

# **Strengths, Weaknesses, Barriers and Opportunities Workpaper**

**Pennsylvania Markets Center Study**

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# PA DEP RECYCLING MARKET DEVELOPMENT

## Strengths, Weaknesses, Barriers & Opportunities

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# Workpaper on Strengths, Weaknesses, Barriers and Opportunities to Recycling Market Development

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## Introduction

R.W. Beck researched the strengths, weaknesses/barriers and opportunities to successfully marketing each recyclable material examined in the Recycling Market Development Study. This working paper is submitted to fill the requirements of Task 5 of the PA Market Development Study. The following materials were examined:

- Organics (Food waste, yard waste, and leaf waste);
- Paper;
- Steel and Aluminum Cans;
- Glass;
- Plastics; and
- Electronics.

Some strengths, barriers/weaknesses and opportunities apply to several or all of the commodities. These are discussed in the section entitled, “Non-Commodity Specific.”

## Methodology

Strengths, weaknesses/barriers, and opportunities were divided into the following categories:

- Infrastructure/Operational;
- Economic;
- Educational/Informational; and
- Regulatory/Policy.

In some cases a particular strength, weakness, or opportunity might actually fall into more than one category. In these instances, R.W. Beck chose the most relevant category, in the interest of avoiding redundancy.

The information contained in this report was obtained through telephone interviews, in-person discussions, the Recycling Market Development Summit, and by drawing upon the knowledge R.W. Beck has gained from other similar U.S. projects. As such, the perspectives of processors, end users, recycling coordinators/managers, DEP officials, and trade association representatives, among others, are represented in this report.

## Non-Commodity Specific

There are several issues and factors that apply to several commodities. These are described below.

### Strengths

#### Economic

- Grant opportunities exist for municipalities, to help fund recycling programs.

#### Infrastructure/Operational

- In urban parts of PA, the transportation network is strong.
- Some municipalities have successfully formed cooperative programs to jointly market materials.
- Several universities exist in Pennsylvania, which provide opportunities to recover a relatively high volume of recyclables in an efficient manner.

#### Informational/Educational

- Many knowledgeable and experienced recycling coordinators work at the municipal level.
- Several organizations exist that can be of assistance to recycling businesses and suppliers, such as PROP, MACREDO, Pennsylvania Municipal Authorities Association, and PRC.

#### Regulatory/Policy

- Proactive DEP and legislation (Act 101) exists to support recycling efforts.

### Weaknesses/Barriers

#### Economic

- The private sector is not eligible for grants that public-sector entities can receive. Private recyclers/processors feel that this puts them at a disadvantage.
- There is no real incentive for in-state producers to purchase from in-state suppliers. Purchasing decisions are based upon quality, price, and relationships.
- Market price fluctuations hamper the ability to budget properly. These occur due to global impacts, and are difficult to influence at the state or local level.
- Several recycling programs exist that have relatively small quantities of material and are trying to market their materials independently. This may not be the most efficient use of resources.

## Strengths, Weaknesses, Barriers and Opportunities

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- Many material marketers are shortsighted, and sell to the highest bidder. If they sell consistently to overseas markets, this does not support the domestic infrastructure.
- Waste disposal tipping fees in Pennsylvania are relatively low, thereby limiting the economic incentive for waste diversion through recycling.

### Infrastructure/Operational

- The transportation network is not adequate in rural areas. It is difficult to take advantage of backhauls.
- Processing centers are not always efficient – some have relatively small volumes, which also hinders bargaining power when selling materials.

### Educational/Informational

- Many counties lack coordinated recycling efforts (some counties, for example, do not have recycling coordinators on staff).
- Contract administrators and procurement officials need more information on bidding contract pricing, to minimize risk.
- There is always the need to continue and/or expand educational efforts.
- In many instances the “low hanging fruit” has been picked, and municipalities are going to have to get more creative and resourceful to further increase recycling.
- Simply stating, “tons recycled” is no longer adequate. Program needs to find more creative means of benchmarking successes. Simply stating, “tons recycled” is no longer adequate. Programs need to find more creative means of benchmarking successes.

### Regulatory/Policy

- Other Act 101 requirements are not fulfilled – e.g. mandatory programs.
- Act 101 addresses specific materials and does not address opportunities to recycle other materials that are prevalent in the waste stream, such as construction wood waste and food waste.
- PA DEP waste and waste management regulations refer to PENNDOT standards for aggregate uses, which may in turn refer to ‘PENNDOT certified stockpiles.’ Contractors, therefore, are hesitant to use alternative materials in construction and water filtration projects.

