

SOUTH CAROLINA
RECYCLING MARKET DEVELOPMENT ADVISORY COUNCIL
2004
ANNUAL REPORT

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- South Carolina Department of Commerce, Business Solutions Division
- Department of Health and Environmental Control's (DHEC) Office of Solid Waste Reduction and Recycling
- DHEC's Center for Waste Minimization
- South Carolina Manufacturing Extension Partnership
- University of South Carolina
- Clemson University
- EPA Region 4
- Carolina Recycling Association
- Earth Protection Services, Inc.
- Keep the Midlands Beautiful
- Santee Cooper
- Sustainable Universities Initiative
- South Carolina League of Women Voters
- South Carolina Sierra Club
- South Carolina Wildlife Federation
- Palmetto Pride

South Carolina's successful recycling market development program would not be possible without the benefits of these partnerships.

INTRODUCTION

The Recycling Market Development Advisory Council (RMDAC) consists of fourteen members, representing industry, local governments, higher education, and the general public (See Appendix A, page 38). Established by the Solid Waste Policy and Management Act of 1991 and appointed by the Governor, the Council formulates programs and policies to encourage markets for new and existing recyclable materials.

Managed within the South Carolina Department of Commerce, the Recycling Market Development staff coordinates the activities of the Council while providing technical assistance and economic development assistance to recycling businesses and industry.

Mission Statement

The Council's mission is to assist in the development of markets in South Carolina for recovered materials and products with recycled content with the primary objectives of improved solid waste management, resource conservation, and economic development.

Guiding Principles

- To meet specific Council requirements contained in the Solid Waste Policy and Management Act of 1991.
- To assure existing and potential recycling businesses of a consistent, cost competitive, quality supply of required recyclables.
- To identify existing barriers to and opportunities for increased recovery and use of recovered materials recycled within the State and take appropriate actions to eliminate or maximize these conditions.
- To monitor and understand the implications of institutional, economic, market, and technical developments both in and out of the state that could measurably influence the generation and use of recyclables.
- To assist in the creation of jobs and investment of recycling industries in the state.
- To maximize the recycling rate within the state consistent with all appropriate environmental and economic considerations.
- To establish and maintain close working partnerships with allied state agencies and councils.

For additional information about the Council and its activities, refer to the S.C. Recycling Market Development Advisory Council Web site at www.sccommerce.com and select "Grow Your Business" to locate the recycling market development program pages.

EXECUTIVE SUMMARY

Since its creation in 1992, the Recycling Market Development Advisory Council has worked to improve the supply of certain recyclable materials where significant demand exists as well as address the market needs for new or emerging recyclable materials. While some materials are readily available for recovery, the key to recycling's success is matching the collected items with businesses that can reuse and/or recycle the materials into new products or services. For other recyclables, the challenge is the collection of the material in order to supply a steady stream to processors.

Economic impact of recycling highlighted

Beginning in the latter part of 2003 and continuing through the first quarter of 2004, the recycling industry was surveyed to measure the economic impact that it has on the state's economic picture. The results were impressive. From the 260 companies that responded, it was determined that the sector employs some 20,000 people and generates an annual payroll in excess of \$712 million. The Council conservatively estimates that for every \$1 of those wages, an indirect payroll of an additional \$1 is generated in our communities for a total economic impact of \$1.4 billion.

As a result, the Council developed and distributed a series of six press releases from the end of August through the first of October that expounded upon the numerous complexities of the industry, from large manufacturers to small processors that recover recyclable material and turn them into new products consumers use every day. Success stories and insight from industry leaders were described as part of the ongoing education process for policy leaders and the general public about the importance recycling plays in South Carolina.

The articles were used by a number of media outlets throughout the state, and staff participated in several interviews as well. The entire series can be viewed in Appendix B, beginning on page 43.

New committee created to address impact of industrial recycling; Tires join Established

As mentioned in last year's report, the Council's ongoing participation in the Business Recycling Assistance Program has worked to continue efforts to increase waste reduction and recycling activities by South Carolina companies. With the growing interest by industry to market their by-products as an alternative to merely disposing these materials, an opportunity was created to help bridge the dialogue between industry and the regulatory community to foster increased beneficial reuse.

A sampling of the industrial by-products generated in the state include but are not limited to wood waste and pallets, construction and demolition debris, foundry sand, fly and bottom ash resulting from utility power operations, residual from pulp and paper mills, and agricultural wastes. By tracking the generation of these materials as well as matching potential reusers or recyclers of these by-products, RMDAC can continue to provide value-added market alternatives to waste disposal.

In addition to the creation of the Industrial Recycling Committee, the success of tire recycling efforts in the state warranted this committee merging into the Established Recyclables Committee. Clarence Hermann, the tire industry representative on the Council, agreed to serve as the new chair of the Established Recyclables committee for 2004 during this transition.

Building support for sustainable development

Staff continued to work with a number of organizations to foster sustainable practices among the business and government sectors. Working with the Sustainable Universities Initiative and the S.C. Department of Health and Environmental Control's Office of Solid Waste Reduction and Recycling, staff formed the S.C. Sustainability Network to promote programs that embrace the triple bottomline of sustainability: financial prosperity, environmental integrity and social responsibility.

The partnership helped design an informative Web site that showcases examples of ongoing sustainable practices by South Carolina communities, businesses, educational institutions, government agencies and other organizations. Housed on the University of South Carolina's Web site, the site can be viewed at www.sc.edu/sustainableu/SCSNew/index.html.

Because the state's recycling industry plays a vital role in helping companies and organizations meet their sustainability goals, the Council will continue to meet with groups interested in fostering this new sustainable paradigm in an effort to not only grow the recycling industry but to also meet the Governor's mandate "to enhance the quality of life for all South Carolinians."

Electronics recycling legislation update

The Council continues to support legislation to establish an electronics recycling program for the state. Efforts to build support for this initiative have included meeting with national computer and electronic manufacturers to secure backing for the proposed South Carolina legislation; participating in the national dialogue to develop markets and a recycling infrastructure for discarded electronic devices; building grassroots support through presentations and articles for environmental groups, local governments, business organizations and other concerned parties; meeting with key legislators and the Governor's Office; and hosting an electronics collection where more than 1,100 Midlands residents recycled more than 100 tons of used computers and other electronic devices in cooperation with a grant from Dell Inc.

Given the toxicity of many electronic devices and the potential problems for public health and the environment created by improper handling and disposal, the Council will continue to work with the Governor and General Assembly to pass legislation to establish a statewide program for the recovery and recycling of electronic scrap in 2005.

Additional Recycling Market Development Efforts

RMDAC supports policy and initiatives that encourage the expansion of recycling markets, particularly within the private sector. The South Carolina Department of Commerce staff that supports RMDAC provides technical and economic development assistance to recycling companies and other industry in the state.

Some of RMDAC's accomplishments or initiatives from the past year are listed here. Detailed information on these and other projects are provided in the Committee Reports section of this report beginning on page 9.

- Hosting a Recycling Business Forum in October at the BMW Zentrum to network with recycling business owners as well as provide them with assistance and resources and hear their concerns for use in developing the Council's future work.
- Working with other states and industry to look at alternatives to increase the overall recovery rates for plastic bottles, aluminum cans, glass bottles and other recyclable beverage containers.
- Providing business development support to new and expanding recycling companies that resulted in \$3,625,000 in investment for 2004.

2005 GOALS AND OBJECTIVES

The Recycling Market Development Advisory Council has identified the following goals and objectives for 2005. These objectives will set the primary agenda for the Council and its committees during the year.

- Continue to work with a number of stakeholders to identify the most viable solutions to increase the recovery rate of all established recyclable commodities in South Carolina.
- Foster market development work for a number of emerging recyclable commodities, including carpet and electronics.
- Support the development and expansion of recycling businesses in the state, including studying the viability of potential incentives to increase growth in the recycling industry sector.
- Build support for the development of a statewide Electronics Recycling Program.

The Council will hold a strategic planning meeting at the end of January and will use this meeting to develop more goals for work in 2005 and into the future.

2004 PROGRAM INITIATIVES

The goals and objectives in last year's annual report are listed below and helped define the Recycling Market Development Advisory Council's work plan for 2004. Four committees comprising RMDAC members and staff, along with support from DHEC's Office of Solid Waste Reduction and Recycling, addressed each of these objectives. The committees were created to address market development issues for recyclable materials currently being collected, new or emerging recyclables, scrap tires and policy issues.

2004 Goals and Objectives

- Increase collections of all beverage containers for recycling.
- Identify one new market opportunity for glass collected in South Carolina.
- Promote higher value uses for scrap tires among processors, recyclers, and other industry sectors looking to consume tire by-products.
- Develop a strategy to increase recycling of construction and demolition waste.
- Develop a strategy to promote greater recycling of organics in South Carolina.
- Assist development of markets for post-consumer carpet.
- Work with SC industry to expand markets for certain industrial by-products.
- Build support for passage of Electronics Recycling Bill.
- Support the development and expansion of recycling businesses, including looking at possible incentives to increase growth in South Carolina's recycling industry.
- Revisit all recyclable commodities' collection numbers for measuring progress and identify materials for additional work/emphasis.

ESTABLISHED RECYCLABLES COMMITTEE

Mission

The Established Recyclables Committee is charged with facilitating the recovery of established recycling commodities for reuse by the manufacturing community. This committee encourages the increased collection and use of these materials and looks at ways to overcome barriers to markets.

2004 Summary

Revisit all recyclable commodities' collection numbers for measuring progress and identify materials for additional work/emphasis.

After looking at collection numbers for 2003 and comparing them to the Council's initial report on the status of recycling markets in 1993, the committee found that there have been many successes in the state's recycling industry. A number of the items that were collected in early recycling programs have experienced significant increases in recovery while a few have experienced declines in recent years.

For example, in the paper category, commodities have experienced significant increases in the past decade, with old corrugated cardboard enjoying a 75 percent recovery rate, newsprint and magazines hovering at the 50 percent mark, and office paper at 40 percent. Mixed paper wasn't even a viable commodity 10 years ago but technology advances and foreign demand have helped this area grow.

Tire recovery has flourished in the state and much of the success of tire recycling can be attributed to the tire fees collected on the purchase of new passenger tires. These funds have played a significant impact in helping develop a recycling collection infrastructure, clean up numerous tire stockpiles as well as support grants that have led to a number of research and market development projects.

Scrap metal has enjoyed cyclical success, buoyed in 2004 by increased domestic and foreign demand and higher market prices. With a number of end-users like Nucor and SMI Steel, a number of local foundries, a good base of scrap metal processors and a good balance of manufacturers to use scrap metal, this commodity segment does well in South Carolina with recovery rates averaging more than 65 percent.

One commodity that has not done as well in South Carolina is glass. A lack of an in-state processor, rising transportation costs and limited markets for green glass have impacted those recovery numbers. As mentioned in another goal for this committee, work was done to determine if there were other market opportunities for glass recycling in South Carolina and that work is highlighted below.

Identify one new market opportunity for glass collected in South Carolina.

Glass recovery in South Carolina is only seven percent, and the majority of what is collected is sent to regional processing facilities in Atlanta, GA, and Raleigh, NC. As mentioned in previous RMDAC reports, the loss of the Ball Glass plant in Laurens in 1996 had a devastating impact on the state's glass recycling efforts.

While there are regional markets for clear (flint) and brown (amber) glass, the lack of green glass end-users has hampered local governments' efforts to recover more glass. Oftentimes, any revenue made on clear or brown glass goes to offset the cost of transporting green glass. In some cases, communities have given up collecting glass altogether.

After a number of years of grappling with this dilemma, staff looked at alternative markets for recycling glass in-state to entice more communities to increase glass recovery efforts. As suggested in the report provided in Appendix C (page 53), initial work suggests that using green and mixed glass in landscaping applications may be a beneficial market for this material. The study makes some basic assumptions and further work would be needed before adopting the suggested models, but scenarios for processing this glass either as a local government or as a private business concern seem to show positive cash flow as opposed to the negative or break-even status glass now has in many communities.

Increase collections of all beverage containers for recycling.

As a whole, beverage containers of all types -- plastic, aluminum and glass have experienced declines in recent years and staff was invited to participate in a dialogue of states working together to address this issue. Realizing the political realities of passing mandated deposit legislation, the participating states (North Carolina, Wisconsin, Minnesota, Florida and South Carolina) tried to develop a shared responsibility model that would bring government and the beverage producers together to develop a program to increase recycling recovery for this fast-growing waste stream.

A June meeting was held in Chicago and representatives from a dozen states, a number of recycling companies that use beverage containers as feedstock, the U.S. Environmental Protection Agency, the National Recycling Coalition and the beverage industry met to discuss the dynamics of this issue and look at possible models used in other countries to see if a similar program could be adopted in the United States.

In conjunction with staff's work in this national discussion, the committee began to develop its own matrix of possible solutions to increase beverage container recycling. Among the topics that have been discussed are

- A producer responsibility model to ensure the recovery and recycling of all beverage packaging;
- A shared responsibility model (like Ontario) that splits the cost between producers and government to recycle these materials;
- A Buy Back Program that creates value for products that otherwise have insufficient value to stimulate collection. Cost is built into the price of the product and then remitted by the brand owner and/or retailer for payout to the consumer;
- An advanced packaging-based fee that would be similar to existing solid waste fees that are collected at point of sale for a solid waste trust fund. Monies would be distributed to counties/municipalities/businesses based on collection performance;
- A tipping fee surcharge administered on tonnage of all municipal solid waste landfilled in the state;
- Implementation of variable rate pricing or Pay-As-You-Throw models that mimic other utility or provided services where consumers pay based on consumption. Provides a more equitable way of sharing the cost burden of solid waste and provides a greater incentive to recycle rather than dispose of household discards;
- Landfill bans on packaging or container waste. North Carolina currently bans aluminum cans for disposal and some individual communities are looking at cardboard for possible bans.

The committee will continue to meet with related stakeholders in 2005 to determine if any of the above models are viable for potential legislative action. Work needs to continue with all of the effected stakeholders, including government, beverage producers, the recycling industry, environmental groups and other allied organizations seeking involvement in reversing the trend of declining recovery rates for recyclable containers.

Promote higher value uses for scrap tires among processors, recyclers, and other industry sectors looking to consume tire by-products.

