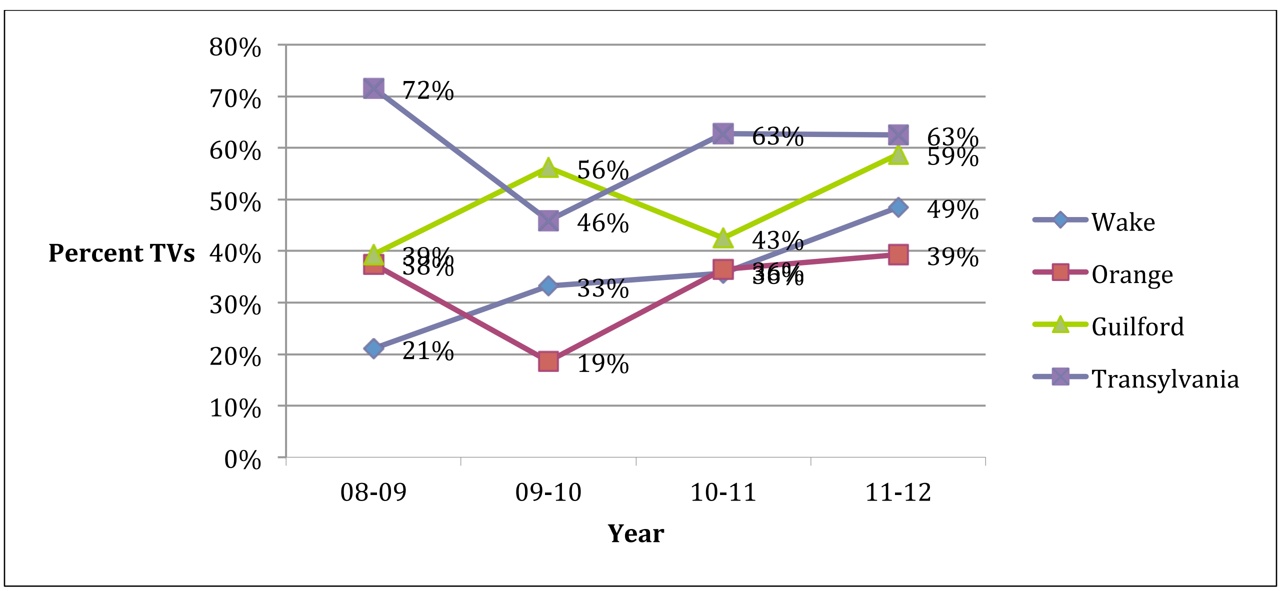
According to the survey respondents, older programs receive only slightly less TVs as a percentage of all electronic material. Both the oldest and newest counties are receiving an average of about 78 percent CRTs in their TV material while the middle-aged counties (2005-2008) receive about 83 percent CRTs. So, while the number of CRTs is on a downward trend overall, there appears to be a spike in CRTs and a high leveling point. It is common belief that as flat screens replace bulky TVs, there will be an inevitable fall in the number of CRTs received by public programs. However, it appears that this trend is slow. Counties should plan to receive CRTs for a decade or more, rather than hoping to wait out the tide for a few years.

Figure 6. Age and Material

Program Start Date	Percent TVs	Percent CE	Percent Other	Percent CRTs	# of Programs
Old Programs (existed in 2003)	60	29	12	78	6
Middle-Age Programs (started between 2005-2008)	63	24	13	83	8
New Programs (started between 2010-2011)	63	29	10	77	7

Another way to look at the trends in material is to examine annual changes in tons collected and material percentage. As programs mature and expand they should see an increase in the total tons and a decrease in the number of TVs, given current consumption trends. Looking at the annual tons in the four oldest counties, there does not appear to be significant trend in the tons received. That said, during the years for which data is available, the four counties that reported their TV tons appear to be converging at 50 percent TVs as seen in Figure 7 below. In follow-up interviews, one county with an older program connected an increase in tons received to the implementation of the electronics law. However, this does not appear to be a significant trend as only three programs out of eight saw an unusual increase in total tons collected after the electronics law went into effect. Moreover, there was very little change in the percent of TVs as seen below.

Figure 7. Program Maturity and Material



County Resident Income

The average income of a county's population appears to be a stronger predictor of the type of material counties receive than either population or program age. Although causality and statistical significance is not tested in this study, Figure 8 demonstrates that per capita income in the past 12 months is more highly correlated with the percent of CRTs and TVs than are any of the other variables mentioned above.[9] When the three counties that reported 50 percent or less CRTs are removed, the trends between county income and material become stronger.

It's important to note that Wake and Guilford counties are not included in the income correlation. Wake and Guilford do not manage the solid waste programs in the town of Cary (Wake) and the town of Greensboro (Guilford). Since these are important districts, it would be inaccurate to use county income data to measure their correlation. If Guilford is included this might affect the correlation somewhat as Guilford contributes 95 percent CRTs. When Wake and Guilford are removed from the other measures in Figure 8, the values of correlation coefficients generally decrease. One exception is that the correlation between population metrics and CRTs received increases to .22 for population and .15 for population density as noted in brackets.