## Potential Opportunities

### Economic

- Develop a statewide or regional recyclable materials marketing system to increase market leverage.
- Develop economic incentives for in-state consumers of recyclable commodities to purchase materials from in-state sources.
- Develop economic incentives for in-state suppliers of recyclable materials to sell to in-state markets.
- Encourage State agencies to work with individual PA-based mills and other end users to enhance the economic viability and competitiveness of existing PA recycling end markets.
- Link Performance Grants with actions on the part of the grant recipients that lead to measurable increases in recycling as opposed to their measurement of recycling activities that would be occurring without any government involvement or assistance.
- Consider requiring grant recipients to show a return on the State's investment.
- Implement a revolving loan program with the help of economic development groups; in general, support recycling businesses from an economic development perspective.

### Infrastructure/Operational

- Work toward more cooperative processing to standardized materials production and increase the tonnage- of materials meeting certain specifications available for market, thereby improving efficiencies of scale and market leverage.
- Encourage the establishment of public/private partnerships, via provision of incentives and facilitation assistance.
- Provide information exchange forums to Facilitate business transactions between feedstock suppliers and end users.
- Encourage local governments to make collection of recyclables mandatory when establishing franchise agreements for the collection of solid waste.

### Educational/Informational

- Promote regional cooperation as an aid for long-term planning and budgeting.
- Involve agencies that can provide economic and/or technical assistance to recycling businesses. PennTap, for example, can provide expertise in specific areas, to help businesses overcome technical problems.

## Strengths, Weaknesses, Barriers and Opportunities

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- Learn from what other states have done in establishing market development programs.
- Provide regional forums to facilitate education on needs and issues with respect to collection, processing and marketing of recyclable materials.
- Promote more non-traditional local uses for materials, particularly in rural PA, as many of these uses are small-scale in nature.
- Encourage end-users to pay a premium for high-quality materials generated by PA MRFs.
- Create “brand support” for recycled content products, and promote the use of recycled content to potential end users.
- Look at NERC relationships with end users, and use as a model to transfer in PA.
- Create consumer demand for products made with recycled content by targeting large quantity buyers and distributors, such as Home Depot and Office Depot. Encourage manufacturers to use more recycled content in manufacturing their products. At the same time, learn from them about issues and barriers that limit the amount of recycled content in their products or the amount of feedstock they are able to purchase from in-state sources.
- Develop a Recycled Content Product database to facilitate procurement of recycled content products.
- Encourage the manufacturing sector to design for recyclability.
- Develop better means of measuring the impact of specific recycling programs and recycling market development efforts to determine best practices and help secure future funding.
- Keep industry, economic development, and state agencies, involved in the recycling market development loop.
- Establish a peer-match program to provide a means by which recycling professionals can learn from each other, particularly with respect to lowering costs of operations and processing recyclable materials.

### **Regulatory/Policy**

- Advocate enforcement of federal as well as state recycling and recycled product procurement requirements.
- Re-visit Act 101 to determine if the act should be expanded to address additional materials.
- Consider requiring State agencies and divisions (e.g. PENNDOT) to use recycled content materials and products.

### Organics (Food/Leaf/Yard Waste)

Leaf waste is a Commonwealth of Pennsylvania Act 101 material. Therefore many Pennsylvania municipalities offer residents the opportunity to bring their leaf and yard waste to municipal operations that compost the material. Many municipalities also host backyard composting education programs. In addition, there are several private compost operations throughout the Commonwealth. Leaf waste is more commonly collected than other yard waste. Food waste diversion programs are minimal. There are only two companies operating in Pennsylvania that use food waste as feedstock in composting operations. The Commonwealth does not have a general permit issued to date that allows the use of non-vegetative food waste as feedstock in composting operations, or from post-consumer sources.