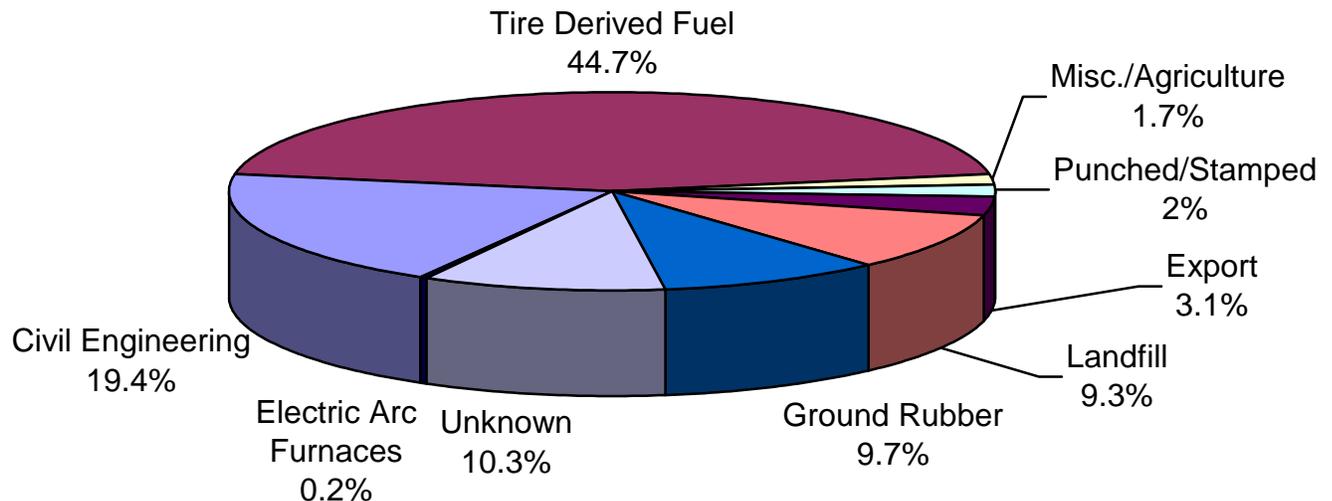
This year the Council merged the Tire Committee with the Established Committee largely because the recovery and marketing of tires has been so successful. According to the Rubber Manufacturers Association, the tire recycling rate for the nation is up from 77.6 percent in 2001 to 80.4 percent in 2003.

Scrap tires continue to be used in a number of applications including tire-derived fuel, civil engineering and crumb rubber products. With higher energy costs, TDF remains an attractive alternative to fossil fuels. And new to the tire markets in 2003 are tires being used by the steel industry in electric arc furnaces producing high-carbon steel.

For more detailed information about South Carolina tire processing, see the Tire Market Report on page 35.

U.S. Scrap Tire Utilization 2003

As reported by U.S. Rubber Manufacturers Association



EMERGING RECYCLABLES COMMITTEE

Mission

The Emerging Recyclables Committee assists in developing markets for emerging or under-collected materials.

2004 Summary

Develop a strategy to increase recycling of construction and demolition (C&D) waste.

Committee work in this area consisted of identifying existing companies, monitoring the progress of DHEC's proposed amendments to its solid waste regulations, and working with companies planning new or expanded recycling sites.

There were 23 companies identified that separate and process land clearing, construction and demolition debris for recycling identified. This list includes some construction and land clearing contractors operating their own C&D landfills that are separating materials for recycling. This list may be provided as a resource for companies looking to recycle this waste stream but is not necessarily inclusive of all C&D recycling businesses in the state.

RMD staff assisted Myrtle Beach Recycling during its start-up period in early 2004. The company accepts construction debris such as wood, concrete, metal, plastics, and cardboard for recycling. Two other prospective C&D recyclers are looking to open facilities in the coastal area. Recycling these materials is becoming more cost effective in the Low Country for several reasons:

- Increased landfill costs;
- Increased transportation costs;
- Improved demand for metal, plastics and paper; and
- Accepted use of crushed concrete as aggregate, replacing quarried stone from other areas of the state.

In another related project, Ashmore Brothers, a Greenville-based paving contractor, has been working with Clemson and the S.C. Department of Transportation to develop a specification to allow roofing shingles in the production of asphalt. The construction specification was approved and Ashmore recently completed a road project in Greenville using 500 tons scrap shingles.

Develop a strategy to promote greater recycling of organics in South Carolina.

Producing compost from the organics waste stream represents a good opportunity to recover a significant amount of material currently being landfilled. The U.S. Environmental Protection Agency (EPA) estimates that yard trimmings and food residuals make up about 23 percent of the municipal solid waste stream.

Compost material has significant benefits¹ that include

- Improving the soil structure to create a better plant environment;
- Improving drainage and reducing erosion and run-off;
- Improving moisture-holding capacity;
- Improving and stabilizing soil pH;
- Supplying nutrients;
- Supplying significant quantities of organic matter; and
- Binding and degrading specific pollutants.

¹ Carolinas Composting Council of the Carolinas Recycling Association

Emerging uses for compost include

- Bioremediation and pollution prevention;
- Disease control for plants and animals;
- Erosion control;
- Composting of contaminated soils;
- Reforestation and wetlands restoration; and
- Habitat revitalization.

In October, DHEC staff along with the Carolinas Composting Council conducted an erosion control workshop at the Georgetown County landfill to demonstrate the effectiveness of using compost as a soil stabilizer and erosion control media.

RMD staff has worked with two companies that are considering establishing commercial composting operations in South Carolina. These companies will not commit the resources and funding until SC DHEC proceeds with its proposed composting regulations for commercial projects. The proposed amendment will clarify and amend the application, design, operation, monitoring and closure requirements for the composting and grinding of yard trash and land-clearing debris. This amendment will also expand the scope of the regulation addressing the composting and grinding of other waste streams and mixed waste streams.²

Assist development of markets for post-consumer carpet.

Local markets for post-consumer carpet do not exist in South Carolina. Wellman's Johnsonville plant is converting post-consumer nylon fiber into an engineered resin that is sold to automotive parts manufacturers. The carpet, however, is processed in Atlanta so the material is collected from that area of Georgia.

RMDAC is a member of the Carpet America Recovery Effort (CARE). CARE is a joint industry-government effort to increase the amount of recycling and reuse of post-consumer carpet and reduce the amount of waste carpet going to landfills. For more information see www.carpetrecovery.org. Working through CARE, RMDAC continues to look for carpet processing or recycling opportunities in South Carolina.

RMD staff and the S.C. Manufacturing Extension Partnership (MEP), along with Wellman, submitted a grant application to CARE to expand the use of post-consumer carpet resin in manufacturing. The project would identify and work with South Carolina companies to incorporate recycled post-consumer nylon resin in their product manufacturing. The grant was not approved in 2004; however the proposal will be resubmitted to CARE for the 2005 grant cycle.

² SC DHEC proposed Amendment of R.61-107.4, Solid Waste Management: Yard Trash and Land-clearing Debris and Compost.

INDUSTRIAL RECYCLING COMMITTEE

Mission

The Industrial Recycling Committee focuses on strategies to promote greater recycling and reuse opportunities by the state's various businesses and industries.

2004 Summary

Work with SC industry to expand markets for certain industrial byproducts.

As this new committee began its work to promote the beneficial reuse of industrial byproducts, it began by looking at information pulled from the state's Industrial Directory to see what industries had the potential to create the largest volume of byproducts available for reuse. The metal industry has the largest number of companies, with 657 listings, followed by plastics with 273 companies, wood with 231, chemicals with 185, cement and concrete with 150, pulp and paper with 108, and fiberglass and agriculture with 26 companies each.

Then the committee broke down potential reuse materials by industry. Considered materials included

- Spent pot liners from the aluminum industry;
- Baghouse dusts, slag-like drossings and skimmings, furnace refractories, settling pond residuals from copper and brass fabrication;
- Cement kiln dust from the cement industry – but cement industry can use other industry byproducts for concrete production;
- Solvents, sludges and spent catalyst from chemicals industry – these have high BTU value and can be used as an alternative fuel;
- Fly ash and bottom ash, boiler slag and fluidized bed materials from coal combustion utilities – several of these materials can be used in value-added applications such as cement/concrete, blast grit, wallboard and flowable fill;
- Spent foundry sand, slag and baghouse dust with potential reuse opportunities like silica for cement, hot mix asphalt and concrete blocks;
- Baghouse dust, mill scale, slag and automotive fluff from the iron and steel industry;
- Sludge, ash and caustacizing residues from pulp and paper operations;
- Animal fats, meal and feathers from agriculture; and
- Pallets, crates and wood waste from a number of applications.

Realizing the magnitude of choices before them, the committee met with representatives from Santee Cooper to learn more about how it had successfully marketed its ash byproducts into a number of reuse markets. Santee Cooper started its ash reutilization program in 1974 by sending fly ash to an area cement producer. Then in 1994, the agency began looking for other ways to reduce its pond storage and monitoring costs and worked with a consultant to identify additional reuses for fly and bottom ash.

In 1999, working with the SEFA Group, Santee Cooper built a carbon-burnout unit at the Winyah station to make ready-mix concrete with its ash. And the heat recovered as part of the process is used for condenser water, reducing Santee Cooper's coal consumption. In fact, much of the concrete going into the new Cooper River Bridge in Charleston is coming from Santee Cooper.

A couple of years ago, Santee Cooper began working with CAST Minerals from West Virginia to use its bottom ash in a light-weight concrete block. This new block is 12 lbs. lighter than traditional concrete block, but has same strength and is more resistant to earthquakes. It takes 5500 tons of bottom ash to make 1 million blocks, and last year Santee Cooper generated more than 8 million blocks. It's also being used in lightweight structural concrete applications.

Santee Cooper currently generate 650,000 tons of ash a year at the Winyah and Cross plants and that number will double by 2009 with the addition of two new generators at Cross facility. The utility is also looking to market gypsum generated as part of the SO₂ scrubber process. Last year, 166,214 tons were sent to cement manufacturers in Harleyville and Holly Hill, but they are hoping to secure additional markets as the amount of gypsum will increase with new units going online in 2009.

Through the Business Recycling Assistance Program, staff was contacted by representatives from Kohler to see if a byproduct produced at its Spartanburg manufacturing facility could be reused. At its Wisconsin and Texas facilities the company has been able to market a number of byproducts for use in a variety of applications, including structural fill, pipe bedding, road sub-base, flowable fill and general fill to name a few. At its Spartanburg plant, Kohler generates non-spec ceramic toilets and sinks that it plans to crush and sell as an aggregate substitute. Working through the Industrial Recycling Committee, Kohler was able to identify the proper channels at DHEC to review analytical data on the material and receive approval for marketing the pottery cull as a recovered material.

Kohler also provided assistance to the state by participating in a stakeholder meeting hosted by the committee to bring regulators and other industry together to discuss how to increase byproduct reuse in the state. Nathan Nissen, an environmental director for Kohler, came to Columbia and presented information on industrial byproduct guidelines used in Texas and Wisconsin. He also provided case studies of successful initiatives Kohler had undertaken to market its slag, process sand and ceramic aggregate at its other locations.

As a result of this meeting, the committee asked DHEC to work with them on the development of a fact sheet that would provide a simple roadmap of the process of determining whether a byproduct was a solid waste or recovered material, identify the rules regarding the movement of recovered materials, and address if there would be any stormwater or air issues that would need to be addressed.

POLICY COMMITTEE

Mission

The Policy Committee assists RMDAC and its committees in implementing strategic market development policy and programs, giving consideration to legislative, governmental, and private sector concerns.

2004 Objectives

Build legislative support for passage of Electronics Recycling Bill

Work continued in 2004 to build support for proposed legislation, Senate Bill 148, to establish a statewide Electronics Recycling Program. This proposed legislation would establish an advanced recycling fee (ARF) on the purchase of televisions and monitors and the fees collected would be used to help develop the collection infrastructure and offset processing fees for the proper management of discarded electronic devices.

Representatives from Panasonic and Hitachi met with Senator Leventis and staff members from the Department of Commerce and DHEC to discuss their support for Senate Bill 148. Panasonic and Hitachi are among a coalition of consumer electronics manufacturers supporting the ARF model in South Carolina and other states. The manufacturers' coalition also includes IBM, JVC, Phillips, Mitsubishi, Toshiba, Sanyo, Sony, and Thomson. See appendix D on page 61.

Council members and staff met with leaders of several key environmental organizations, including the Coastal Conservation League, S.C. Wildlife Federation, Congaree Land Trust, and the League of Women Voters, to discuss their support for the electronics recycling legislation in 2005.

Although Senate Bill 148 did not pass in the 2004 legislative session, the Council recommends that the proposal be introduced again in 2005. The Council will continue to work with key industry and government stakeholders to support this important program.

Expand network of allies for RMDAC initiatives

In an effort to build support on a number of recycling-related issues, staff worked to identify and engage some new allies to help foster pro-recycling messages to a number of key audiences, including elected officials, local governments, recycling businesses, the business community and the general public.

One of the efforts used to foster increased support for recycling was the S.C. Recycling Business Forum that was held in October at the BMW Zentrum in Greer. More than 60 recycling business and industry representatives attended the half-day session that included reviewing Council initiatives as well as an update by DHEC staff on pending solid waste regulations.

The forum also allowed attendees to comment on key issues affecting recyclers and material markets. Highlights from these comments are outlined on page 18. As a result of the forum, the Council was able to identify allies that may support its efforts to shape pro-recycling policy in South Carolina.

RMDAC plans to build on the success of this event by sponsoring annual forums to facilitate communication of recycling business issues and market opportunities for commercial and industrial waste streams.

RECYCLING MARKET DEVELOPMENT STAFF ACTIVITY

In addition to the Council's committee activities, the Recycling Market Development staff continued its work to assist new and existing industry in South Carolina and promote waste reduction and recycling opportunities. Housed within the Business Solutions Division of the Department of Commerce, RMDAC staff provides business development and technical assistance to the recycling industry as well as market referrals and recycling support to members of the state's business community, publicly-supported agencies and other organizations interested in reducing waste disposal costs.

Direct assistance was provided to 390 industries and governmental entities by the RMDAC staff. Although the Department's Business Visitation Program was discontinued in July of 2003, requests for assistance from Business Solutions and Business Development staff still generate numerous requests for assistance in recycling and waste reduction and RMDAC staff followed up with these requests as part of the South Carolina Business Recycling Assistance Program (see below).

Of the businesses assisted in 2004, 202 were recycling companies that were provided assistance with business development planning, product marketing and accessing financial, regulatory, or other resources. There were 13 active leads considering starting new businesses, establishing an additional facility in South Carolina, or expanding existing in-state operations, and an additional 41 requests by individuals wanting more information about starting a recycling business. Staff provided business development support to seven new and expanding recycling companies that resulted in \$3,625,000 in investment for 2004.

Economic impact of recycling industry examined

Staff tracks approximately 300 recycling related companies in South Carolina that are involved in the marketing, transporting, processing, or manufacturing of recycled materials and products. This includes everything from small businesses that bale or shred material for further processing to large corporations that make consumer products from recycled material. These companies recycle a range of materials including plastics, metal, wood, paper, glass, and industrial by-products.