Figure 8. Correlations of Demographics with Material Composite

	CRTs	**TVs**
County Income	0.38	-0.37
Population %	0.15 (.22)	-0.16
Population Density	0.13 (.15)	-0.13
Program Age	-.15	.08
* Brackets indicate correlation with Wake and Guilford counties removed.		

Interestingly, the correlation for CRTs is positive, indicating that higher income counties receive more CRTs as a percent of all TV material. However, given the narrow margins (most points fall between 70% and 100%) in which this portion is considered, the trend is not informative for practical purposes. Figure 9 below shows this narrow trend line. In contrast, Figure 10 shows a stronger relationship between income and TVs as a percent of all material. The lower income counties tend to collect a higher portion of TVs in their programs.

[9] Per capita money income in the past 12 months (2011 dollars), 2007-2011 according to US Census Bureau, American Community Survey, 5-Year Estimates. Visit http://quickfacts.census.gov/qfd/states/37000.html

Figure 9. CRT-TVs and County Wealth

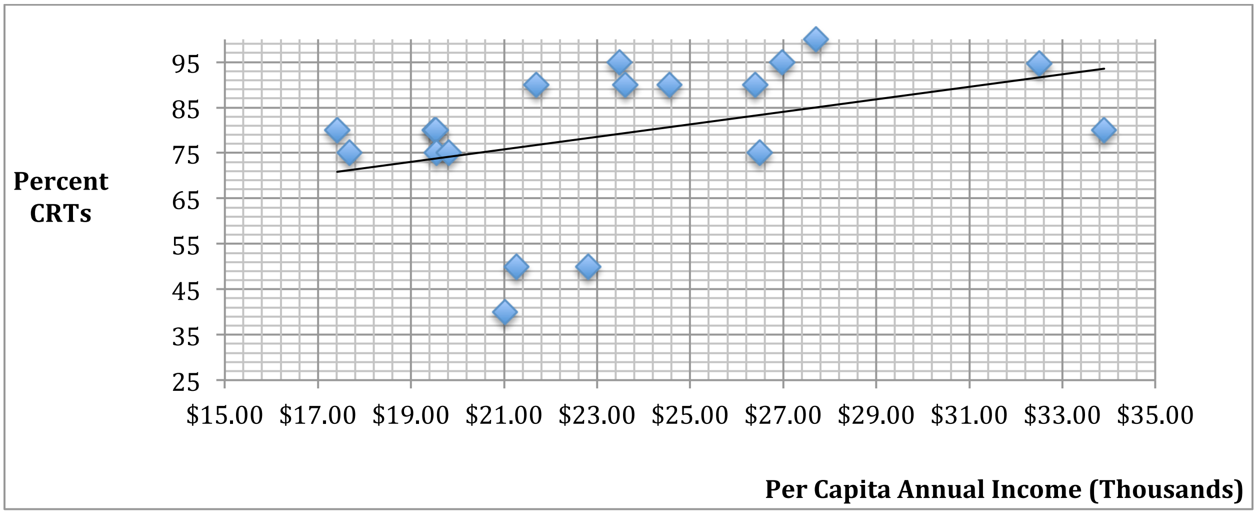
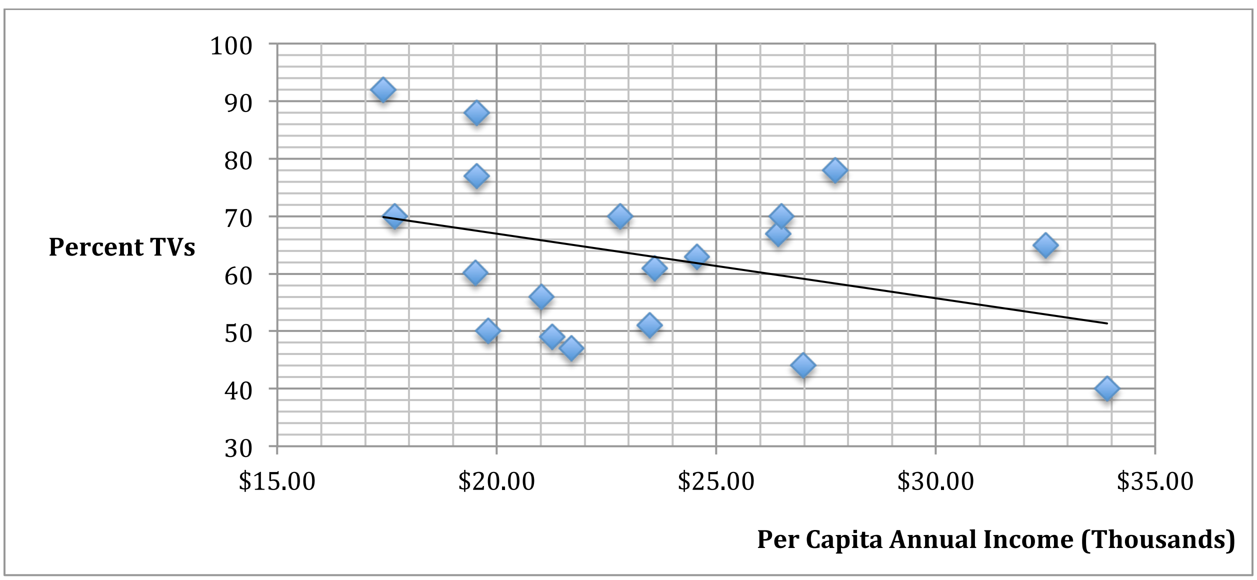