### Strengths

#### Infrastructure/Operational

- Strong (nearly infinite) supply of raw material is available.
- Several food banks operate in Pennsylvania, offering opportunities for food “reuse” for consumption – particularly in densely populated areas.
- High-quality feedstock is available.
- Privately owned composting operations as well as publicly owned processing facilities (mainly processing yard waste and leaves) have emerged.
- Models exist where food waste programs are successful. For example, Woodhue Limited, of New Jersey, composts food from grocery chains; San Francisco has a successful residential food waste composting program; and Orange County, North Carolina, has a successful commercial composting program.
- The U.S. Composting Council has already implemented a Seal of Testing Assurance (STA) program, which tests compost, thereby helping to ensure consistent quality composted products.

#### Educational/Informational

- Many potential contributors to food banks are hesitant to donate food, due to liability issues, despite the fact that they are protected by The Good Samaritan Act.
- Backyard composting classes have been well attended and indicate that there is an interest in using compost.
- The general public is becoming educated about compost and willing to use composted materials. Composting food waste may be a logical next step.

- Programs exist that have successfully implemented large-scale composting programs (e.g. San Francisco), which could serve as model programs.
- Composting classes (for processor) are available through PROP.

### **Economic**

- Processors indicate that the landscaping market is strong.
- Composting can be cost-effective in some areas (e.g. to avoid landfill tip fees).
- Some of the municipal composting programs routinely have an oversupply of compost.

### **Regulatory/Policy**

- PA DEP has a General Permit process for composting facilities. This means that qualifying new businesses only have to apply for a Determination of Applicability, which is a much shorter process than requesting a permit.

## **Weaknesses**

### **Infrastructure/Operational**

- Food banks often do not operate in rural areas.
- There appears to be an insufficient number of processing facilities for composting in some regions of the Commonwealth.
- Many communities, especially in rural areas, find curbside collection of yard/leaf waste to be cost prohibitive. Instead, they may have drop-off programs for leaf waste. This is cumbersome to residents and less likely to be used than a curbside program.
- The infrastructure is not in place for facilities to collect and process food waste.
- There is a need to “link” end users with processors.
- Municipal composting operations may compete against private operations.
- The collection and processing infrastructure for food waste is currently inadequate and poses challenges. For example:
  - Materials can be heavy/full of moisture — compaction to reduce moisture and weight can create odor issues.
  - Space for additional waste receptacles can be an issue.
  - Food waste may attract vectors.

## PA DEP Recycling Market Development

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- Frequency of collection can be an issue (collection must be frequent to minimize odor issues, however, this is not always cost-effective).

### **Educational/Informational**

- Peer training, certification and other means of improving the skills and practices of professionals in the industry are needed.
- Differences between “compost” and “mulch” must be made clear to end-users.
- Must overcome “bad history” regarding product performance and quality.
- Must overcome perception that material is a waste byproduct versus a commodity.
- Benefits of improving soil quality using composted materials need to be promoted.
- Sustainable landscaping philosophy actually reduces use of compost/mulch in a specific location, but can also lead to increased awareness of the benefits and uses of composting/mulch.

### **Economic**

- The public sector competes with the private sector – however the private sector is ineligible to receive State grants.
- Bulk versus bagged – Bagged product is more attractive to some end users, and bagging equipment requires further investment and the corresponding retail market requires more sophisticated marketing campaigns.
- Need to develop new, large end users, for example:
  - Land reclamation;
  - Mine reclamation;
  - Brownfields; and
  - Erosion/soil reclamation.
- Compost competes with established alternatives, such as chemical fertilizers – some potential users are hesitant to change.
- Different consumers require different marketing efforts at an added expense, for example:
  - Commercial;
  - Residential; and
  - Governmental.

## Strengths, Weaknesses, Barriers and Opportunities

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- The costs associated with permitting/bonding processing facilities can be onerous.
- Out-of-state materials may compete with in-state materials, particularly close to state borders, due to higher tip fees in surrounding states (e.g. NY).

### **Regulatory/Policy**

- Burning of leaf and yard waste is still allowed – a disincentive for implementation of leaf/yard waste recycling programs.
- Permit/bonding requirements can be overly stringent, essentially acting as a barrier to market entry and excessive financial burden, according to processors.

### **Potential Opportunities**

#### **Infrastructure/Operational**

- Implement a pilot project or demonstration project in this arena (e.g. using food waste as feedstock in a composting operation). Regional pilot or demonstration projects were suggested.
- Mandate certification of processors.
- Conduct more frequent and consistent inspections of processing facilities (currently they are inspected at least once per year, if problems, more often).
- Mandate certification of compost facility inspectors (currently there is no certification requirement, however, inspectors take the composting course offered by PROP).
- Expand technical assistance programs to composting operators.
- Neighboring communities could work together to form a multi-jurisdictional composting facility, share chipping equipment or share leaf vacuuming equipment.