As mentioned in the Executive Summary, a detailed look at the financial impact of the recycling industry was examined. Through a direct mail survey, recycling companies were asked to update their information related to commodities, location, employee numbers, shifts, materials recovered/recycled, and new products manufactured as well as provide new information the Council had not previously tracked, including estimated payroll data and whether the business was woman- or minority-owned. A student intern helped follow up with phone calls and recorded the data into the recycling industry database.

The survey was sent to 311 companies and data was collected for 255 companies. Twenty percent of responding companies reported payroll data. A total payroll estimate for all 255 companies was determined by calculating the average payroll figure for responding companies for each of the primary recycling company categories, as shown in the table below. The average payroll amount for each category was then applied to the total number of employees reported for that category. The results were as follows:

Category	# Companies	Average payroll/job	# Jobs	Estimated Payroll
Manufacturer	95	\$44,556	12,537	\$558,598,522
Processor	106	\$24,033	4,474	\$107,522,135
Hauler	12	\$27,455	204	\$5,600,820
Broker/remanufacture/reuse/sales	42	\$18,135	2348	\$42,653,768
Total	255		19,563	\$714,375,245

Recycling businesses play a significant role in South Carolina's economy. Their employment level is comparable to the lumber and wood products or apparel sectors in this state.

South Carolina Recycling Business Forum

Staff coordinated the first annual South Carolina Recycling Business Forum in October at the BMW Zentrum in Greer, South Carolina. More than 60 representatives from the recycling industry attended the half-day session that included presentations from the Commerce department, the Council itself, and the solid waste regulatory and small business assistance programs at the S.C. Department of Health and Environmental Control.

The program also featured time for participants to share their concerns and suggestions for future work by the Council. Among some of the items discussed were

- Mercury switches and their impact on scrap processors and regulators;
- Discussion of an energy tax credit to reduce transportation costs;
- Possible landfill bans on CRTs, cardboard, and oil-related products (filters, absorbent products, etc);
- Greater product stewardship by manufacturers to facilitate increased recycling;
- Desire for outreach/awareness (possible legislative event and print campaign promoting job impact of recycling discussed);
- More procurement opportunities for recycled products; and
- More networking/information sharing opportunities.

The Council will consider these tasks for further review and work.

South Carolina Business Recycling Assistance Program

The South Carolina Business Recycling Assistance Program (B-RAP) continues to provide free technical assistance to business and industry throughout the state. A partnership of DHEC's Center for Waste Minimization, the Office of Solid Waste Reduction and Recycling and RMDAC, the program provides a variety of technical assistance opportunities to businesses, industry, government agencies and others in four specific areas: waste reduction, recycling, buying recycled, and recycling markets/market development.

Assistance provided to both new and existing businesses included

- Referrals to the state's recycling industry as well as to other affiliated organizations, including DHEC, the S.C. WasteXchange, the S.C. Manufacturing Extension Partnership, the Carolina Recycling Association (CRA), the state's Keep America Beautiful affiliates, S.C. Solid Waste Association of North America (SWANA), and local recycling coordinators and solid waste professionals;
- Identification of new and existing markets/end-users for recovered materials through the *Index of Waste Minimization Resources* and RMDAC's recycling businesses database;
- Phone and electronic consultations as well as personal on-site visits, as requested, to determine the existence of recyclable materials as well as the quantity of materials;
- Educational materials, including topic-specific fact sheets and posters, bi-monthly *B-RAP News* electronics newsletter and a major overhaul of the B-RAP web site (www.scdhec.gov/brap);

- Presentations to various businesses, conferences, civic and environmental organizations promoting the financial benefits of adopting waste reduction and recycling activities; and
- Development of a new public service announcement scheduled to run in 2005 to further increase awareness about the benefits of recycling at work.

In addition, staff managed ongoing education and outreach efforts to promote the recycling of mercury-containing lamps as part of a \$50,000 grant received from the U.S. Environmental Protection Agency. Activities related to the grant included

- Development of fact sheets and posters that have been distributed to more than 1,200 businesses in the state;
- A direct mail campaign targeting nearly 900 tanning bed operations that included an industry-specific poster and letter encouraging recycling;
- Presentations and exhibition at a number of environmental conferences, including the Carolina Recycling Association, the S.C. Resource Conservation Challenge annual workshop, the Charleston Chamber's Business Expo and the S.C. Environmental Symposium; and
- Distribution of articles on the program to such publications as the *Charleston Business Journal*, the S.C. Manufacturing Extension Partnership magazine *Competitive Edge*, the *B-RAP News*, the *R-Word* newsletter for CRA and *South Carolina Recycles*.

In February, B-RAP recognized two businesses for their exemplary efforts to reduce waste and recycle materials at their plants – SMI Steel and Barnet Polymers. In conjunction with the annual Recycle Guys Awards Program, Horry County was also recognized for their efforts to recruit more than 560 area businesses to participate in their cardboard recycling program.

An article highlighting these accomplishments can be viewed online at http://www.scdhec.gov/lwm/brap/forms/brap2_04.pdf.

Dell Grant Used to Sponsor Midlands Electronics Recycling Collection Event



Using its community partnerships and experience from a 2003 electronics recycling event, RMDAC applied for and received a \$10,000 grant from Dell Computer to host another community-based electronics recycling collection on April 3, 2004, in Columbia. Nearly 1,100 residents dropped off 103 tons of scrap electronics, also referred to as e-waste, during the five-hour collection event. Once again, Earth Protection Services, Inc., an Arizona-based recycler of electronics and mercury lamps with a Williamston, SC facility, served as the

vendor for the event, providing collection, transportation and processing for the five tractor-trailer loads of materials recovered.

Some 67 percent of the participants supported paying an advanced recycling fee, similar to existing fees on tires, motor oil, white goods and batteries, to help establish an electronics recycling infrastructure in South Carolina.

Participants were asked a number of questions by volunteers to determine their knowledge on the potential hazards of improper disposal of e-waste, willingness to recycle, preferred methods for recycling, and willingness to pay an advanced recycling fee to support a permanent electronics recycling program in their community. The majority responded they would simply put their electronics in the trash if the event had not provided them a recycling opportunity. Like the 2003 event, participants replied they preferred taking their e-waste to a community recycling center rather than shipping it to manufacturers for recycling, cited that once-a-year collection would be sufficient and year-round collection was the second most selected option. Some 67 percent of the participants supported paying an advanced recycling fee, similar to existing fees on tires, motor oil, white goods and batteries, to help establish an electronics recycling infrastructure in South Carolina.

See Appendix E on page 64 for more details.

Other Activities

Staff members actively participate as members of the following organizations or councils:

- Carolina Recycling Association
- CRA Midlands Networking Council
- South Carolina Resource Conservation Challenge Task Force
- Solid Waste Advisory Council
- Waste Tire Committee
- South Carolina Solid Waste Association of North America
- South Carolina Economic Development Association
- Keep the Midlands Beautiful

REQUIREMENTS OF THE 1991 SOLID WASTE ACT

The Solid Waste Policy and Management Act of 1991 requires that the Recycling Market Development Advisory Council consider the following elements in its annual report.

Any Revisions Which the Council Determines are Necessary to its Initial Report

There are no revisions to be added at this time.

A Description and Analysis of the Amounts and Types of Solid Waste Materials Recovered or Recycled in This State During the Preceding Year

Recycled materials reported in Tables 1 and 2 are compiled by DHEC from its annual county solid waste survey. Figures are reported on a fiscal year basis for a period of July 1 through June 30. Data reflected in this report is from FY 2004.

Table 1 shows the amount of recyclable material collected by local government programs, primarily serving residential households in South Carolina. This category is considered to be post-consumer material.

According to these reports, the post-consumer paper recovery rate declined by 23 percent from FY 2003. This includes all grades of paper collected by local government programs but consists primarily of cardboard and newspaper, accounting for nearly 90 percent of this recovered fiber. The decline contradicts 2004 market reports for recovered paper (see page 27). Prices for most grades rose during the year as domestic and export demand grew at a robust rate. Two reasons for the discrepancy may be the result of either or both of the following reasons:

1. DHEC suggests that data collection and reporting has been refined so that the numbers should be more accurate than previous reporting years which suggests that last year's numbers may have been too high.
2. The reporting process in general may be flawed to the extent that counties depend on external tracking sources or inaccurate estimates for their annual report to DHEC.

In a similar situation to paper, metal recovery rates declined by 25 percent. Metal prices reached record prices in 2004 and the demand, much like paper fiber, was at record levels as well. The same reasons cited above may account for this discrepancy.

The overall plastic total remained at the same level as the 2003 total, but a breakdown by resin type shows interesting gains for PET (soda bottles) and HDPE (milk and detergent bottles), which increased 23 percent and 60 percent respectively. Mixed plastic, which can include PET, HDPE, and the other resins 3 through 7, decreased significantly by 40 percent. Last year this category grew by 194 percent and was attributed to the possibility that more communities were going to "all bottle" collection programs or combining their HDPE and PET bottles as a mixed bale commodity. Market prices have improved for PET and HDPE so it is possible that communities that were once commingling these materials have gone back to marketing these materials separately.

Total banned items dropped by 18 percent this past year, with the large portion of this being lead-acid batteries and yard waste. This same trend was noted last year and may be attributed to a decline in the number of processors willing to accept lead-acid batteries. Yard waste can be affected by seasonal variations as well storm activity.

Table 2 includes totals reported to counties by local business and industry as well as the post-consumer totals shown in Table 1. These numbers are not consistent from year to year since

counties rely on local industry to provide totals. And in some cases, counties don't actively retrieve this information from industry.

The bar charts on page 24 reflect five-year recycling trends for the basic commodities of paper, plastic, metal, and glass. As mentioned earlier, the drops in paper and metal recovery are puzzling but the steadiness of plastic and glass markets can be attributed to the hard work of local governments, grants from the Solid Waste Trust Fund, technical support from RMDAC and DHEC's Office of Recycling, and our citizens' commitment to recycling.

However, as shown in Table 3 on page 23, the amount of municipal solid waste (MSW) continues to grow in the state. The MSW disposal rate rose to 4.35 pounds per capita in 2003, after remaining at 4.2 pounds per day for three years. Opportunities to reduce this per capita rate of disposal and increase overall recycling still exist. But reversing the trend in higher waste disposal will require further commitment of state resources to maintain existing infrastructure, continue public education activities promoting the need for recycling, and support South Carolina's recycling industry.

Recommendations Regarding Materials Which Should be Added or Deleted From Source Separation, Recovery, and Recycling Programs

Electronic equipment should be collected for recycling where economically feasible. This category includes discarded products such as computers, televisions computer monitors and VCRs (see comments on pages 6 and 16.) Currently state and federal regulations prohibit industry from disposing large quantities of these materials in municipal solid waste landfills. Regional and local markets exist for certain electronic scrap and collection programs have been initiated on a limited basis by a few South Carolina communities.

Recommendations, Including Tax Incentives, to Facilitate the Development of Markets for Recovered Materials or Products in This State

No recommendations are made for this section.

Table 1
Post-Consumer Recycled Materials
(Reported by County/Residential)
Tons

	2004	2003	Percent Change
Paper	86,793	112,718	-23%
Metal	35,547	47,673	-25%
Glass	9,544	9,279	3%
Plastic, total	6,141	6,153	-
#1 PET	1,916	1,555	23%
#2 HDPE	2,359	1,470	60%
Mixed	1,867	3,128	-40%
Banned¹, total	198,494	242,372	-18%
Lead acid batteries	2,675	3,622	-26%
Used oil²	8,470	53,737	
Waste tires	20,198	20,000	1%
White goods	34,983	24,581	42%
Yard waste	132,168	140,433	-6%

Table 2
Total Recycled Materials
(Reported by County/Residential, Commercial, Institutional/Non-Profit, Industrial)
Tons

	2004	2003	Percent Change
Paper	1,987,683	2,153,930	-8%
Metal	883,498	1,501,154	-41%
Glass	18,860	14,655	29%
Plastic	88,605	57,807	53%
Banned	354,492	421,693	-16%

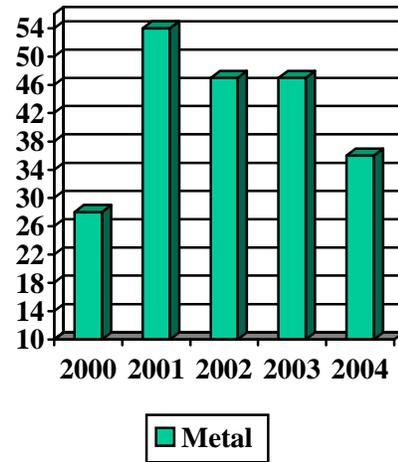
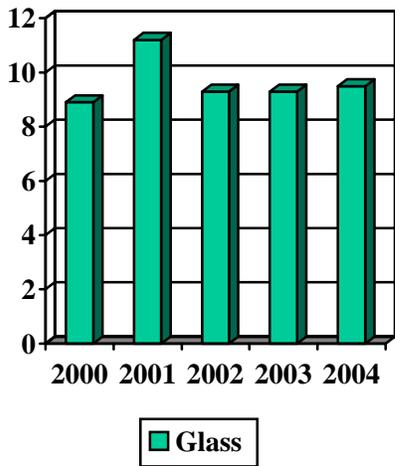
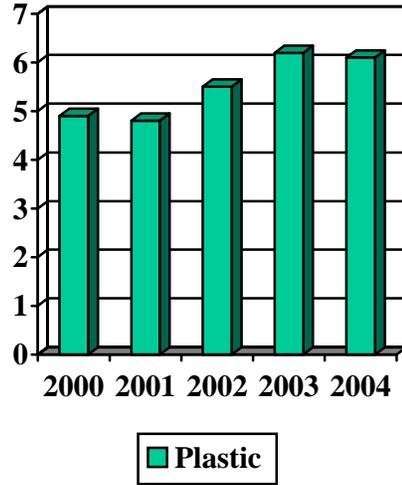
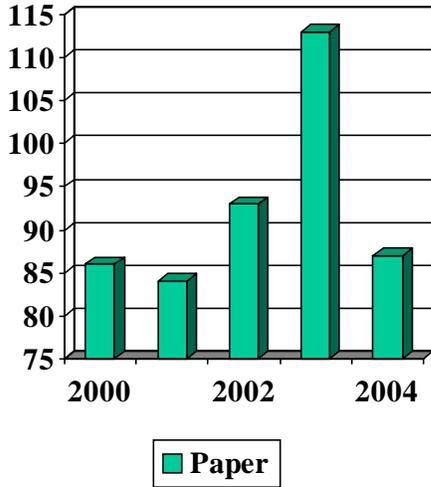
Table 3
Per Capita Municipal Solid Waste Disposal by Fiscal Year

Year	Pounds Disposed Per Person/Per Day
1999	3.61
2000	4.20
2001	4.23
2002	4.2
2003	4.35

¹ Banned items include tires, oil, lead-acid batteries, yard waste and white goods.