Figure 10. TVs and County Wealth



Customer Base

It appears that the customer base and the percent of TVs, computers and other material is not related in any meaningful way. This indicates that counties will not be able to increase the number of computers they receive by expanding their collection to commercial businesses. However, there is a large correlation (-.46) between the portion of CRTs a program receives and it's customer base. As Figure 11 demonstrates, with each additional customer added, the portion of CRTs (as percent of all TVs) tends to decrease. Those counties that receive material from residents, non-profits, government and businesses on average receive 26 percent less CRTs (as a portion of all TVs) than do counties collecting material only from residents or residents and non-profits/government.

This type of analysis is possible because counties follow a similar pattern in their customer base. All counties receive material from residents and those counties that receive material from one other customer receive it from non-profits *or* local government. Following that, all counties with three customers receive material from residents and non-profits as well as local government *or* commercial businesses.

Notice in Figure 11 that adding one customer category actually increases the portion of CRTs when the customer is local government *or* non-profits. When businesses are thrown into the mix with residents and non-profits, the proportion of CRTs drops. And, when counties serve all four of these customers, the proportion of CRTs decrease by more than 12 percent. Finally, when schools are included as a fifth customer, the proportion of CRTs increases once again. In fact, those counties that received material from schools in addition to all other customers had 13 percent more CRTs than those counties that received material from only three sources and no schools.

While not conclusive, this trend leads to a hypothesis that the portion of CRTs drops the most when businesses are served, followed by government. It is more difficult to make a statement about non-profits given the division of the customers. However, it appears clear that counties serving schools are likely to have a higher portion of CRTs in their material.

Figure 11. CRT-TVs and Customers

Collected:	+0	+1	+2	+3	+4
	Only Residents	Residents & Non-Profits or Local Gov't	Residents & Non-Profits & Gov't or Business	Residents & Non-Profits & Gov't* & Business	Residents & Non-Profits & Gov't & Business & Schools
Percent CRTs	92	97	82	69	77
	2	3	3	6	7
*One of the counties collected from Schools instead of Gov't. Without this county CRTs are 64%.					

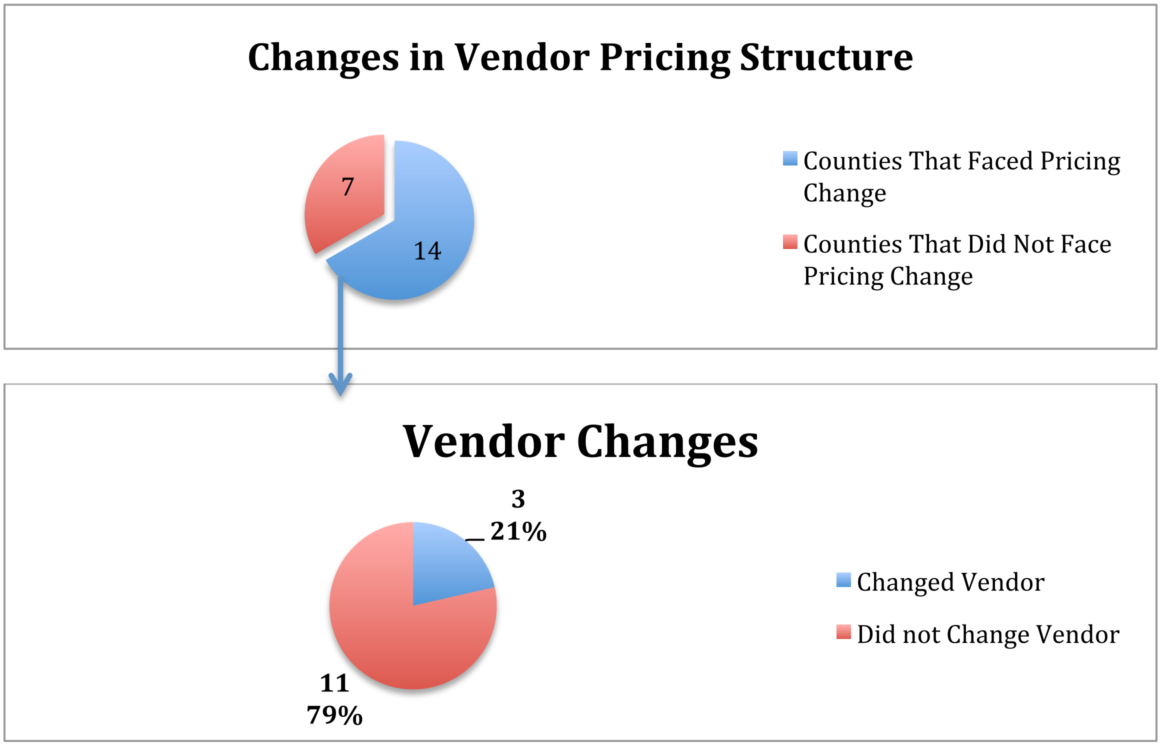
For the purpose of further research, it is interesting to note that county per capita income as measured above is also highly correlated with the customer base (-.41). This means that the wealthier a county is, the fewer customers it tends to serve. This observation might play a role in the relationship between CRTs and county income mentioned above.