#### **Educational/Informational**

- Educate potential donors of food for reuse about the potential to donate food, and the fact that they are protected from liability under The Good Samaritan Act.
- Publish a food bank and food rescue directory and distribute it to commercial generators of consumable food.
- Appoint an Ombudsman to address issues, or Recycling Markets Center could serve as Ombudsman.
- Piggyback educational efforts on current waste diversion educational efforts.
- Educate consumers regarding the benefits of utilizing composted products.

## PA DEP Recycling Market Development

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- Link education efforts to sustainable landscaping concepts.
- Use Earth Day more effectively in education campaigns.
- Use television to promote composting.
- Establish outreach requirements for all grant recipients – a peer match program was suggested.
- Promote the U.S. Composting Council’s STA program.
- Include sustainable practices – e.g., the use of soil amendments and mulch could reduce need for chemical fertilizers and frequent watering – in promoting compost.

### **Regulatory/Policy**

- Require the use of composted materials in State projects, possibly by executive order, to maximize use of compost. Examples include:
  - Mine reclamation;
  - Highways;
  - Erosion and sedimentation control; and
  - Growing Greener projects.
- PA DEP can change bonding requirements so that initiating a composting business is less onerous.
- PA DEP can expedite the general permitting process, such that the first facility to use a new type of general permit does not have to wait for months to be permitted.

### **Economic**

- Explore the possibility of changing legislation such that the funding algorithms for 904 grants could include yard waste.
- Work with economic development organizations to promote and seek business assistance for composting businesses.
- Reduce financial burdens associated with bonding requirements for composters.

### Paper

There are three types of paper that are on the Act 101 list of materials: ONP, OCC, and high-grade office paper. There are several end users for recovered paper in Pennsylvania – particularly boxboard manufacturers, and alternative users of newspaper (insulation and gypsum board). Most of the fiber recovered in the state, however, is transported out-of-state for consumption. There have been several mill closures in Pennsylvania in recent years; however finding end markets for fiber products has not been an issue for MRF operators. Fiber markets are impacted significantly by global factors. The collection and processing (MRF) infrastructure in the Commonwealth is amenable to all fiber grades; however not all municipalities collect and market the same fiber grades.

### Strengths

#### Economic

- Export demand is increasing – having a positive impact on prices for secondary materials.
- Pennsylvania is in a good location for exporting, relative to many other states (e.g. those in the Mid-west) in that many PA suppliers can economically transport truckloads of paper to New York City ports.
- There is a demand for recovered paper – it is not difficult to find a market for clean recovered paper materials.

#### Operations/Infrastructure

- There is a good supply of recovered paper in PA, and good collection systems in place.
- There are a number of paper mills located in PA.

### Weaknesses/Barriers

#### Economic

- Global implications may reduce paper production in North America, thereby lowering domestic recovered paper demand. There is a strong potential for Asian paper manufacturers to flood the market with low cost paper products, resulting from over production, thereby displacing demand for domestically produced products.
- Mothballed mills in Pennsylvania are not expected to reopen, and others may be shuttered.
- There is no incentive for PA mills to buy feedstock from in-state sources.

## PA DEP Recycling Market Development

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- Transportation costs are high in the more rural areas of PA although transportation is economical in the urban areas.
- Dissemination of State grant money to support public sector infrastructure development may be a disincentive for public/private cooperation.
- It is not economically efficient for some paper grades to be collected and marketed in some locations. Collecting office paper in the rural areas, for example, is often not economically feasible.

### **Operations/Infrastructure**

- A lack of standardization with respect to the types of paper collected limits the ability to cooperatively process and/or market materials.
- Many processing facilities produce varied materials meeting different specifications, thereby further limiting regional cooperation in marketing materials and supplying designated end users.
- Mills often have different specifications, and tolerances are subject to change as commodity prices fluctuate, which places a burden on the processor.
- The emergence of single-stream programs in PA could have a negative impact on the marketability of recovered paper if glass is collected along with the paper in the same compartment.
- Small-quantity marketers do not have as much bargaining power as larger marketers, which is an issue particularly in rural PA.
- Residential mixed paper is under-recovered in PA.