² According to DHEC, oil numbers compiled from counties are collected on fiscal year calendar while numbers reported by Santee Cooper are on calendar year. Santee Cooper's DIY numbers also include collections from farmers and commercial enterprises which may account for discrepancy.

South Carolina Post-Consumer Recycling Five Year Trends¹ (Tons)



¹ Quantities are based on data from Table 1, reported in 1000 ton units

MARKETS UPDATE

Industry representatives on the Recycling Market Development Advisory Council provide the following market updates. These include the primary commodities typically recovered in most municipal and county recycling programs as follows:

Glass	clear, brown, green
Paper	newspaper, corrugated
Plastics	PET, HDPE – clear and pigmented
Metal	ferrous and non-ferrous metals
Used Oil	oil, filters, bottles
Tires	

Each update will consist of the following four sections, which include comments on the basic market factors of supply, demand and pricing for each recovered material.

2004 Summary

A discussion on major changes in supply, demand and pricing for this material that have occurred during the past year, including both national and state perspectives with explanations of significant differences between the two.

2005 Outlook

Forecasts for the coming year and circumstances impacting supply, demand, and pricing for the material relative to 2004 conditions.

Future Trends

A discussion of long term trends in supply, demand and pricing beyond 2004.

RMDAC Action

Actions that this Council should consider to improve market factors.

GLASS

2004 Summary

Glass collected in South Carolina for recycling is sent to two regional processors; one in Atlanta (Fibres International) and one in Raleigh (Recycle America Alliance-Container Recycling Group). Glass market prices were flat across the board for all three cullet categories: flint, amber, and green.

South Carolina's supply of glass cullet has been stable and of good quality. Fibres International says its South Carolina depot locations have been its most improved supply base, delivering increased volumes over 2003. Markets for all three colors are strong with most bottles being made going into the breweries throughout the southeast. Recycle America Alliance - Container Recycling Group (RAA-CRG) reports that it receives good quality sorted glass from two regional collections sites in South Carolina.

There are six counties that serve as host counties for glass collection, allowing smaller communities that don't generate a large enough volume to combine their glass with these higher volume collections. Currently Darlington, Georgetown, Hampton, Horry, Lexington and York counties provide this hosting service.

2005 Forecast

Demand for 3-color separated glass should remain stable into 2005. The economics for transporting mixed glass cullet from South Carolina has kept Fibres from making the capital investments in the new technologies that are available. However, RAA-CRG has made a significant investment in high technology equipment to process mixed broken glass. The three mixed markets are the same as sorted. Our technology sorts the three mix into the individual colors.

Co-mingled glass and plastic containers are being processed by RAA-CRG, which may result in improved efficiencies and add further stability to glass markets for South Carolina. The economics of collecting sorted glass and or sorting glass in a Materials Recovery Facility environment should be carefully weighed against the economics of collecting mixed glass and shipping a three-mix glass.

Pricing for 2005 should remain relatively flat. Demand for clear and amber are fair and green demand is marginal as it has been for years.

RMDAC Action

RMDAC should continue to support programs that increase the overall recovery rate of recyclables in South Carolina as well as encourage communities to look at alternative markets for recovered glass.

PAPER

2004 Summary

The market for old corrugated cardboard (OCC) started the year at \$65 per ton and hit a high of \$95 per ton in March. Pricing held steady until August before taking a slight dip to \$85 per ton and finished the year at that level. Likewise, newsprint started the year at \$65 per ton and climbed to \$90 per ton in April. In June, newsprint dropped to \$85 per ton and continued to hold steady through the close of 2004.

Mixed paper markets had another strong and steady year, holding at \$60 per ton for all of 2004. This was a marked improvement as this grade was nearly impossible to move just a few years ago. High grades had a more variable year, with prices bouncing throughout the year between \$100 and \$115 per ton.

2005 Forecast

Early winter storms could cause price increases in all grades if they continue through January. This usually is the low collection time of year due to low consumer spending following the holiday season. Most forecasters still look for price increases for all grades in 2005.

Future Trends

Export demand will continue to grow in 2005 as markets in Asia and India continue to grow. The rest of the world continues to look at the United States to provide their needed fiber supply, and this will play a major role in maintaining strong pricing. With domestic orders staying strong, business should stay solid through 2005.

RMDAC Action

RMDAC will continue to work closely with DHEC and the Carolina Recycling Association to increase collections and to develop new markets. Lee County established a paper recycling program in 2004 and Dillon County is scheduled to go online with its paper recovery program in early 2005.

PLASTICS

2004 Summary

PET Summary

According to recently published 2003 recycling rates from the National Association for PET Container Resources (NAPCOR), 841 million pounds of PET were collected for recycling out of 4.29 billion pounds sold for a recycling rate of 19.6 percent. This rate was a slight decrease from the 19.8 percent recycling rate established in 2002. U.S. reclaimers purchased 520 million pounds, which was 2 million pounds less than the previous year. The export market purchased 321 million pounds, up substantially from the 275 million pounds purchased in 2002. Domestic purchasers also imported 62 million pounds for total purchases of 582 million pounds. The imports came primarily from Canada, Mexico and Europe.

Concerns continued to increase during 2004 over single-serve container growth and the lack of a proper infrastructure to recycle containers consumed away from home. Also, demand continues to far outstrip supply for U.S. producers while increased exporting of supply offshore further compounds this situation. The continued growth of new colors and barriers in beverage bottles has affected quality for end-use recycled products.

In the state of South Carolina, PET recycling increased 722,000 pounds from 3.1 million pounds in 2003 to 3.8 million pounds in 2004.

2005 PET Outlook

The PET market will continue to see a growth in new colors and barriers in beverage bottles not compatible with current recycling processors. The additional growth of single-serve containers in water, juice, tea and soft drink bottles will cause further reductions in recycling rates and production yields of processors. Increased attention by stakeholders to address the lack of growth in recycling rates is occurring from recycling processors, state and federal government agencies and the beverage industry. Additionally, continued growth for export market demand will further compound the crisis the domestic producers face of inadequate supply of recycled PET to match the demand for end products.

HDPE Summary

According to recently published 2003 recycling rates from NAPCOR, 420.4 million pounds of natural HDPE were recycled out of 1.524 billion pounds produced for a recycling rate of 27.3 percent in the U.S. This represents a 6.0 million pound increase over 2002 volume. On pigmented mixed color, 402.8 million pounds were recycled out of 1.780 billion pounds produced for a 22.6 percent recycling rate in 2003. This represents a 16.8 million pound increase over the 2002 level recycled.

Concerns continue to exist over quality levels with pigmented PET contamination in the HDPE recycle stream. Demand remained very strong from domestic producers with much lower export levels than PET. Growth in markets for recycled HDPE in products such as bed liners, mud flaps and plastic lumber have further compounded the demand versus supply imbalance.

In the state of South Carolina, HDPE recycling increased 1.7 million pounds from 2.9 million pounds recycled in 2003 to 4.7 million pounds in 2004. The reported pounds, however, have shifted in reporting somewhat as mixed plastics decreased 2.5 million pounds from nearly 6.3 million pounds in 2003 to 3.7 million pounds in 2004.

2005 HDPE Outlook

Demand is projected to remain strong due to new applications in both packaging and automotive products. Pigmented PET contamination will continue to be a quality issue going forward with the growth of new designs in packaging.

Future Trends

In PET, growth and demand is expected for recycled content into bottles, strapping and other applications. The export market is expected to continue its growth as well putting further pressure on the U.S. fiber, strapping and sheeting reclaimers for supply. Further pressure on quality and yield will come with increasing products made in new colors, barriers, new polymers, and small containers in the collection stream.

In HDPE, demand will continue to far outstrip supply as growth is expected in bottle and plastic lumber applications. New applications are also surfacing for automotive products such as bed liners and mud flaps. Pigmented PET in colors as a contaminant still is a major issue to quality production going into 2004.

RMDAC Action

1. In partnership with SC DHEC, work to increase collection of all beverage containers for recycling, with emphasis on creating a multi-media outreach/education program to foster increased participation throughout the state.
2. Continue to support the development and expansion of recycling businesses in South Carolina.
3. Monitor the establishment of "All Plastics Bottle" programs in South Carolina
4. No new materials should be added at this time.

FERROUS METAL

2004 Summary

The year 2004 will long be remembered as the best year ever for ferrous scrap metal. Prices for many grades traded at three times their historical highs with industrial scrap surpassing \$400 per gross ton (GT) after breaking the magical \$200 per GT barrier for the first time in late 2003.

The year started seasonally strong and then began an anticipated correction with lower pricing in the spring. During the summer the supply of scrap tightened just as steel mill operating rates were increasing. In addition, a freight shortage created delivery concerns and some mills began to run out of select grades of raw material. A buying frenzy ensued where mills tried to secure iron units from all available sources regardless of location. Prices continued to show surprising resiliency in the fall as ferrous scrap moved to new highs with the peak occurring in late October to early November. Finally at the end of the year prices began to decline as mill inventory was better aligned with production requirements.

Despite these higher costs for scrap metal and other raw material, 2004 was still a banner year for steel mills themselves. Orders for steel were strong and most mills found a way to pass on higher prices to their customers in the form of scrap surcharges that changed each month. The exceptions to this trend were foundries that were locked into annual agreements to supply their customers with castings at fixed prices. Automakers especially resisted the surcharges and foundries like Citation and Intermet filed for Chapter 11 bankruptcy protection as a result.

The consolidation trend also continued in 2004. Charlotte-based Nucor Steel with three mills in the Carolinas increased its market share to position itself with ISG Steel as the largest companies in the United States. ISG continued its pattern of rescuing failed mills (LTV, National Steel) by purchasing and restarting Georgetown (SC) Steel late in the year. ISG then announced a deal with Ispat Steel to form a new company – Mittal Steel – which would become the largest steel company in the world.

2005 Forecast

The new year is expected to be another strong one for ferrous scrap, but few expect prices to surpass the record levels of 2004. The year will begin with another round of corrections as prices settle down from historic highs. But few expect that prices will return to traditional levels any time soon. Most likely there has been a fundamental shift in the base price of scrap metal.

The optimism for 2005 is based on a healthy domestic economy and strong orders for steel. Any increase in export activity also will benefit the price of scrap as the most recent run occurred with little pressure from foreign markets. The scrap metal market tends to reflect the leading edge of the economic cycle and if this holds true, then we are all in for a good year. Prices for metal finished goods will be higher, but their impact on overall inflation is much less than other raw materials, such as petroleum-based products.

Future Trends

The consolidation trend will continue within the steel industry with fewer mills holding larger market shares. Electric arc furnace (EAF) mills will improve their technology and capabilities as they move to replace older, less efficient and less environmentally-friendly blast furnaces. Scrap metal will remain a global commodity of great value with increasing interest in the development and acquisition of alternative sources of iron units to prevent another supply crisis.

RMDAC Action

RMDAC will continue to promote and encourage recycling activities that will increase the recovery of scrap metal. Metal recycling is more economically viable than ever with higher prices and there is available capacity to handle all industrial and consumer scrap within the state.

NON-FERROUS ALUMINUM

2004 Summary

Aluminum prices reached nine-year highs in October, as demand rose at its fastest rate in more than 20 years, helped by further strong demand in China and a strong recovery in the U.S. because of increased economic activity.

Prices for recycled aluminum followed primary prices throughout the year. Aluminum used beverage containers (UBCs) are currently averaging \$0.46/lb in the Southeast, slightly below the national average of \$0.50/lb. U.S. primary production fell approximately 8.5 percent from 2003 levels. However, the restart of additional domestic capacity in the Northwest was announced late in the year after high power costs led to shutdowns over the last several years.

The aluminum can recycling rate continues to drop each year and according to the Container Recycling Institute, one trillion cans have been wasted since 1972 – a quantity of scrap aluminum worth about \$21 billion at today's market prices.

Global demand for aluminum has risen nearly 10 percent in the year, outstripping supply for the first time in four years. Global inventories have fallen a whopping 800,000 tons, the largest drop in nine years. China produced nearly 20 percent of global output this year, compared with a market share of less than eight percent in 1994.

2005 Forecast

The outlook is positive for the aluminum industry based on continued improvement in supply and demand and a higher metal price (projected U.S. \$0.79/pound in 2004 and U.S. \$0.85/pound in 2005, up from U.S. \$0.65 in 2003). Chinese aluminum production and demand will continue to significantly influence the industry.

Future Trends

The energy value (95 percent) that can be reclaimed through recycling continues to make aluminum one of the most attractive and profitable materials for recycling. As with any commodity, trading is now a global business. Any unexpected changes in production requirements domestically, the worldwide value of the dollar, or significant shifts in the export market, will affect pricing.

RMDAC Action

With an established recycling infrastructure in place (both private and municipal), the Council should continue to educate and encourage local governments, private citizens and industry to recover more aluminum and other non-ferrous metals. These materials typically serve as the income generators for municipal recycling programs and efforts should continue to increase collections.

USED OIL

2004 Summary

The state's used oil recycling program for do-it-yourselfers (DIYers) continues to flourish, thanks to a combination of technical assistance and grant funding for local governments. As a result, South Carolina is recognized as having one of the nation's most comprehensive used oil recycling programs for DIYers.

According to figures compiled by the S.C. Department of Health and Environmental Control's Office of Solid Waste Reduction and Recycling (Office), DIYers recycled 1,142,199 gallons of used oil in (calendar year) 2003. This marks the fifth consecutive year that more than 1 million gallons were collected. Overall, more than 10 million gallons have been collected from DIYers since used oil recycling efforts began in South Carolina in 1990. Figures for 2004 were not available when this document was prepared.

In fiscal year (FY) 2003 (July 1, 2002 – June 30, 2003), DIYers recycled 186 tons of used oil filters – a decrease from the previous FY when 210 tons of used oil filters were recycled. Still, the recycling of used oil filters reflects a significant environmental protection program when one considers that each filter may contain from four ounces to one quart of oil if not properly drained. While there was a decline in the tonnage of filters reported as being recycled, it does not mean that used oil filter recycling has decreased. One reason for the tonnage decrease is that several counties now market used oil filters with their appliances and/or other metals. This means that filters may be included in the numbers for appliances and/or metals instead of used oil filters. In addition, Lexington County, a host county for oil filter recycling, experienced operational problems with their oil filter processing equipment throughout much of 2002 and 2003. As a result, Lexington County reported that they only recycled 5.7 tons of filters in 2003 despite recycling more than 45 tons in 2001.