Trends in Vendor Relationships

In FY11/12, county-vendor pricing and contracts went through a great deal of changes. Most of the counties surveyed experienced a change in contract pricing during the year. All but one change involved an increase in the charges and/or a decrease of services provided by the recycler. Prior to 2012, many counties received free pick up and equipment from recyclers. Common "fee" increases consisted of charges for such previously free services.

However, only 5 out of the 14 counties that experienced price changes also changed their vendor. All 9 of the counties that did not change vendors accepted a price increase and many were hoping to change vendors soon. Three counties that changed or shopped for vendors (tried a new company but returned to the original vendor) also experienced a cost increase in their program. While counties should be changing to cheaper processors, many were locked into contracts or were unable to find acceptable options available on the market within the 2011/12 fiscal year. Two counties reported that they are currently searching for new options and one county changed vendors during the current (2012/2013) fiscal year. It should be noted that the ability of counties to switch to another certified vendor that is cheaper will be hampered by a worsening CRT market that affects all processors. The best that a county can hope or plan for is to find a vendor that has support from TV manufacturers to subsidize costs as part of their market share recycling obligations.

Figure 12. Changes in Vendor Pricing FY11/12



Out of a total of 8 recyclers, Synergy, Creative Recycling Systems, and E-Cycle Secure captured 76 percent of all contracts (formal and informal) in my survey. All of Synergy's customers experienced a fee increase. Synergy did not receive any manufacturer funding, so it is reasonable to expect that their fee would increase.

Creative and E-Cycle Secure's customers also experienced price increases. However, unlike Synergy, Creative and E-Cycle Secure received the majority of TV manufacturer funding (by pounds recycled). This indicates that these companies were recycling more TVs overall than covered by their agreement with manufacturers, or that the companies charged manufacturers too little for recycling. There is no law that restricts recyclers from charging counties an additional amount over the manufacturer's price. Recyclers should not charge counties in a competitive market. However, if the recycler's costs aren't fully covered by manufacturer funds, or if the market is not competitive (For example, if county knowledge and/or access to other recyclers in the state is limited) then the recyclers will charge the county. Both of these forces are likely at work in N.C.

In FY11-12, TV manufacturers under-purchased recycling tonnage and were likely charged less than they should have been by recyclers. [10] It is likely that this situation produced a temporary shortage of funded recycling and limited county options. However, even if manufacturer funding reaches the correct levels, survey responses show that counties are not able to jump quickly from one recycler to another, even when they experience price increases. If counties are unable to connect with the recyclers who receive manufacturer money, they will not be able to use competition to their advantage.

County Costs

Costs Summary

The survey asked county recycling program managers questions about their program's costs. The survey went into greater detail than is typically considered by program managers. For example, the survey asked questions about staff wage and time spent working on electronics. With such fixed costs, counties often do not break out the actual distribution of costs by recycling or solid waste program. For this reason, the data collected by the survey should be taken as a rough reflection, rather than an absolute picture, of county budgets.

As seen in the summary table below, there was a wide range of costs, with one county spending as little as $1/ton on their electronic recycling and another spending as much as $344. Since staff costs tended to be the less reliable and highest cost point during survey follow-ups, I provide all net costs and revenue removing this budget item. Two counties report charging residents a drop-off fee for electronics, this was not included in their revenue because I have chosen to define this revenue as money coming in from outside the county.

Figure 13. Cost per Ton – Summary

Note that brackets indicate costs whereas revenues are provided without brackets.

Budget Summary (Per Ton)								
	Capital	**Operational**	**Staff**	**Outreach**	**Total Cost**	**Vendor Revenue****	**State Revenue**	**Net Revenue No Staff**
Non 0 Min*	$ (0.17)	$ (0.10)	$ (11)	$ (0.47)	$ (1)	$ 3	$ 22	$ (365)
Max	$ (43)	$ (305)	$ (1,286)	$ (10)	$ (344)	$ 50	$ 155	$ 116
Average	$ (11)	$ (41)	$ (223)	$ (2)	$ (54)	$ 22	$ 54	$ (24)
*** All costs and revenues start at 0, average includes 0**								
**** Only four counties received vendor revenues**								

[10] Sourced from Internal DENR reporting

Capital costs tended to be very low. Of the four counties that reported no capital costs, two programs reported a history of full service provision including pick-up and loading from the vendor, another reported repurposing old equipment at no cost, and finally one program had already surpassed the timeframe for straight line depreciation. The two counties reporting free-full-service contracts with their vendor also reported $0 in operational costs.