### **Education/Informational**

- Alternative uses for paper need to be researched/developed and made known to the public, as well as to materials marketers.
- There is a need to develop dialogue between recyclables collectors, processors, and end users, so that each can understand the others' needs.
- There is concern among some recycling stakeholders in PA that Pennsylvania may take an educational “backstep” because of the emergence of single-stream programs in PA and the fact that such programs do not expect residents to separate recyclables by type of material.
- Preliminary waste composition data indicates that there is still a significant amount of paper being disposed, rather than recycled in Pennsylvania.

### Potential Opportunities

#### Economic

- Work with in-state mills to develop incentives to keep them operational in Pennsylvania.
- Work to attract alternative end users of recovered paper to establish production facilities in PA.
- Smaller processors/marketers can work together to gain bargaining power, and perhaps share warehouse space.

#### Infrastructure/Operational

- Collect more types of recovered paper at drop-box locations.
- Move toward greater standardization of the types of recovered paper collected and processed throughout the state.
- Ensure that colleges and universities have infrastructure in place to recycle paper.
- Pursue opportunities for collecting, processing and marketing more residential mixed paper.

#### Educational/Informational

- Facilitate communication between mills and processors – e.g. develop a newsletter to keep mills and MRFs in communication with each other. MRF managers/materials marketers would be better able to understand end markets and better plan for the future.
- Given the prevalence of source separation based curbside recycling programs in PA, promote the use of PA recovered paper as a premium feedstock.
- Promote “Buy Recycled,” for paper, particularly with State agencies, as well as with county and city-level offices. Perhaps issue an executive order to increase use of recycled paper by State agencies and institutions.

### Steel and Aluminum Cans

Steel and aluminum cans are both Act 101 materials. By and large, recycling programs have been set up to include the collection and processing of these materials, as they are financially viable to recover. Pennsylvania has historically been a heavy steel production state. Aluminum, however, is generally sold to out-of-state end markets, although there are some end-processors of aluminum ingot located in Pennsylvania.

## Strengths

### Economic

- Steel and aluminum are, and have historically been, relatively high-priced commodities, often supplementing the cost of recycling other materials.
- End markets are consistently available.
- The “rebirth” of the manufacturing industry is expected to have a positive impact on prices.

### Infrastructure/Operational

- The recovery and processing infrastructure for steel and aluminum cans is well developed.

## Weaknesses

### Economic

- Pricing is volatile due to global factors that are beyond the control of PA stakeholders.
- Aluminum and steel cans are becoming less commonly used – less available in secondary market.
- Excise taxes on steel imports may not have a significant positive impact on steel prices.

## Potential Opportunities

### Infrastructure/Operational

- Expand opportunities for recycling aluminum cans at points-of-consumption.

### Educational/Informational

- Develop educational information promoting recycling that informs Pennsylvanians of the dollar value of aluminum cans disposed last year – perhaps putting it in the context of the cost of other programs that residents clearly value.

## Glass Containers

Glass containers are listed as two materials (colored and clear) on the list of Act 101 materials. Glass is a relatively low value commodity that is not always cost-effective to transport and process to make furnace ready. Glass manufacturers located in-state (and in nearby southern New Jersey) indicate that they have a strong demand for glass – particularly flint. They often, however, prefer to source their feedstock from bottle-

bill states, as that material is cleaner, and therefore free of contaminants that could damage the batch of glass, or the furnace itself. Because the alternative virgin materials are not that costly, the price for secondary glass will always be relatively low. Over the years, glass containers have been losing favor to plastic; however, there are some applications in which glass will always be preferable. Several MRF operators and recycling coordinators stated that finding suitable markets for mixed cullet is their largest issue.

### Strengths

#### Infrastructure/Operational

- Glass markets are available in PA.
- Beneficiators are located in PA.
- Alternative uses for mixed cullet exist, and several models exist where municipalities are successfully recycling glass in these alternative ways. In some cases (such as in water filtration applications) glass actually outperforms the traditional material (sand).
- Pilot projects have been conducted in PA using glass cullet in the construction of roadbase – “glassphalt” – showing a willingness to examine the alternatives.

### Weaknesses/Barriers

#### Economic

- Prices for secondary glass have been weak – even for flint.
- Collection and processing often results in mixed broken cullet, which is often not cost-effective to transport and/or process to furnace-ready specifications.
- Alternative applications for glass compete with aggregate, which is plentiful and therefore relatively low-cost in Pennsylvania.