Additionally, DIYers recycled more than 48 tons of oil bottles in FY 2003. This is a decrease of nearly 50 percent from the previous fiscal year. Like filters, recycling oil bottles is important because they, too, can contain excess oil up to an ounce each if not thoroughly drained. While there was a decline in the tonnage of bottles reported as being recycled, it does not mean that oil bottle recycling has decreased. One reason for this decrease is that most counties now collect and market oil bottles with other pigmented HDPE plastic. As a result, a portion of the used oil bottles that are being recycled are being counted in the HDPE plastic rather than the oil bottle numbers. From 2002 to 2003, the amount of HDPE plastic being recycled increased by more than 500 tons.

Introduced in January 2000, the Office continues to offer its "Green Driver Project," targeting students in high school driver education classes and stressing the environmental impact of driving. Information covered as part of this initiative includes information on recycling used oil, filters and bottles, energy conservation, ground-level ozone prevention and other environmental tips. Since the Project began, staff made 813 classroom presentations to 36,240 students. The Project also uses the successful video "DHEC 1: Behind the Oil Change," to demonstrate the consequences of a teenage student's decision to improperly dispose of used oil. In addition, the Office works with Palmetto Pride to add a litter component, including litter laws and enforcement as part of the Green Driver curriculum.

Due to the unique problems of recycling used oil filters, the Office continues to work with vendors – scrap metal yards and steel mills – that accept filters. Ongoing negotiations with vendors to ensure continuing markets are an integral aspect of the used oil program.

2005 Forecast

The amount of used oil, bottles and filters collected for recycling should continue to grow in 2005. The priorities of the Office regarding its used oil recycling program are:

- To continue to collect oil bottles. Most counties are using oil drain racks to drain the bottles and make them easier to process. Once drained, the oil bottles can be mixed with other HDPE plastics. This makes it easier to market the oil bottles. The Office will continue to encourage all counties to use the oil drain racks.
- To add farmer oil collection tanks, one per county, where needed. Farmer oil tanks are now at 29 oil collection sites in 26 counties (Abbeville, Aiken, Barnwell, Cherokee, Chesterfield, Clarendon, Darlington, Dillon, Dorchester, Fairfield, Georgetown, Greenville, Greenwood, Hampton, Horry, Kershaw, Lancaster, Lee, Newberry, Oconee, Orangeburg, Pickens, Sumter, Union, Williamsburg and York). Five more counties will be setting up tanks in FY 2005. Each of the tanks holds at least 550 gallons of used oil and is fitted with a pump and hose to make it easier for farmers to recycle up to 55 gallons of used oil at one time.
- To continue to expand the oil/gasoline mixture collection program by adding collection tanks where needed. There are currently 30 oil/gasoline mixture sites in 26 counties (Aiken, Allendale, Anderson, Barnwell, Beaufort, Berkeley, Calhoun, Charleston, Cherokee, Clarendon, Dorchester, Fairfield, Georgetown, Greenville, Greenwood, Hampton, Kershaw, Lexington, Newberry, Oconee, Pickens, Saluda, Spartanburg, Sumter, Williamsburg and York). Seven more counties will be setting up tanks in FY 2005.
- To secure and maintain markets or other uses for used oil, bottles and filters.

Future Trends

The Office will continue to provide grant funding to local governments to set up, maintain and improve used oil recycling programs. The Office also will continue its statewide awareness campaign on used oil recycling including the national award winning "Recycle Guys" public service announcements and the "Green Driver Project."

RMDAC Action

The Recycling Market Development Advisory Council should continue its work promoting, supporting and securing markets for the state's used oil recycling program.

TIRES

2004 Summary

Scrap tire markets in South Carolina and the region remained healthy in 2004. According to our annual Tire Recycling Survey of DHEC-approved tire processors, the major portion of SC scrap tires were processed for two primary markets -- tire derived fuel and tire shreds for drain fields.

The survey of scrap tire facilities and processors shows that 7.1 million South Carolina scrap tires were recycled into a variety of products in 2004. The table below provides a comparison of the number of tires processed and end-market utilization over the past six years.

SC Tire Markets Six-Year Trend Analysis

	1998	1999	2000/01	2002	2003	2004
Tires processed (millions)	3.34	3.99	8.0	6.9	7.0	7.1
Septic drain field	80%	88%	52%	42%	26%	27%
Tire derived fuel	13%	10%	34%	35%	58%	58%
Crumb rubber	1%	2%	4%	14%	7%	4%
Civil Engineering	0	0	9%	1%	5%	11%
Landfilled	6%	0	0	8%	4%	0

For the second consecutive year, TDF exceeded tire shreds for drain field applications. This confirms the trend over the past five years in moving toward higher end value products derived from scrap tires. Previously the greatest use of scrap tires in South Carolina was tire shreds used as drain fields for septic tank systems. The average price for tires shreds is \$15 per ton. More recently the market has shifted to tire chips used as supplementary fuel, especially in cement kilns. The average price for tire derived fuel is closer to \$30 per ton. These figures support the national trend toward greater usage of TDF to reduce fuel costs, especially in cement kilns and pulp and paper mills.

Tire shreds and civil engineering, which combined for 38 percent of the markets this past year, continues to be a viable alternative product for tire processors.

Crumb rubber, a very small portion of the market segment, is being made from heavy truck tires. Passenger tires, as well as some truck tires, are recovered for TDF of civil engineering and tire shreds. The crumb rubber is being produced in North Carolina. RTG in Berkeley County, which was the only S.C. crumb producer, closed in 2004. New owners plan to reopen the plant as Rubber Recovery Incorporated in early 2005.

2005 Forecast

Markets for products derived from scrap tires are expected to remain strong in 2005. The demand for TDF alone could outpace the supply, with the continued use of this material by pulp and paper mills and cement kilns. Markets for tire shreds also remain strong and will continue into 2005. Road construction projects facilitated by the Clemson Asphalt Recovery Technology Service (ARTS) Center, along with the growing sports turf and playground market should create a small demand for processed crumb rubber.

Future Trends

Market demand for processed scrap tires should remain stable in the near future. Pulp and paper mills have invested in systems to use TDF as supplemental fuel for its wood-fired boilers. The market for tire shreds as drainage media has been well-accepted among contractors for the past five years and should continue to be a good market alternative. Steel mills using electric arc furnaces have successfully tested scrap tires as fuel and carbon source. Crumb rubber production and demand should continue to grow.

Nationally, the Rubber Manufacturers Association has reported that 80 percent of scrap tires generated are recovered for recycling or energy use. This is impressive milestone has been made possible by the support of tire manufacturers, consumer-paid recycling fees that fund state and local government recovery infrastructure and recycling business development that results in the creation of stable and diversified markets. This trend should continue into the future.

RMDAC Action

The Council will continue to encourage the use of crumb rubber in asphalt rubber paving and other added value applications for recycling scrap tires in South Carolina.

APPENDICES

APPENDIX A

South Carolina Recycling Market Development Advisory Council

APPOINTEES

REPRESENTING

A. Gerald Fishbeck
United Resource Recovery

Recycling Industry
Chairman, RMDAC

Clarence H. Hermann
Michelin Tire Corporation

Tire Industry
Vice-Chairman, RMDAC

Vic Carpenter
Anderson County

County Government

Kay Clamp
SC Petroleum Council

Petroleum Industry

Scott Courtney
ALCOA

Aluminum Industry

Phil Ammons
Wellman, Inc.

Plastics Industry

Roger LeDuc
City of Aiken

Municipalities

Haskell Grant
Milliken and Company

South Carolina Department Of Commerce

Ronnie Grant
Sonoco Products Company - Paper Division

Paper Industry

Donna London
Strom Thurmond Institute
Clemson University

Higher Education Research

Jeff Kennedy
Carolinas Recycling Group, LLC

Scrap Metal Industry

James Zieche
Allied Waste Systems

Solid Waste Collection and Disposal Industry

Steve Carreras
Recycle American Alliance

Glass Industry

Chris Fisher
Fisher Recycling

General Public

STAFF

Ted Campbell
Senior Manager

South Carolina Department of Commerce
RMDAC

Karen Owens
Manager

South Carolina Department of Commerce
RMDAC

Noel Hill
Administrative Assistant

South Carolina Department of Commerce
RMDAC

Meet the Recycling Market Development Advisory Council



Phil Ammons represents the plastics industry. He is director of Raw Material, Recycled Products Group for Wellman Inc. where he is responsible for purchasing nylon and polyester recycled raw materials for the Engineering Resins and Fiber Division in Johnsonville. Phil oversees direct sales or use of recycled waste for all of Wellman's North American plants. He is a member of the Carolina Recycling Association and the Association of Post-Consumer Plastics Recyclers. This is Phil's third year serving on the Council, and he is a member of the Established Recyclables Committee.



Steve Carreras is a new member of the Council, having joined this summer as the representative for the glass industry. He works in the Business/Market Development area for Recycle America Alliance, LLC, Container Recycling Group (RAA). In addition to glass, Steve also has extensive knowledge in the plastics recycling arena, and he focuses on developing a strong raw material base for his company's commingled plastic processing facilities and on expanding the end markets for the finished product. Prior to joining RAA, Steve worked in a number of capacities at Wellman Inc. He serves on the Established Recyclables Committee.



Vic Carpenter represents county governments on the Council. He is employed by Anderson County as the Director of Environmental Services, with responsibility for a number of county programs including solid waste, recycling, wastewater and stormwater management, water quality implementation and the County Animal Shelter. Vic serves on the Established Recyclables Committee.



Kay Clamp represents the petroleum industry's perspective on the council. Since 1998, she has served as the executive director of the S.C. Petroleum Council, providing government relations for the major oil companies that do business in the state. She is the former director of the S.C. Petroleum Marketers Association and manager of public affairs for the State Development Board. Kay chairs the Policy Committee.



Scott E. Courtney is the Water Quality Specialist at Alcoa – Mt. Holly (a primary aluminum production facility in Goose Creek, S.C.) with primary responsibilities for water program management, stormwater pollution prevention and contingency plans. He has been with the company since 1994, first as a coop student and then full-time after receiving a Bachelor of Science degree in Agricultural Engineering from Clemson University. He serves on the S.C. Recycling Market Development Advisory Council where he chairs the Industrial Recycling Committee. He is also an active Master Waste Educator in the Charleston area. Scott is a Certified Hazardous Materials Manager and a S.C. Registered Professional Engineer. Alcoa – Mt. Holly has a mature Pollution Prevention Team that has implemented projects during the past 14 years that have resulted in more than \$1,500,000 in savings for the company.



Gerry Fishbeck is Vice President of Operations for United Resource Recovery Corporation. He possesses a Bachelor of Science degree in Chemical Engineering from the University of Delaware, in addition to an MBA from the University of South Carolina. Prior to joining URRC, Gerry was Wellman's Vice President of Recycling and Business Development and has been in the recycling field for more than 15 years. He is a member of the Association of Post-Consumer Plastics Recyclers and currently serves as Chairman for South Carolina's Recycling Market Development Advisory Council, of which he was a founding member.



Chris Fisher is one of the Council's newest members, representing the general public. Chris is President of Fisher Recycling, a small, family-owned recycling business located in Charleston, S.C. He is a past board member of the Carolina Recycling Association. and is actively involved in a number of organizations and committees concerned with Charleston's appearance and protecting the environment.



Haskell Grant serves as the S.C. Department of Commerce's industry representative on the Council. He is a senior buyer for Milliken and Company in Spartanburg where he has worked for 32 years in the industrial engineering, process engineering and purchasing areas. Haskell joined the Council in 1997 and currently serves as the chair of the Emerging Recyclables Committee.



Ronnie Grant represents the paper industry on the Council. He has been employed with Sonoco for more than 36 years, working the past 19 in the Recovered Paper Division, which handles more than 3 million tons of recovered paper each year. Ronnie was instrumental in getting the North Carolina and South Carolina Recycling Associations to merge into the Carolina Recycling Association. He served as chair of the Established Recyclables Committee for a number of years and currently serves on the Industrial Recycling Committee.



Clarence (Red) Hermann represents the tire industry. An environmental manager at Michelin, Red has served on the Council for seven years and has chaired the Council's Tire Committee. He currently serves as the Vice Chair for the Council as well as chairs the Established Recyclables Committee.



Jeffrey A. Kennedy represents the scrap metal industry. Jeff is the Vice President of Operations, Environmental, Health and Safety (EHS), and Production Maintenance for Carolinas Recycling Group, LLC. A fourth generation scrap processor, he has worked with CRG, and its predecessor K&W Recycling, for more than 16 years. Jeff provides operational oversight for processing plants in Clinton, Cayce and Greenwood, SC, as well as manages the EHS program and production maintenance for all 10 of CRG's plants - eight of which are in SC, one in NC and one in GA. Carolinas Recycling Group is an active member of the Institute of Recycling Industries (ISRI). Jeff serves on the Industrial Recycling Committee.



Roger LeDuc represents municipal governments. He has been the City of Aiken's Manager since 1998 and prior to that served as Aiken's Public Works Director for 12 years. In 2000, Roger was recognized as one of the Top Ten Public Works Leaders in North America and received the Order of the Silver Crescent from Governor Jim Hodges. He also serves on the state's Waste Tire Committee and is a member of the Aiken Chamber of Commerce and Aiken Corporation. He sits on the Council's Policy Committee.



Donna London is a Research Associate with the Strom Thurmond Institute of Government and Public Affairs at Clemson University and she represents the concerns of higher education on the Council. She is coordinator of the Self Civic Fellows of the Jim Self Center on the Future, the Clemson coordinator for the Sustainable Universities Initiative and a frequent host of Your Day, a daily radio program broadcast on the S.C. Educational Radio Network. She serves on the Policy Committee.



Jim Zieche represents the solid waste industry. Jim is the district manager for Allied Waste Services in South Carolina. The S.C. district includes three landfills, four collection companies and four transfer stations, serving more than 15,000 commercial and 6,000 industrial customers. Jim has been on the Council for four years and serves on the Emerging Recyclables Committee.

APPENDIX B

Contact: Karen Owens
Manager of Recycling Market Development
803-737-0239

FOR IMMEDIATE RELEASE

September 8, 2004

Manufacturers Making New Products from Items Formerly Known as Trash

Recycled products abound in today's marketplace, creating jobs for South Carolinians

COLUMBIA, SC – The world's largest producer of polyester fiber from recycled bottles has a plant in Johnsonville, S.C. that employs 650 people and creates a significant impact on the Pee Dee's economy.

Wellman first started recycling plastic fiber waste in the early 1960s and went on to pioneer bottle recycling in the 1970s. The company helped lead a revolution in the consumer packaging industry in the early 1990s, being the first company to develop a closed-loop recycling chain for PET and polyester packaging. The company annually buys more than 160 million pounds of recycled containers and industrial PET waste that is processed into staple fiber and sold to the apparel and home fashions industries for use in products consumers use every day, such as backpacks, blankets, sportswear and carpeting.