In fact, many counties were able to avoid investing heavily in capital and operational costs prior to FY12/13 because their recycling vendors provided these services free of charge. In FY11/12, all counties received a minimum of pick-up service from their recycling vendor. Most counties also received basic supplies such as shrink-wrap and pallets. Only three out of the 21 counties did not report receiving supplies from their vendor. Meanwhile, only four counties actually incurred vendor charges during the fiscal year. A common complaint from counties was that vendors were no longer providing basic services such as transportation, supplies, and loading free of charge in FY12/13. It seems that vendors used these services as a platform to charge counties on a per pound basis for TVs. It's important to note that when vendors added fees for some material in FY12/13, they generally also started offering revenue. However, since most counties have a majority of TVs and CRTs in their systems, these revenues are not making a significant impact.

Only four counties received revenue from their vendors, at an average of $22/ton. However, all but one county in my survey received state electronic funds and many reported spending only a small portion of the funds in FY11/12. For those that saved their FY11/12 funding, this money proved to be extremely valuable in FY12/13, as they were able to use these funds to pay the new vendor fees. In the table above, the tendency of counties to save state funds led to a many of them falling into the net revenue category for FY11/12. (12 out of 21 counties experienced net revenue in their programs when staff costs were not included.)

Cost and Vendor Relations

It is clear from my research that counties are incurring higher costs in FY12/13 than they did in FY11/12. However, it seems important that counties consider these costs in terms of the investments they have made in their program. Three out of the five counties (Brunswick, Orange, and Wake) that made the largest absolute investments in capital costs also received vendor revenue at an average of $.85 for every dollar spent in capital. These counties all began their electronic recycling programs before 2006, however the age of programs does not appear to be a good predictor of per ton capital investment.

Counties reporting no change in their vendor relationship also tended to have a higher cost per ton in FY11/12. Even if we remove the four counties that received revenue from vendors, the five remaining counties that did not experience a price change spent an average of $90/ton without staff costs. On the other hand, the 12 counties that experienced an increase in vendor fees show an average of $11/ton in net revenue derived from state funds. These observations indicate that money invested in an electronic program today, might put counties in a better position to negotiate with their vendor tomorrow.

Cost and Other Factors

Driven by Carteret and Chowan, the costal counties surveyed appear to incur greater net costs on average than do counties in the central or west of the state. However, based on the counties surveyed there does not appear to be a strong relationship between urban density (rural vs. urban counties) and cost. While this paper predicted that county costs would change based on the type of material received, that does not seem to be the case in FY11/12. Because most of the counties surveyed were experiencing neither costs nor revenues in regards to their vendor(s), the material type did not change their costs. Material is likely to be a more powerful force in FY12/13 due to the fact that vendors have moved to a fee and revenue model.

Further Observations on Management Practices

About half the respondents report that non-county electronic recycling programs were operating in their county. The majority of those counties also provide residents with information about these private collection opportunities. This does not seem to predict the type of material that the counties receive or the cost of the program.

12 counties also report receiving scavenged material in their electronics program. Those counties with scavenged material were 19 percent more likely to experience a change in prices from their vendor between FY11/12 and FY12/13. In addition, one quarter of these counties have been penalized by their vendors specifically for supplying poor quality material.

Conclusion

Analyzing trends in material receipt and vendor relationship alongside cost data brings to light a number of important trends. First, it is clear that counties are experiencing unanticipated costs in the form of vendor per pound per material fees justified by vendors in part through charges for previously free services and made necessary due to the high cost of recycling CRTs. However, the level of capital investment counties made in their electronic programs prior to FY12/13 appears to have affected their vendor relationship. Counties that use their own labor and equipment might expect better relationships with their vendors in future dealings.

If more money is funneled into the system by TV manufacturer purchases, counties may see costs decline. However, it is unlikely that counties will be able to return to a cost free scenario such as existed prior to 2012. Counties can make sure they are getting the best deal possible by shopping for more vendors and noting where else vendors may be collecting material as well as how much manufacturer funding they have received. Given that many counties in the survey were not using a vendor with backing from the EPR system, DENR should work to make sure that a market place for purchased TV tonnage is available.

Unlike in FY11/12, material type will be a critical component to county costs in FY12/13 and will likely remain so going forward. Strategies counties can use to increase and secure the quality of material include increasing the number of customers served while staying aware of the potential for CRTs to increase with the adoption of schools as customers. Counties can also invest in infrastructure and outreach to minimize the receipt of scavenged material.

CRTs will continue to be expensive to recycle, and it is likely that they will remain in the system for many years to come. The law does not force recyclers to take into account the full cost of recycling in their contracts with manufacturers. If there is in fact low competition in the recycling market, counties lacking a competitive edge in their material and vendor relationships will continue to pay fees. Without changing the law, DENR can consider increasing the amount of funding provided to electronic management programs.