#### Regulatory/Policy

- PA DEP waste and waste management regulations refer to PENNDOT standards for aggregate uses, which may in turn refer to ‘PENNDOT certified stockpiles.’ Contractors, therefore, are hesitant to use alternative materials in construction and water filtration projects.

#### Educational/Informational

- There is a perception among some stakeholders that the aggregate industry is threatening to raise aggregate prices if the State and municipalities promote the use of glass in ways that compete with aggregate use.

## Infrastructure/Operational

- Glass can be damaging to MRF equipment – causing excess wear and tear and therefore increasing maintenance costs.
- Glass, particularly in single-stream recycling programs, can become embedded in paper, thereby potentially decreasing its marketability or damaging equipment at the consuming paper mill.
- Some pilot projects using mixed cullet as feedstock were not successful due to the supplier not meeting PENNDOT specifications.

## Potential Opportunities

### Infrastructure/Operational

- Facilitate cooperative purchasing and use of glass crushers by PA communities.

### Regulatory/Policy

- Have the State use ASTM standards rather than PENNDOT standards in regulations relevant to alternative uses for glass.

### Educational/Informational

- Educate PENNDOT engineers and contractors on alternative uses for glass cullet.
- Provide examples of specific projects where cullet has been used successfully in various applications.
- Work to obtain understanding on the part of the aggregate industry that using glass in typical “aggregate” applications will not impact the magnitude of their business in-state to a significant degree.

## Plastics

Plastics are an Act 101 material. There are several end markets for post-consumer plastics located throughout Pennsylvania. In particular, these manufacturers consume PET and HDPE bottles (coded #1 and #2). In addition, some plastic lumber manufacturers have started businesses in Pennsylvania. This industry can often utilize some plastics #3-#7, for which there is generally relatively low demand. The growth in the plastic lumber and plastics composite industry is expected to increase the demand for film plastics.

## Strengths

### Economic

- PET and HDPE are relatively high-value commodities on a dollar-per-ton basis.

## Strengths, Weaknesses, Barriers and Opportunities

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- It is generally not problematic to find end markets for HDPE and PET bottles.
- Virgin resin prices are currently on the rise, which is expected to have a positive impact on secondary plastic prices.
- The phase-out of CDC-treated lumber is expected to have a positive impact on the composite lumber business, which has already been experiencing high growth in 2002.
- Trex is duplicating its Spanish recycling operation in the U.S (Winchester, VA), which will allow it to accept streams of plastic bags that include food contaminants, etc. This facility is expected to be operational by early 2003.
- AERT, another manufacturer of plastic lumber, expanded its production in 2001 and plans to further expand its plastics reclamation and production capability throughout 2002.
- Trex expects to have to source much of their feedstock from other nations, because they don't expect U.S. supply to meet demand.
- Pepsi and Coca-Cola's promises to increase recycled content may help support the price of post-consumer PET.

### **Infrastructure/Operational**

- Most residents have the opportunity to recycle #1 and #2 plastic bottles through their drop-off or curbside programs.
- Some supermarkets offer recycling opportunities for plastic bags.

### **Educational/Informational**

- Plastics manufacturers are working closely with the Association of Post-Consumer Plastics Recyclers (APR) to try to limit the plastic resins used in manufacturing containers to #1 and #2, to the extent possible.

### **Weaknesses/Barriers**

#### **Economic**

- The growth of post-consumer plastic prices is limited, because virgin plastics are a readily available substitute for post-consumer plastics.

#### **Educational/Informational**

- The plastics numbering system (e.g. #1 bottle vs. #1 tub) is often confusing to residents, and they are not sure what is recyclable.
- Pennsylvanians are still landfilling a considerable amount of plastics.

### Infrastructure/Operational

- Some municipalities do not offer the same recycling opportunities for plastics as they do other program recyclables. (In Philadelphia, for example, plastics are only collected via drop-off locations, not curbside.)
- There are still many venues, such as recreational events and point-of-sale locations, where recycling opportunities are lacking. Primarily, for plastic beverage bottles.
- Sorting plastics is labor-intensive, and in some programs the costs may not be justified.
- Many types of plastics are used, not all of which are commonly recycled.
- Some plastics are multi-layer, or include nylon barriers, which can be problematic to recycle (e.g. sports drinks).
- Many products are being marketed in different-colored containers, the recyclability of which is limited (e.g. purple ketchup bottles).
- Plastics can be challenging to process and good baling equipment is required – the material is voluminous but light.