"Recycling provides an important feedstock for our company as well as many others located throughout our state," said Phil Ammons, director of raw materials for Wellman's Recycled Product Group and the plastic industry's representative on the S.C. Recycling Market Development Advisory Council.

The Governor-appointed Council monitors the recycling industry in the state and recently reported that some 260 recycling companies employ 20,000 people in the state and create a \$1.4 billion economic impact in South Carolina.

"Although more and more plastic bottles are being generated annually, we are seeing less of them make their way to recycling containers and that's a real concern for our business," Ammons explained.

The emergence of single-serve containers as well as the proliferation of new beverage choices for consumers--such as bottled waters, specialty teas and a growing number of sports drinks--create a seemingly plentiful supply of PET. But the reality is that PET recycling rates in the United States have dropped from 40 percent in 1995 to about 20 percent, or 800 million pounds, in 2002. Of that 20 percent, nearly 280 million pounds, or 35 percent, of PET are going abroad to Asia for processing.

"We want people to realize that we have the capacity in South Carolina to process a lot more bottles than are being collected currently," Ammons added. "Through the Council, we are working with a number of organizations to promote recycling in hopes of increasing collection numbers for all materials, not just plastics."

Nucor Steel, the largest recycler in North America, has multiple operations in South Carolina. Nucor operates Electric Arc Furnace shops in Darlington and Huger. These facilities take scrap metal and melt it into structural steel shapes, beams and sheet metal that are used to make a wide variety of end products. Nucor also uses these recycled steel products to fabricate steel joists, girders and decking for buildings at

their operations in Florence and Swansea. In addition, recycled steel is used to manufacture shafts, keystack and other types of cold finished steel at the Darlington facility. With more than 1,700 employees located throughout the state at its manufacturing facilities, Nucor is a significant employer in South Carolina.

According to Steve Rowlan, general manager for environmental affairs at Nucor, the company is one of the greatest recycling stories in North America. "We annually convert more than 17 million tons of scrap steel into useful products that are found in everything from appliances to shopping centers," Rowlan explained. "In South Carolina, Nucor is recycling scrap metal at the rate of 180 pounds per second every second of every day. As a result, Nucor converts scrap material into a useful product that is then sold into virtually every type of steel market that exists." Nucor's efforts also save tremendous amounts of natural resources from further depletion.

In addition to conserving natural resources, Nucor has used its internal recycling program to help others in the Darlington community. Working with the local Special Needs and Disability Board, the company's cardboard, plastic and paper are sent to a processing facility that Nucor built where special needs clients separate and bale materials for markets, and the proceeds from the sales of these materials benefit the board and its programs.

"It's just another way we demonstrate our commitment to recycling and our community," Rowlan added. Nucor was recognized for its recycling efforts and community involvement in 2002 with the Best Industry Recycling Award from the Business Recycling Assistance Program.

Probably one of the most recognizable products people use every day is the cardboard box. LINPAC Paper in Cowpens takes bales of old cardboard, along with newspaper and magazines, and converts more than 600 tons of this material a day into rolls of new paper used to make new corrugated boxes. "It's a perfect closed-loop, recycled product," said Jim Painter, LINPAC vice president and general manager. "Business is good, but we've got to make sure we keep getting paper."

Greenville Recycling, a LINPAC division, buys and bales recyclable paper from businesses in the Greenville-Spartanburg area and transports it to the Cowpens mill for recycling into new packaging products. It also works closely with the community and local government to support recycling efforts by providing audits for businesses wanting to reduce their waste disposal costs as well as assisting with educational tools and programs that promote recycling more paper.

"People need to realize that paper and cardboard aren't trash. They are valuable resources that can be reused again and again to make new products," Painter added. "And making those new products is how our business thrives. We have almost 100 employees that depend on individuals and companies doing the right thing – recycling."

The S.C. Recycling Market Development Advisory Council is a Governor-appointed council that supports programs and policies to create markets for recyclable materials. As part of the Business Solutions Division at the S.C. Department of Commerce, staff provide technical and economic development assistance to recycling businesses, industry and other organizations.

Contact: Karen Owens
Manager of Recycling Market Development
803-737-0239

FOR IMMEDIATE RELEASE:

September 15, 2004

Small Recycling Businesses Play a Big Role in Industry's Growth

*Giant multinationals aren't the only ones making an impact
in recovering recyclable commodities*

COLUMBIA, SC – Sunshine Recycling in Orangeburg has 14 employees and runs one shift, seven days a week. The company provides nearby industry with recycling collection services for all types of scrap metal—from aluminum cans and steel containers to copper wire and brass fixtures, diverting thousands of tons of materials from our state's landfills.

When talking with Sunshine owner Joseph Rich, it's obvious his commitment to protecting the environment is a primary reason he started his recycling business. "Simply put, the items we recover can be reused to make new products," Rich explained. "Recycling helps save energy and reduces the demand for raw materials, creating a positive impact on our environment."

"The greatest disadvantage to landfilling discarded items is that nothing is gained from the process, except disposal," Rich added.

Last year, Sunshine Recycling processed more than 10,325 tons of material that, if recycling had not been an option, industry would have paid nearly \$330,400 to dispose. Rich was recognized last year as a recipient of the *Columbia Business Journal's* "Twenty Under Forty" for his company's success and involvement in his local community.

According to a recent survey conducted by the S.C. Recycling Market Development Advisory Council, the state's recycling industry has more than 260 businesses with approximately 20,000 employees and an estimated annual payroll in excess of \$700 million. Many of these companies are considered small businesses, employing 100 people or less. Yet they play an important role in helping divert reusable materials from the state's landfills, according to Council Chairman Gerry Fishbeck.

"Many small recycling businesses play a vital role in collecting, processing and brokering the materials that larger recycling manufacturers rely on to make new products," Fishbeck, vice president of United Resource Recovery Inc., explained. "For instance, my company helps process PET bottles so they can be made back into new containers for the beverage industry."

United Resource Recovery has a 10-million-pound-per-year PET plant in Spartanburg, and also recycles 12 million pounds of X-ray film annually and employs 44 people. While the company is not considered a giant in the U.S. marketplace, its patented technology for recycling PET is being used globally to affect plastic recycling in Europe and Mexico. "We've looked beyond our borders to take advantage of business opportunities to recycle more material in countries where recycling is mandated," Fishbeck added. "The global economy plays an important role in our company's success and we are constantly looking for ways to use our technology to enhance plastics recovery around the world."

Chris Fisher started his small recycling company in 1992 with an old, beat-up blue pickup truck, collecting cans, bottles, plastic and paper from several Charleston restaurants. Fisher says he provided a service that these business owners and managers didn't have time to do themselves. "I read an article in *Entrepreneur Magazine* that profiled a small commercial recycling outfit in Sacramento, California and realized that the business I wanted to start was not only the right thing to do for the environment but a worthwhile business venture, too."

While Fisher's business has grown tremendously over the past 12 years, his focus has remained on the local business community, often stressing the cost saving benefits businesses can achieve through recycling. He's added secure document destruction and electronic recycling to his menu of services and some of Charleston's most notable institutions are customers.

Even though his clients may generate tons of materials and employ hundreds of people, Fisher Recycling is still a small, family-run business with six employees. And Fisher has dedicated considerable time to his community, participating in a number of organizations and committees concerned with the city's appearance and protecting the environment.

"Recycling plays an important role in our state's economy and the Council wants to remind citizens and businesses alike that they help make recycling a success by making good choices, putting paper, cans, bottles and other materials in the recycling stream rather than the waste stream," Fishbeck added.

The S.C. Recycling Market Development Advisory Council is a Governor-appointed council that supports programs and policies to create markets for recyclable materials. As part of the Business Solutions Division at the S.C. Department of Commerce, staff provide technical and economic development assistance to recycling businesses, industry and other organizations.

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Contact: Karen Owens
Manager of Recycling Market Development
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FOR IMMEDIATE RELEASE

Businesses Are Important Cog in Recycling's Wheel *Businesses create majority of waste in SC; opportunity for recyclers*

COLUMBIA, SC – Before implementing its recycling program, SMI Steel had 20 dumpsters located throughout its 90-acre West Columbia facility. Now it has only four.

According to Ben Kumangai, an environmental technician and head of SMI's solid waste task force, when the company discovered it was spending more than \$4,000 a month on trash disposal, the employees knew they needed to make some changes.

Working with staff from the Business Recycling Assistance Program, SMI employees began looking for ways to consolidate collection points and determining what materials could be pulled out of trash dumpsters for recycling instead. "We wanted to make waste reduction and recycling opportunities convenient throughout our plant," Kumangai said. The task force placed recycling containers in the roll mill, melt shop, customer service and transportation area as well as in SMI's administrative offices.

SMI, which reprocesses steel scrap, recycles a number of materials, including cardboard and office paper, pallets, nickel-cadmium batteries, fluorescent bulbs, computer equipment, oily rags and mats, aerosol cans and parts washer solvents. The task force collects aluminum drink cans, with the proceeds going to its employee emergency fund.

As a result, SMI saves about \$1,000 a month on its waste disposal and it also provides recovered materials to other companies like SMI that are in the recycling business. "Our solid waste task force helps reinforce the message to our employees that we are a recycling business and that there are other companies that rely on these materials just like we rely on scrap metal," Kumangai added.

About three years ago, the state Commerce Department and the Department of Health and Environmental Control (DHEC) developed the Business Recycling Assistance Program (B-RAP) to help business and industry reduce waste and recycle more material. More than half of the waste generated in South Carolina comes from business and industry.

The program provides free, non-regulatory technical recycling assistance to industry, and can refer companies to appropriate recycling operations in the state. Partners in the program include the S.C. Recycling Market Development Advisory Council, which is managed within the Commerce department, and DHEC's Office of Solid Waste Reduction and Recycling and the Center for Waste Minimization.

"Increasingly, we find that many business owners are looking for ways to cut expenses," said Karen Owens, B-RAP manager. "We talk to them about how much money they spend on waste disposal and how they could easily pull two or three items out of their trash for recycling. Recycling not only helps reduce the number of trash collections, but there is also the potential to generate revenue from this recovered material."

The emergence of programs such as environmental management systems, lean manufacturing and ISO 14001 certification have helped companies realize that they can reduce their material consumption, reuse byproducts they may have previously thrown away, conserve energy, improve regulatory compliance and lessen their potential liability by adopting programs that reduce waste and pollution from the beginning rather than at the end of their operations. Recycling is one strategy that can help South Carolina industries maintain their competitive edge in a global economy.

“We have a significant amount of recycling capacity in our state,” Owens added. “Providing businesses with this market information helps us build supply and create jobs.”

According to a recent survey conducted by the S.C. Recycling Market Development Advisory Council, the state’s recycling industry has more than 260 businesses with approximately 20,000 employees and an estimated annual payroll in excess of \$700 million.

Here are examples of other companies that have reduced waste and saved money:

- Bose Corporation has worked hard in recent years to increase cardboard recycling at its Blythewood facility. By installing a baler and working closely with its facility maintenance staff, Bose has more than doubled its cardboard recovery, recycling more than 760 tons of cardboard in 2003.
- Dräxlmaier Automotive in Duncan went from recycling no waste to recycling 75 percent within the course of 18 months. After conducting a comprehensive waste audit, employees determined that nearly 85 percent of the waste being generated could be recycled. By implementing an aggressive program targeting five distinct areas of operations, the company was able to realize significant savings in disposal costs and complete the first phase of ISO 14001 certification.
- Alcoa has worked for nearly 15 years to reduce the amount of waste being landfilled from its Mount Holly facility by nearly 84 percent, with a cumulative savings of more than \$1.6 million. The company has also focused on several other environmental initiatives to reduce air emissions, enhance water quality and promote environmental stewardship in its community.

“In creating B-RAP, we hoped our efforts to target businesses and track their success in recycling would lead to improvement in the state’s overall recycling rate,” said William W. Culler, director of DHEC’s recycling office. The current recycling rate, based on 2003 numbers, is about 29 percent, and the state’s goal is 35 percent by 2005.

B-RAP has an informative Web site (<http://www.scdhec.gov/brap>) and offers onsite visits, educational seminars and a number of publications designed to help businesses get a recycling program started. The program also has expanded its services to help state agencies, colleges and universities and the state’s public school system.

The S.C. Recycling Market Development Advisory Council is a Governor-appointed council that supports programs and policies to create markets for recyclable materials. As part of the Business Solutions Division at the S.C. Department of Commerce, staff provide technical and economic development assistance to recycling businesses, industry and other organizations.

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Contact: Karen Owens
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FOR IMMEDIATE RELEASE

Local Governments Connect Materials With Markets *Communities provide the frontline support that makes recycling happen*

COLUMBIA, SC – Recycling is one of South Carolina’s top environmental success stories of the past decade. And recycling works in South Carolina in large part because local governments have developed successful residential collections programs.

“There are many factors that make recycling work, but none more important than a successful local program,” said William W. Culler, director of the S.C. Department of Health and Environmental Control’s Office of Solid Waste Reduction and Recycling. “Local programs are the front line of recycling, from collecting, sorting and marketing materials to educating residents, schools and businesses in their communities. Fortunately, we have many terrific local programs throughout the state.”

In fiscal year 2003, South Carolinians generated 4.5 million tons of municipal solid waste (MSW) – better known as garbage. Of that total, about 1.3 million tons of materials – or about 29 percent of the total MSW generated – were recycled. When compared with other states in the Southeast, South Carolina has one of the region’s top recycling rates and is nationally ranked 15, according to *Biocycle* magazine’s State of Garbage in America annual survey.

According to Culler, the state began a more concentrated effort to recycle following the passage of the S.C. Solid Waste Policy and Management Act of 1991. The state’s first comprehensive solid waste management legislation set recycling and waste reduction goals and required county governments to have recycling coordinators and to develop source separation (recycling) programs.

Currently, South Carolina has 65 curbside recycling programs offered by municipal governments. Three counties – Cherokee, Pickens and Richland -- offer countywide curbside programs. Local programs provide nearly 600 drop-off sites for recyclables throughout the state. As a result, each of the state’s 46 counties contributes in some way to the state’s recycling effort.

“That’s good news for our recycling industry,” said Ted Campbell, senior manager of the state’s Recycling Market Development Advisory Council, which monitors recycling business activity. “Creating greater access for residents and businesses to recycle is critical to increasing supply needed by our recycling companies to make new products.”

The Recycling Market Development Advisory Council recently released data suggesting the state’s recycling industry generates nearly 20,000 jobs and creates an economic impact of \$1.4 billion.