Finally, while population appears to be a fair metric for distributing funds, DENR should examine the role that income per capita plays in the type of material received by counties. Distributing funds by population ensures that everyone receives about the same amount of money per ton of total material as well as per ton of TVs. However, if per capita income and other wealth metrics are significantly correlated with an increase in the portion of TVs received by counties, there may be other funding mechanisms or vendor matching that can be put in place to assist vulnerable programs.

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APPENDIX A

NCDENR	State of North Carolina Department of Environment and Natural Resources Division of Waste Management	**COMPUTER EQUIPMENT MANUFACTURERS** Annual Reporting For the period of **July 1, 2011-June 30, 2012**

NC Statute 130A-309.134(h) requires that Computer Equipment Manufacturers shall submit a report to the Department by October 1 of each year stating the total weight of all computer equipment collected for recycling or reuse in the previous fiscal year. The report shall also include a Summary of Actions taken to comply with the requirements of the approved Manufacturers' Plan. Documentation of transactions for collection and recycling required.

Date: ______________________

Manufacturer Name: ______________________

Manufacturer's Toll Free Recycling Phone Number: ______________________

Manufacturer Website (URL): ______________________

Contact Name: ______________________

Contact Telephone Number: ______________________

Contact E-mail Address: ______________________

Weight of Computer Equipment Collected in North Carolina

List the sources and processing destinations of computer equipment collected in North Carolina (include local government recycling programs, retail facilities, and other sources you used to collect computer equipment in the state). Attach documentation of transactions that show the actual purchase of tonnage or the arrangements for claiming the material

Collection Source (including contact name/number, City, State)	Processing Facility (including contact name/number, City, State)	Weight (lbs)	Document -ation Attached	Certified?
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐

If you have additional sources and processors, please list on a separate page and attach to this report.

NC DENR - Electronics Management Program   Computer Equipment Manufacturer Annual Report(7/12)

Total Weight of Computer Equipment *collected* in North Carolina: ______________________

Total Weight of Computer Equipment *processed* from North Carolina: ______________________

Summary of Computer Equipment Recycling Plan Actions:

Attach additional sheets if needed.

Please attach this form and documentation of collection and transactions to an e-mail message and send to electronic_recycling@ncdenr.gov or mail to North Carolina Department of Environment and Natural Resources; Division of Waste Management, Solid Waste Section; 1646 Mail Service Center; Raleigh, NC 27699-1649 Attn: Shawn McKee

State of North Carolina Department of Environment and Natural Resources Division of Waste Management	**TELEVISION MANUFACTURERS** Annual Reporting For the period of **July 1, 2011-June 30, 2012**

NC Statute 130A-309.134(h) requires that TV Manufacturers shall submit a report to the Department by October 1 of each year stating the total weight of all TVs collected for recycling and recycled in the previous fiscal year. Documentation of transactions for collection and recycling required.

Date: ____________________

Manufacturer Name: ____________________

Manufacturer's Toll Free Recycling Phone Number: ____________________

Manufacturer Website (URL): ____________________

Contact Name: ____________________

Contact Telephone Number: ____________________

Contact E-mail Address: ____________________

Weight of Televisions Collected in North Carolina

List the sources and processing destinations of televisions collected in North Carolina (include local government recycling programs, retail facilities, and other sources you used to collect televisions in the state). If material from one collection source is taken to multiple processing facilities, please list the collection source as many times as necessary to indicate the various destinations.

Attach documentation of transactions that show the actual purchase of tonnage or the arrangements for claiming the material. Documentation must demonstrate that the materials being claimed originated in North Carolina. Acceptable forms of documentation can include approved invoices, bills of lading, signed letters of acknowledgement from receiving facilities, financial reports, or other documents indicating specific arrangements.

Collection Source (including contact name/number, City, State)	Processing Facility (including contact name/number, City, State)	Weight (lbs)	Document-ation Attached	Certified?
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐

Collection Source (including contact name/number, City, State)	Processing Facility (including contact name/number, City, State)	Weight (lbs)	Document-ation Attached	Certified?
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐
			☐	R2 ☐ E-Stewards ☐ RIOS ☐ Other ☐

If you have additional sources or processing facilities, please list on a separate page and attach to this report.

Total Weight of Televisions *collected* in North Carolina: ____________________

Total Weight of Televisions *processed* from North Carolina: ____________________

Average Price per Pound Paid to Processors or Material Source ____________________

Due Diligence and Compliance Assessments:
Per § 130A-309.135. (d), a television manufacturer shall conduct and document due diligence assessments of the recyclers the manufacturer contracts with, including an assessment of compliance with environmentally sound recovery standards adopted by NC DENR. (Note: no standards have been adopted to date by NC DENR; manufacturers should use their own documented standards until such time as NC DENR adopts its own standards.) This documentation may be requested with future submittals.

Please attach this form and documentation of collection and transactions to an e-mail message and send to electronic_recycling@ncdenr.gov or mail to North Carolina Department of Environment and Natural Resources; Division of Waste Management, Solid Waste Section; 1646 Mail Service Center; Raleigh, NC 27699-1649 Attn: Shawn McKee

APPENDIX B

Intro

This survey will ask detailed questions about the start-up costs of your program and expenses for the fiscal year 2011/12. We suggest you have your waste management budget and any vendor documentation handy when answering the questions.