### Potential Opportunities

#### Infrastructure/Operational

- Pursue opportunities to source more film plastics from both residential and commercial sectors.
- Assist communities in pooling their plastics commodities to help increase their prices, ship materials more frequently, thereby freeing up storage space.
- Sell mixed plastics bales to facilities that have optical scanning equipment. For some MRFs, this might be more cost-effective than sorting plastics.
- Promote sharing of processing facilities (and baling equipment), to reduce processing facility redundancy.
- Expand recycling at point-of-consumption venues, such as sporting events, festivals, convenience stores, etc.

### Electronics

Electronics are not an Act 101 material, however R.W. Beck was asked to examine the strengths, weaknesses, barriers and opportunities in electronics recycling as part of this project. Electronics recycling is a growing field, and to a large extent the infrastructure for recycling electronics in Pennsylvania is still being developed.

## Strengths

### Economic

- There are markets for the end materials, such as aluminum, copper, and other metals, and usually the plastics can also be sold.
- Recycling electronics has the potential to be a sustainable business – some such businesses are quite profitable.
- The re-use potential for electronics can be strong for corporate computers.
- In some cases, electronics manufacturers or retailers will co-sponsor recycling collection events, helping to offset the cost.

### Infrastructure/Operational

- Several communities have already held computer recycling events and recycling coordinators are generally pleased with the results – (e.g., Centre County, Lackawanna County, Westmoreland County, Cumberland County).
- There is a CRT glass processor (“glass-to-glass facility”) located in Susquehanna County, PA (Envirocycle) – one of a handful in the Country.

### Regulatory/Policy

- State in process of developing permitting requirements for electronics processors.

### Educational/Informational

- Residents that are aware of issues with recycling electronics seem very interested in “doing the right thing.”

## Barriers/Weaknesses

### Economic

- Recyclers state that many residents are still unwilling to pay to recycle their electronics.
- Private recyclers have to compete with prison-based recycling programs – not competing on a “level playing field.”
- Collecting used electronics from the residential sector is not economical – low reuse potential and high collection costs, particularly in rural or low-density areas.
- Recyclers say that their profit margins are low, which creates a degree of vulnerability in recovering and processing electronics.

## **Infrastructure/Operational**

- Some recyclers do not properly handle the potentially hazardous materials they collect.
- Schools and governmental entities often treat computers as they would other equipment or furnishings that they no longer use – auction them off, send to a warehouse, offer to public. Often resulting in improper end of life management.
- Software licensing issues exist with computer reuse.
- Data security issues exist with computer donation/reuse.
- Some recyclers feel that landfill operators have no incentive to disallow electronics, because they are often relatively large, heavy items, which means more revenue for landfills.
- Questionable environmental practices have been uncovered with electronics exported to recycling operations in third world countries, especially China.

## **Educational/Informational**

- Several recyclers and recycling coordinators stated that residents can be shortsighted, and don't understand that there are costs associated with recycling used electronics – particularly CRTs.
- Many residents do not understand that electronics, especially CRTs, can be hazardous when disposed improperly.
- Many information/technology professionals are not aware of the potential hazards of improperly disposed electronics, nor the costs associated with proper materials handling.

## **Regulatory/Policy**

- Pennsylvania has no landfill bans on electronics from either the residential or the corporate sector.
- There is no disincentive to dispose of electronics improperly. Recyclers state that they have even seen computers being disposed in corporate dumpsters with no repercussions.

## **Potential Opportunities**

### **Economic**

- Establish partnerships between private recyclers and prison programs as one recycler in PA is currently doing.

- Establish cooperative electronics collection programs between local governments to enable cost sharing and better economies of scale.
- Develop partnerships between local governments and electronics retailers or manufacturers to share the costs of electronics recycling.

### **Educational/Informational**

- Educate students in technical school settings about the need for proper electronics end-of-life management.
- Educate corporate IT professionals about the need for proper electronics end-of-life management.
- Provide education to the public regarding electronics recycling programs, as well as mail-in programs, which may provide more timely opportunities for some residents.