There are a number of outstanding programs throughout the state. Charleston County offers curbside collection and more than 40 drop-off locations that accept a variety of materials. York County has developed extensive education and outreach programs for its residents. Horry County provides 22 staffed recycling centers and has developed one of the state’s best programs targeting businesses – a program that offers recycling collection of paper and cardboard to about 700 businesses. Greenville County works closely with its school districts to recycle paper at schools and save the district money on avoided disposal costs.

All, however, is not perfect. Local recycling programs face many challenges. Funding, of course, is an issue. “Recycling competes with other environmental programs including air quality and drinking water,” said Vic Carpenter, environmental services director for Anderson County and the county government representative on the Recycling Market Development Advisory Council. “We have to make sure we keep our costs down and monitor market prices for recovered materials in order to be effective.”

Carpenter says that education and outreach efforts play an important role in recycling’s success. “If residents don’t know what to recycle, where to recycle or why they should recycle, recycling will not work.” As a result, Anderson County has built an environmental education center that includes an outdoor classroom and meeting space so school groups and others can learn more about recycling and its benefits. The county also has a recycling educator on staff that makes presentations and develops educational materials for county residents.

Rural counties often have an obstacle that more populous counties do not. Rural counties – with their low population – have more difficulty collecting materials. Good market prices for recyclables are based on quantity (the amount of materials collected) and quality (low contamination). Barnwell County, however, overcame that challenge. The county has taken a regional approach and works with its neighboring counties to collect more recyclables. In addition, the county has worked with businesses, the hospital and schools to enhance its recycling program.

Another obstacle facing local governments is participation by their residents. “Every program is under-utilized,” Culler said. “Many residents believe recycling is working and they don’t have to concern themselves with it anymore. That’s simply not true.”

“Recycling is an important solid waste management tool for communities and there is a cost associated with recycling, just like there is for managing a landfill or operating an incinerator. But recycling saves natural resources and energy. And recycling creates significant economic benefits, lessens pollution and reduces the need to build new landfills,” added Culler.

The S.C. Recycling Market Development Advisory Council is a Governor-appointed council that supports programs and policies to create markets for recyclable materials. As part of the Business Solutions Division at the S.C. Department of Commerce, the staff provides technical and economic development assistance to recycling businesses, industry, and other organizations.

Contact: Karen Owens
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What Does the Future Hold for Recycling in S.C.?

Emerging materials, interest in sustainability helps foster recycling's visibility

COLUMBIA, SC –Old carpet. Discarded computers. Industrial byproducts. Construction debris. These are some of the emerging waste streams that companies in South Carolina are looking for opportunities to recycle rather than rely on expensive disposal options.

The S.C. Recycling Market Development Advisory Council, the Governor-appointed group that monitors recycling issues for the state, has committees that are addressing these concerns and working with companies to identify market development projects that can divert these materials from the state's landfills.

According to Milliken's Haskell Grant, who chairs the Emerging Recyclables committee and represents industry's concerns on the Council, there aren't easy answers. "Carpet is a commodity that we've struggled with for a number of years," Grant said. "There used to be a company in the Upstate that processed used carpet but the economics just weren't there to sustain it. We have seen some growing interest in recent months that indicate there may be some headway in recycling discarded carpet, but developing the collection infrastructure and sustaining supply takes time."

Nationally, 4.7 billion pounds of carpet are discarded each year, with 96 percent of it being landfilled.

Electronic waste is another issue that Grant's committee has worked on, and they've identified passing legislation to develop a statewide recycling program for electronic waste as a priority. Since 1997, the Council has advocated a system modeled after existing, successful solid waste programs for recycling motor oil, tires, white goods and lead-acid batteries. The proposed bill would place a nominal recycling fee on the purchase of new computer monitors and television sets; the collected fees would go to an environmental trust fund that would provide grants to local communities to help set up public recycling collection programs and support South Carolina's electronic recycling businesses.

"The advanced fee and trust fund scenario has worked well to recover discarded tires in our state," said Clarence Hermann, vice chair of the Council and environmental manager with Michelin. "Those funds have created markets for millions of used tires that are processed into other useful products—such as fuel, lightweight fill and drainfield applications—as well as cleaned up tire stockpiles across the state. The funds have also helped counties properly manage tires disposed in their communities." There have been similar successes with used oil, batteries and old appliances.

According to the Council's calculations, South Carolinians generate nearly 1.5 million electronic devices annually. Often referred to as e-waste, these old cell phones, computers, televisions and other electronics contain potentially toxic materials such as lead, mercury and cadmium, posing a threat to public health and the environment if not handled properly. "And given the volume of materials being generated, it's also a concern when you look at the capacity of our permitted landfills and the lack of support for siting new landfills," Haskell Grant added.

On a more positive note, a new committee charged with promoting recycling among the business community has made some progress in identifying potential reuse opportunities for high volume, non-hazardous waste generated by industry. Kohler Co. operates a manufacturing facility in Spartanburg that

makes plumbing fixtures. Some of its below-spec vitreous sinks and toilets were being targeted for possible disposal until recently.

“We have successfully recycled pottery cull at our facility in Wisconsin and have regulatory approval to do so in Texas. We approached the Commerce department’s recycling staff about implementing a similar program in South Carolina,” said Troy Stucke, an environmental manager for Kohler’s North American operations. “We were able to work with the state regulatory agency to provide analytical data on our material, and get approval to market it as an aggregate product that can be used in a number of applications. It’s a great win-win for all because we don’t have to pay to dispose of this material, and our clients get a product that serves their needs at a reasonable cost.”

Many companies across the nation have adopted sustainable practices as part of their daily operations in an effort to increase financial profitability, lessen environmental impacts and foster greater community support. In South Carolina, companies such as Alcoa, BMW and Milliken have outlined these initiatives in their corporate policies and annual reports and continue to make significant progress in all three areas.

Alcoa in Mount Holly has saved more than \$1.6 million in disposal costs by implementing aggressive recycling and waste reduction policies. The company also emphasizes being a good community neighbor through its participation and sponsorship of Berkeley County Kids Who Care About the Environment, a non-profit organization that promotes environmental stewardship to area students. Staff work with students as they participate in an annual environmental competition, demonstrating Alcoa’s commitment to making Berkeley County a great place to live.

In BMW’s recent Sustainability Report, the company highlights its commitment to sustainable business through the reduction of its packaging waste from international suppliers through the introduction of reusable containers, removing lead from its paint process to make cars more recyclable and using methane gas from landfills to generate power at its Greer plant. The automotive company has played an active role in helping address air quality issues in the Upstate.

And Milliken and Company has long been recognized in South Carolina for its zero waste policy and aggressive focus on recycling. “We are constantly implementing environmental initiatives to improve the performance of our manufacturing operations,” said Haskell Grant, a senior buyer at Milliken. “We work with our suppliers and customers to develop environmentally improved new products. And we work with our associates to demonstrate new approaches for protecting the environment.”

“By highlighting the examples of Alcoa, BMW, Milliken and others who take their business and the environment seriously, we hope to encourage others to look at adopting sustainable business practices as part of their operations,” said Ted Campbell, manager of the state’s Recycling Market Development Advisory Council. “Our recycling industry helps these companies maintain a competitive edge in our ever-changing global economy. It’s really a great partnership that helps create positive impacts on our state’s economy and environment.”

According to a recent survey conducted by the Council, the state’s recycling industry has an impact of \$1.4 billion on South Carolina’s economy, with more than 260 businesses employing 20,000 people and generating an estimated annual payroll in excess of \$700 million.

The S.C. Recycling Market Development Advisory Council is a Governor-appointed council that supports programs and policies to create markets for recyclable materials. As part of the Business Solutions Division at the S.C. Department of Commerce, staff provide technical and economic development assistance to recycling businesses, industry and other organizations.

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APPENDIX C

South Carolina Glass Recycling Feasibility Study

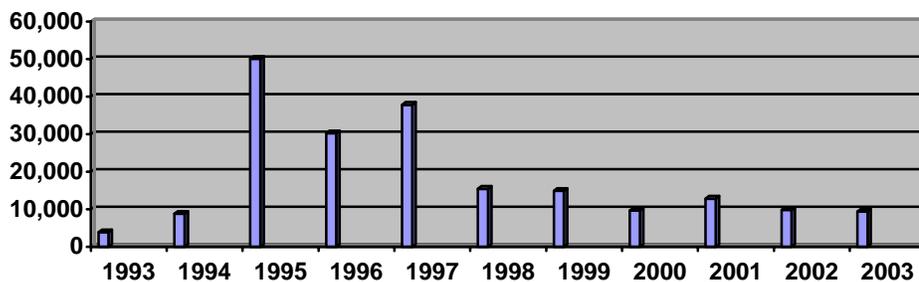
Purpose

The purpose of this study is to look at the recovery rates and potential supply of glass containers generated in South Carolina to determine if a business opportunity exists in the state to provide an alternative glass market(s) to local government and business collection programs.

Glass Recycling in South Carolina

When recycling programs were just getting started in South Carolina in the early 1990s, the state was fortunate to have a glass container recycling facility located in Laurens. In South Carolina, recovery numbers for glass reached an all-time high in 1995, with a reported 50,117 tons of glass recovered through community recycling programs. However, when the Ball Glass plant closed in June of 1996, glass recovered in residential recycling programs were sent to markets in Atlanta, GA, and Raleigh, NC, for processing into new containers. And as a result, recovery numbers have declined steadily over the years.

Glass Collection Amounts in Tons



There is sufficient demand for amber and flint (or clear) glass with the location of regional breweries and food container businesses that can use recycled-content glass containers. However, the lack of strong markets for green glass have provided local communities with a dilemma on how to handle this recovered material that often generates no income or a negative return.

Over the years, glass usage in food containers has decreased with the emergence of plastics as the preferred packaging choice for the majority of food processors.

EPA's Municipal Solid Waste in the U.S.: 2001 Report estimates the national glass recovery rate to be 22 percent. Based on the national generation rate of glass containers reported for that period, South Carolina's generation rate can only be estimated as a per capita portion of that national amount. Using the recovered glass amount reported in 2001 of 11,254 tons, the average recycling rate for glass is estimated to 7.3 percent.

There are only 31 counties currently participating in glass collection. In 2003, South Carolina collected a total of 9,430 tons of glass, with following break down:

Flint (clear)	2,713
Amber (brown)	2,152
Green	1,339
Mixed	3,226

There are a number of factors that may contribute to this low recovery rate. First, 98 percent of the glass recovered in state comes from the residential sector. But more than 40 percent of the waste generated in South Carolina comes from the commercial and industrial sectors. By increasing collection programs targeted at businesses, the glass recycling rate could rise significantly.

Another factor affecting glass collections is the recent economic downturn that resulted in many communities experiencing declines in operating budgets. Available state grant monies have also declined during this period, resulting in fewer mature recycling programs being funded in favor of helping fledgling recycling efforts. Many counties have reported that they have merely maintained existing programs or had to make cuts in services due to lack of funding. From a market perspective, there is ample capacity to accept more material but funding decreases have hampered outreach and expansion efforts.

Transportation costs can often affect glass recovery. While clear and amber glass have considerable demand and value, rising transportation costs often decrease or even eliminate profit if the distance from collection point to market increases too much. In fact many communities report that the value derived from clear and amber glass often offset the costs associated with transporting green glass to market.

Single-stream recycling programs which require that all materials are collected together discourage glass collection because recovered paper is often contaminated. Other barriers to recycling glass include color, contaminants and strict sorting requirements that increase labor costs. Additionally, broken glass frequently is not recycled because of safety concerns related to sorting this material.

Alternative Markets

In addition to recycling glass into new food and beverage containers, there are a number of other uses that have been developed over the years. By looking beyond mature container glass markets, there may be an opportunity to pursue alternative markets that have less restrictive specifications and do not require sorting by color. Some examples include

- Manufacturing fiberglass insulation, glass granular products;
- Blasting abrasive as an alternative to slag, silica sand, aluminum oxide and virgin glass beads;
- Substitute for sand as a filtration media, used in a number of applications, from wastewater treatment to drinking water filtration. The benefits of using glass include better resistance to bacteria formation;
- Substitute for other aggregates in multiple construction projects as well as in structural fill and asphalt pavements. The value of this type of market is less than other potential markets, but so are the processing requirements;

- Fused glass tiles and decorative products have high value-added potential but more rigid processing requirements; and
- Decorative and landscaping applications, such as golf course sand, aquarium sand, potting sand and cultured marble.

In order to determine the feasibility of developing an alternative market, several basic factors should be considered. This includes deciding on the availability of recovered glass, the size of the operation, necessary equipment and other associated costs.

The volume and availability of local recovered glass must be determined to ensure an adequate supply is available for the alternative market. This will take into account generation and collection rates as well as the potential to improve collection amounts.

The plan also must consider current glass market value. Next, we must determine the specifications required to process glass for targeted alternatives markets. This includes estimating market size and the value-processed glass may receive. Lastly, we have to determine the necessary components required to implement the system. This includes all necessary equipment and materials.⁵

Glass Market Pricing

The following prices paid by container glass recycling plants are based on averages reported from nine South Carolina counties.⁶

Clear \$24.50/ton
 Brown \$17/ton
 Green -\$10.50/ton (disposal costs)

Market price ranges for sand and aggregate products:

- \$0-10 for bulk aggregate
- \$20-30 for specialty aggregate
- \$100-1,000/ton for sandblasting and colored landscaping material

On-line index prices for scrap glass⁷:

- 1/8" Aggregate Glass (Andela #1) \$4.50/ton
- Mixed scrap container glass \$.50/ton
- 3/8" Flint Cullet (Andela #30) \$40/ton
- 3/8" Green Cullet (Andela #36) \$25.00/ton

Target Alternative Market

Three different glass material processing models were initially considered for this report: using all three types of glass; using just mixed, brown and green glass; and using mixed and green glass only. This last scenario was chosen as the most feasible option since clear and brown glass historically had a consistent market and positive cash flow. Aggregate and decorative landscape markets will be evaluated. The small supply currently collected in South Carolina limits our ability to consistently manufacture a product such as tile.

⁵ www.cwc.org/gl_bp/gbp2-0101.htm

⁶ DHEC Glass summary document

⁷ www.recycle.net/price/glass.html (Recycler's World)

Cost Benefit Analysis

Two operations for processing green and mixed glass are evaluated in this report. The first analysis is based on a government-operated plant that produces material for internal use such as sand and aggregate. The second plan is based on a for-profit business, selling as sand and a decorative landscape aggregate.

For the purpose of calculating operational and fixed costs, three equipment vendors were contacted. Andela Products, Ltd. was the only responsive company. The company makes equipment specifically for glass recycling operations. In this case, the GPO 5L System was determined to be the most appropriate model. It operates at three tons per hour and makes two products simultaneously, 1/8" sand and 3/8" aggregate. The \$52,000 equipment cost is amortized over seven years, at a 10 percent interest rate. Additional building, flooring, and energy costs also are factored into the analysis. Labor cost would be \$15,000, factoring in one employee to operate the machine at \$10/hour for 1500 hours/year.