We ask that you complete the survey as soon as possible and no later than January 15th, 2013.

*This survey is saved using a cookie stored on your browser. The cookie will keep track of your answers in the survey. If your browser cookies are cleared while the survey is in progress you will have to start over.

Your participation will help the Department of Environment and Natural Resources evaluate the implementation of North Carolina's electronics law and identify cost reduction strategies for local programs. This survey and subsequer analysis will be carried out by MPP Candidate Rachel Leven, from Duke University's Sanford School of Public Policy

In addition to filling out the survey, we encourage willing programs to provide us with their recycling and waste management budget from the 2011/2012 fiscal year.

You can upload your budget below (max of 16MB). You may also email your budget and any questions about this survey to Rachel.Leven@ncdenr.gov.

Choose File no file selected

Macro Descriptions

Please provide your jurisdiction, name, title, email and phone number:

County or Local Program ____

Name ____

Title ____

Email ____

Phone ____

Program Type:

○ County

○ Municipality

How much did it cost to set up your electronic recycling program originally? (costs may include infrastructure, equipment, supplies, etc...)

____

How much did it cost to operate your program in the 2011-2012 Fiscal Year?

____

Please estimate the proportion of materials handled by your electronics program (total must equal 100%):

Percentage of your electronics program that is televisions?	0
Percentage of your electronics program that is computers and related accessories?	0
Percentage of your electronics program that is other electronics (such as phones, stereos, etc...) ?	0
Total	0

Macro Allocation

Did your county or local government allocate money for electronics management in its budget for the 2011-2012 Fiscal Year?

- Yes
- No

How much was allocated?

Did your county or local government allocate money for electronics management in its budget for the 2012-2013 Fiscal Year?

- Yes
- No

How much was allocated?

Capital Expenses

Capital Expenses

In this section you will record capital expenses and other investments made to build and expand your electronic waste program. Please include all costs, even if they were funded through non-county sources such as DENR's electronic management fund. For older electronic management programs, we ask that you record, as completely as possible, capital expenses dating back to the implementation of your program.

Please check the infrastructure re-purposed or purchased for your electronic management program. Note any cost c re-purposing or purchasing the equipment and the fiscal year(s) the costs were incurred. If no costs were incurred enter 0.

	The infrastructure was,			Total cost to re-purpose or buy the infrastructure. (If no costs were incurred enter 0.)	Fiscal Year(s) costs were incurred	About what portion of this asset is dedicated to electronics recycling? Ex: 12%
	Not Used	Purchased	Re-purposed			
Trailers						
Storage Sheds						

Vehicles	○	○	○			
Handling Equipment	○	○	○			
Other:	○	○	○			
Other:	○	○	○			
Other:	○	○	○			
Other:	○	○	○			

Please list any additional capital investments here

1
2
3
4
5
6
7
8
9
10
11

Note any cost of re-purposing or purchasing the equipment and the year(s) the costs were incurred. If no costs were incurred enter 0.

	The infrastructure was,		Total cost to re-purpose or buy the infrastructure. (If no costs were incurred enter 0.)	Fiscal Year(s) costs were incurred	About what portion of this asset is dedicated to electronics recycling? Ex: 12%
	Purchased	Re-purposed			
» 1	○	○			
» 2	○	○			
» 3	○	○			
» 4	○	○			
» 5	○	○			
» 6	○	○			
» 7	○	○			
» 8	○	○			
» 9	○	○			
» 10	○	○			
» 11	○	○			

Please provide any further comments on capital expenses or click the arrow below to enter operating section:

Operating Expenses

In this section, you will record operational expenses from the 2011/2012 Fiscal Year. Please include all cost even if they were funded through non-county sources such as DENR's electronic management fund.

Please ensure that capital expenses incurred this fiscal year and listed in the previous section are not included in operational expenses.

Please describe the employees (full-time and part-time) who work on your electronics waste program in FY 2011/12:

	Number of employees working on electronics. (Enter 0 for no employees.)	Average number of hours employees spend on electronic recycling program	Average annual salary or hourly rate of employees		
				Per Hour	Per Year
Solid Waste Director				○	○
Recycling Director				○	○
Operational Staff				○	○
Administration Staff				○	○
Other:				○	○
Other:				○	○
Other:				○	○
Other:				○	○

Please describe the vehicles and equipment used by your electronics recycling program. Provide the approximate operating costs incurred in using the vehicles and equipment in your electronics program in FY 2011/12:

	Number of units (Enter 0 for no units.)	Describe portion used for electronics program.	Total maintenance and repair costs in FY 2011/12	Total fuel costs for FY 2011/12	Please provide any additional information on how this infrastructure used to serve your electronics program?
		Ex: 5% of driving time			
Trucks					
Vans					
Forklifts					
Trailers					
Other:					

Other:					
Other:					
Other:					

Please describe the supplies used by your electronics waste program. Provide the approximate operating costs incurred in using the supplies in your electronics program in FY 2011/12:

	Number of units (Enter 0 for no units.)	Total supply costs for FY 2011/12.	Please provide any additional information on how these supplies were used to serve your electronics program?
Pallets			
Gaylord Boxes			
Shrink-wrap			
Staff Supplies/PPE			
Other:			
Other:			
Other:			
Other:			

Did you incur education and outreach costs in FY 2011/12 that were not included above? Examples might include signage, brochures, program promotions, graphic design, etc:

- Yes
- No

Please briefly describe these costs and expenditures, as well as the total amount spent in FY 2011/12

Total Cost in Dollars	
Description	

Please provide any further comments on operational expenses or click the arrow below to enter the final costs section:

Other Costs

Which recycler(s) received electronics from you in FY 2011/12? Please describe your relationship with these recycler(s):

	What material type did this vendor handle?			What were you charged for processing per ton? Enter 0 for no charge.			What was your revenue per ton, if any			Total quantity collected and transferred in FY 2011/12,	Are you currently using this vendor?	
	TVs	Computers and Accessories	Other	TVs	Computers and Accessories	Other	TVs	Computers and Accessories	Other	Ex: 5 tons/yr	Yes	No
Vendor's Name												
Vendor's Name												
Vendor's Name												
Vendor's Name												
Vendor's Name												
Vendor's Name												
Vendor's Name												

Please complete the following for each vendor used in FY 2011/12:

	Did this recycler pick up material from your county?		If Yes, how much were you charged for pick up in FY 2011/12?
	Yes	No	
» Vendor's Name			
» Vendor's Name			
» Vendor's Name			
» Vendor's Name			
» Vendor's Name			
» Vendor's Name			
» Vendor's Name			

Did your vendors pricing structures change between FY 2011/12 and FY 2012/13?

- Yes
- No

If Yes, Please describe the changes in your vendor relationships between FY 2011/12 and FY 2012/13.
Consider including:
- The name of a new vendor (if relevant),
- Fee increase or decreases,
- Changes in your transportation arrangements,
- Revenue increases or decreases,
- and Changes to to your contract structure

Please provide any further comments on your program's expenses or click the arrow below to enter the funding section:

Funding

Please note the total revenue used to support your program in dollar amounts in FY 2011/12:

State Funds	$ 0
County and Municipal Funds	$ 0
Drop Off / User Fees for Electronics (paid by residents or businesses)	$ 0
Revenue from Electronic Material	$ 0
Other Revenue	$ 0
Total	$ 0

To help us fully evaluate funding opportunities in the state, please list the sources of "Other Grants"

Program Management

Please describe your electronic recycling program:

Our program actively serves (check all that apply):

- ☐ Residents
- ☐ Commercial Businesses
- ☐ Churches, Charities, and other Non-Profits
- ☐ Local Government(s)

☐ Schools

Electronics are collected at drop-off sites:

○ Yes
○ No

Electronics are collected at:

○ 1 or 2 drop-off locations
○ Between 3 and 5 drop-off locations
○ More than 5 locations drop-off locations

These locations are staffed:

○ Some working hours
○ All working hours
○ None of the time

To the best of your ability please estimate the percent of CRT and flat panel (non-CRT) televisions that your progran received in FY 2011/12 (answer must total 100%):

Old (CRT) TVs	0
New (panel) TVs without CRTs	0
Total	0

Does your program ever <u>receive</u> material (including TVs and Computers) that is scavenged?

○ Yes
○ No

Does your program experience frequent theft and scavenging of material <u>after the material is collected</u>?

○ Yes
○ No

To the best of your ability, please note the percent of your material described as scavenged in FY 2011/12:
Ex: 30% of TVs are scavenged

TVs	
Computers and accesories	
Other Equipment	

Has a vendor ever penalized your program for material quality related to scavenging? Or, has a vendor ever highlighted scavenging as major concern in their relationship with your program?

○ Yes
○ No

Do you have measures or programs in place to discourage scavenging?

- Yes
- No

Please briefly describe these measures and programs:

At collection points materials are stored (select all that apply):

- Outside on the ground or a pallet
- Under a small shelter
- Inside a building
- In a closed trailer
- In an open trailer
- In a locked facility or storage unit
- Other

We consolidate the material from collection points prior to sending it to our vendors:

- Yes
- No

There are electronic collection points and programs (such as take-back programs) operating in my county that are n publicly run or sponsored:

- Yes
- No

Our county provides residents with information about these collections points:

- Yes
- No

Conclusion

Thank you for your participation! The information you have provided is a critical step in evaluating the implementatio of North Carolina's electronics law and identifying cost reduction strategies.

We ask that willing counties send us their recycling and waste management budget from the 2011/2012 fiscal year. Your budget is for our analysis only and will not be republished in any-form. You may also email your budget and direct any questions to Rachel.Leven@ncdenr.gov.

Choose File no file selected

Thank you for your participation! The information you have provided is a critical step in evaluating the implementatio of North Carolina's electronics law and identifying cost reduction strategies. You may direct any questions to Rachel.Leven@ncdenr.gov.