In 2003, a total of 4,563 tons of green and mixed glass was collected in South Carolina. Of this total, 1,339 tons were green and 3,224 tons in mixed glass.⁸ In this analysis production output (P) of 3,645 tons is calculated after factoring in material contamination, equipment efficiency and dust loss.

⁸ State of Recycling Report FY 2002

GOVERNMENT OPERATED ANALYSIS

Operating Parameters

Hours of Operation, h		1500 hrs/yr	.41 hrs/ton
Debris content, dc			5%
System capacity, Q		3 tons/hr	
Production efficiency, e			90%
Dust generation, dg			5%
Production output, P	$(Q \cdot e) \cdot (1 - dc - dg) \cdot h$	3645 tons/yr	

Costs Avoidance

Mixed glass disposal cost, mdc	mdc*mixed tonnage	\$83,824/yr	\$26/ton
Green glass disposal cost, gdc	gdc*green tonnage	\$14,060/yr	\$10.50/ton
Avg. Sand Material Price(1/8"),sp ⁹			\$9.50/ton
Avg. Aggregate Material Price(3/8"),ap ¹⁰			\$7.10/ton
Aggregate cost avoidance, ACA	sp*(P/.5)	\$12,940/yr	\$3.55/ton
Sand cost avoidance, SCA	ap*(P/.5)	<u>\$17,314/yr</u>	<u>\$4.75/ton</u>
Total Cost Avoidance/savings, TCA		\$128,138/yr	\$37.73/ton

Variable Costs

Managerial		\$24,996/yr	\$6.86/ton
Sales & Administrative		\$24,996/yr	\$6.86/ton
Operator		\$34,620/yr	\$9.50/ton
Gas, oil, lube		\$1200/yr	\$0.33/ton
Maintenance materials		\$3516/yr	\$.097/ton
Electricity		\$600/yr	\$0.17/ton
Mobile equipment rental		<u>\$12,600/yr</u>	<u>\$3.46/ton</u>
Total Variable Cost, TVC		\$102,528/yr	\$28.13/ton

Fixed Costs

Building lease (\$1,000/mo) , L		\$12,000/yr	\$3.29/ton
Equipment, EC		\$52,000	
Amortized Life, n		7 yrs	
Interest Rate, i			10%
Amortized Cost of equipment, AC	$EC \cdot i \cdot (1+i)^n / [(1+i)^n - 1]$	<u>\$10,681/yr</u>	<u>\$2.93/ton</u>

Total Fixed Cost, TFC	AC+L	\$22,681/yr	\$6.22/ton
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Total Cost

Total Cost, TC	TVC+TFC	\$125,209/yr	\$34.35/ton
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Profit/(Loss)		\$2,929/yr	\$3.38/ton
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⁹ Sand estimates: Sumter Co: \$9.00/ton for mortar, concrete and FA13 sands; Charleston Co: \$10/ton for building sand; Avg. of 9.50/ton

¹⁰ base/aggregate estimates: Charleston Co: \$9.50/ton for Crush & Run concrete aggregate; Darlington Co: \$4.70/ton for base that it uses for road projects; Avg of \$7.10

Disposal costs are estimated by statewide tonnage figures. The average disposal cost reported for mixed glass is based on local landfilling rates at \$26/ton. Glass processors will take green glass but will not pay for it. The average cost to manage this material averages \$10.50/ton.

Total Cost Avoidance (TCA) of \$128,138 is the anticipated cost savings for implementing a government-run system, including disposal cost avoidance and savings on purchasing sand and aggregate. Total cost or expenses for this scenario are \$125,209; however, transportation costs associated with moving the material from outlying counties to a central processing facility have not been factored. A projected profit of \$2,929 indicates that there may reason to examine this scenario in greater detail, however, transportation costs for some of the glass may have to be subsidized by state or local government funding.

Business Model

The second scenario is based on a business model that would process all of the green and mixed glass generated in the state into decorative sand and aggregate, targeting landscape markets. Local landscaping businesses were surveyed to determine potential average market prices for decorative sand and aggregate.¹¹ The business analysis uses \$32/ton for sand (1/8") and \$50/ton for decorative aggregate (3/8").

Those business owners also were asked about the market potential for the product. Overall, we received excellent feedback, and the businesses seemed very interested in the product. Most companies said the product sounded good and could be used as substitutes for other recycled landscaping products such as brick and rubber mulch.

The cost variables used in this model are the same as the government sector analysis.

¹¹ The businesses surveyed include Locklair Hardware Farm & Garden Supply, Carolina Landscape Material, Appletree Landscaping & Garden Center

Glass Business Analysis

Operating parameters	Equations	per year figures per ton figures	
Hours of Operation, h		1500 hrs/yr	.41 hrs/ton
Debris content, dc			5%
System capacity, Q		3 tons/hr	
Production efficiency, e			90%
Dust generation, dg			5%
 Production, P	 $(Q \cdot e) \cdot (1 - dc - dg) \cdot h$	 3645 tons/yr	
 Product Sales/Revenue			
Sand Material Price(1/8"), sp			\$32/ton
Aggregate Material Price(3/8"), mp			\$50/ton
Aggregate Revenue, AR	$sp \cdot (p/.5)$	\$91,125/yr	\$25/ton
Sand Revenue, SR	$ap \cdot (p/.5)$	<u>\$58,320/yr</u>	<u>\$16/ton</u>
 Total Revenue, TR	 AR + SR	 \$149,445/yr	 \$41/ton
 Variable Costs			
Managerial		\$24,996/yr	\$6.86/ton
Sales & Administrative		\$24,996/yr	\$6.86/ton
Operator		\$34,620/yr	\$9.50/ton
Gas, oil, lube		\$1200/yr	\$0.33/ton
Maintenance materials		\$3516/yr	\$.097/ton
Electricity		\$600/yr	\$0.17/ton
Mobile equipment rental		<u>\$12,600/yr</u>	<u>\$3.46/ton</u>
 Total Variable Cost, TVC		 \$102,528/yr	 \$28.13/ton
 Fixed Costs			
Building lease, L		\$12,000/yr	\$3.29/ton
Equipment, EC		\$52,000	
Amortized Life, n		7 yrs	
Interest Rate, i			10%
Amortized Cost of equipment, AC	$EC \cdot i \cdot (1+i)^n / [(1+i)^n - 1]$	<u>\$10,681/yr</u>	<u>\$2.93/ton</u>
 Total Fixed Cost, TFC	 AC+L	 \$22,681/yr	 \$6.22/ton
 Total Cost			
Total Cost, TC	TVC+TFC	\$125,209/yr	\$34.35/ton
 Profit/(Loss)		 \$24,236/yr	 \$6.65/ton

A projected profit of \$24,236 indicates that there may be reason to examine this concept in greater detail.

Conclusion

The two proposals show that potential costs savings or profit may be gained by implementing a small-scale glass processing facility in South Carolina. Given these results, further analysis and a more detailed business plan for a private or public sector operation may be justified.

The following conditions or assumptions should be noted if further study is done.

- All mixed and green glass produced by local government collection programs would be accessible to the proposed facility;
- Transportation costs for a truckload of glass (40,000 pounds or 20 tons) based on an estimated \$2 per mile for an average hauling distance of 100 miles would be \$10 per ton. This may be an incentive for local governments to deliver green or mixed glass to a processing facility since the delivery costs are comparable, if not cheaper, than current disposal prices;
- Scenario does not account for the potential to increase glass volumes given the low recycling rate in the state;
- Estimates do not include additional glass that may be captured from commercial and business establishments;
- Business model does not include marketing expense for the product; and
- Business model does not include a bagging operation.

An ARF Based Electronic Product Reuse & Recycling System



Coalition Members

Hitachi America
IBM Corporation
JVC America
Mitsubishi Digital Electronics America
Panasonic (Matsushita Electric)
Philips Consumer Electronics North America

Samsung Electronics America
Sanyo Fisher Company
Sharp Electronics
Sony Electronics
Thomson Inc. (RCA)

The Manufacturers' Coalition proposes a comprehensive financing system for the management of end-of-life electronics that utilizes an Advanced Recycling Fee (ARF). The Coalition model is based on the national solution developed by the National Electronic Product Stewardship Initiative (NEPSI). The NEPSI model balances the diverse set of stakeholder interests and is supported by the great majority of participants. This model is built on three core principles:

Principle #1 A shared responsibility system should involve the active participation of the various stakeholders in ways that they can best help deliver the needed services. This includes manufacturers, government, retailers, recyclers, and the consumer. Electronics manufacturers will play a pivotal role through participating in the management of the recycling system, collecting the fee on direct sales, and providing recycling information to customers. To improve product design, the Coalition supports the development of design standards and environmental procurement criteria. Manufacturers also wish to explore how to promote the development of markets for recovered materials through product design.

Principle #2 A sustainable solution to this urgent problem must be a national system. States can contribute to a national solution by adopting consistent approaches, founded on principles of fairness and efficiency, that transition to a national system when one is implemented.

Principle #3 A comprehensive solution should assure that the end-of-life infrastructure – from local collectors and reuse enterprises through national recycling markets – is adequately funded and efficiently managed to deliver environmentally responsible, high reliability service at the lowest practical cost.

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Panasonic ideas for life

SANYO

JVC

PHILIPS

SHARP


THOMSON

An ARF Provides the Greatest Number of Benefits

- An ARF, because it provides ‘soup to nuts’ funding, will build the soundest infrastructure, provide the best service for the public, and place the least financial burden on local communities, and on consumers themselves.
- Because 100 percent of the funding is based on current sales of covered products, the ARF assures the fair distribution of financial responsibility amongst product brands. And it is fair for consumers as only users of new electronics will pay for their recycling, not all taxpayers.
- An effectively run ARF system delivers the lowest cost for consumers by employing competitive contracting for the procurement of transportation and processing, and by creating economies of scale. The system also builds on the existing local infrastructure for collection, reuse and consolidation.
- The ARF provides reliable cost coverage for the substantial historic backlog of qualifying products, including orphan products for which the brand owner is no longer in business.
- The ARF can be implemented effectively at the state level, and it will position a state to readily transition to the national program when implemented.

Key Features of the Coalition Proposal

In short, the system will include the following features:

- It will cover personal and portable computers, monitors, desktop printers and multi-function devices, and TVs from both consumers and businesses.
 - Recycling logistics and processing will be procured through competitive contracting, based on audited environmental standards, to assure the lowest cost, while providing a high level of service.
 - An ARF will provide funds for local collection and it will utilize existing businesses and organizations, offering diverse and convenient service.
 - Product reuse will be provided by local enterprises, e.g. charities, non-profits and businesses.
 - Management of the funds and contracting for service will be performed by a private, not-for-profit third party organization (TPO), in which a central role will be played by manufacturers, with the participation of retailers, government, environmental organizations and other stakeholders.
 - Public education will be provided by statewide promotional materials and local networks.
- No better public educational tool can be found than the ARF itself.

Why Not the Alternative – A Manufacturer Responsibility Mandate?

WE UNDERSTAND THE APPEAL OF THIS APPARENTLY SIMPLE APPROACH, BUT WE BELIEVE THAT IT FAILS TO DELIVER ON ITS PROMISE.

Consider:

- These proposed programs – and none have yet been implemented – generally do not cover collection costs. These costs are left for local governments, many of whom already face very difficult choices.
- The financing system needs to work well and be fair for all brands. It is a complex electronics marketplace, including large and very small companies, domestic and foreign manufacturers, long-term producers and those that come and go quickly, and branded and unbranded products. Enforcement of a mandate will be complex and costly. And inevitably some companies will escape responsibility under a “manufacturer mandate” system.
- Those who promote a manufacturer mandate promise an incentive for environmental design. Indeed, environmental design is very important. However, the financial savings to the manufacturer from improved recycling efficiencies are small, and the benefits are received many years after the sale. Moreover, in collection systems brands are mixed, and without expensive sorting, the benefits of improved design will not be experienced by those that made improvements.
- Note that the companies that promote a manufacturer mandate, those with the largest current market share, will experience competitive advantage by going it alone. The companies that most need a design incentive, small and foreign brands, will work through collectives, which would blunt any design incentive.

In sum, a manufacturer mandate leaves local communities with a new financial burden, fails to deliver a design incentive for industry, will be problematic to enforce, and unfairly advantages the large market-share producers and newer market entrants.

Manufacturers' Responsibilities under the ARF

Some say that the ARF lets producers off the hook.

On the contrary, manufacturers propose to play several important roles to make the ARF system work:

- Participate in managing the system through the TPO.
- Provide information directly to customers on proper end-of-life management, through notices in product literature and on corporate web sites.
- Improve product design by adopting new worldwide standards to eliminate toxics.
- Participate in the creation of an environmental purchasing label, such as the Electronic Product Environmental Assessment Tool, especially for government and institutions.
- Assist recyclers with information on product features that will affect end-of-life management.

Members of the Coalition recognize that there are complexities in an ARF, such as coverage for internet sales and the formation of a private TPO. The members are committed to seeking a fair and equitable distribution of the ARF that captures 100% of covered products and that firmly establishes fair market conditions.

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Electronic Collection Survey Results (Grand Totals)
April, 2004 Dell Sponsored

1. How did you find out about this event?

Flier - 17
Radio - 57
TV - 304
Newspaper - 478
Internet - 67
Other - 94

Total surveys completed --- 1017

2. Number of items brought:

CPU - 829
Keyboard - 546
Fax - 54
VCR - 166
Monitor - 761
Mouse - 290
Copier - 36
Printer - 429
Scanner - 56
TV - 297
Cell phone - 238
Fluorescent bulbs - 80
Printer cartridges - 62
Rechargeable batteries - 167
Other - 576

Roughly 25% collected was TV and monitors

3. What would you have done with your electronics if this event had not been held?

Trash - 270
Return to manufacturer - 13
Charity - 163
Continue to Store - 470
Other - 46

4. What is the most convenient way for you to recycle your electronics if the following options were available?

Recycling Center - 657
Back to manufacturer for a fee (\$30) - 3
Retail - 90
Charity - 182
Other - 38

5. How frequently would you recycle electronics if services were available?

Once a year - **486**

Twice a year - **181**

More than twice a year - **59**

Year-round - **126**

Never again - **6**

6. Are you aware that in S.C. a fee is collected at the time of purchase on tires, motor oil, car batteries and appliances to fund recycling programs?

Yes - **701**

No - **168**

7. Would you support a similar fee being placed on electronics?

Yes - **595**

No – **261**

Not Sure - **37**

About 67% supported paying advance recycling fee