European Union vs. the United States: Recycling Policies and Management

By

Michael D. Bolan

Submitted in Partial Fulfillment of the Requirements

for the Degree of

Master of Science

in the

Environmental Studies

Program

YOUNGSTOWN STATE UNIVERSITY

May 2009

European Union vs. the United States: Recycling Policies and Management

Michael D. Bolan

Signature:

Michael D. Bolan, Student Date

Approvals:

Dr. Alan Jacobs, Thesis Advisor Date

Dr. Cynthia Hirtzel, Committee Member Date

Dr. Isam Amin, Committee Member Date

Dr. Ganesaratnam K. Balendiran, Committee Member Date

James R. Petuch, Committee Member Date

Peter J. Kasvinsky, Dean of School of Graduate Studies & Research Date

European Union vs. the United States: Recycling Policies and Management

Abstract

KEYWORDS: Recycling, Regulations, EU/USA differences.

Recycling diverts municipal solid waste (MSW) from landfills and preserves valuable resources by converting waste material into useful commodities. The concept of recycling materials of value is not new; however, it has become important in MSW management because of economic and environmental issues. Increasing the amount of recycled waste preserves natural resources by reducing the need for more and more landfills. The recycling activities from two study areas, Pordenone Province, Italy and Mahoning County, Ohio, United States of America (US) were considered to evaluate the inducements each area uses to maximize efforts for recycling. Italy is a member of the European Union (EU) and when comparing the percentages of the amount of waste that is recycled versus waste that is incinerated or landfilled among the EU countries, Italy ranks in the middle (Figure 1.0). The EU regulates the recycling management policies for Italy. Mahoning County, Ohio also has an established recycling program, defined by the federal and state Environmental Protection Agency. There are three specific recycling influences: regulations, regularity of MSW pick-up, and economics. Data were collected over three (3) years (2004-2006). Regulations exerted the greatest influence over recycling behavior in Italy followed by economics and regularity of pick-up services. Economics had the greatest influence on recycling in the US, followed by regularity of pick-up and finally regulations. Although waste generation (per capita) in the US is much greater than in Italy, the percentage of waste that US recycles is less than in Italy. This study examined the effectiveness of recycling practices in each study area and determined that practices from one country could be effective in the other and vice versa.

Acknowledgements

I would like to thank Dr. Alan Jacobs for his support and encouragement over the past few years. Without his steady guidance I would not have accomplished the goals of my graduate career. I likewise thank Dr. Cynthia Hirtzel and the YSU faculty for opening the doors of wisdom, understanding and kindness. Messrs. Jim Petuch, and Dan Kuzma and Drs.Felicia Armstrong, Carl Chuey, Friedrich Koknat, and Daryl Mincey willingly assumed the task of educator, mentor, and friend and for that I am truly grateful and humbled. I also extend my sincerest thanks to residents of the Pordenone Province communities in Italy and particularly Alessandro Medici, and the residents of Roveredo-in-Piano. Last, but certainly not least, I extend my heartfelt thanks to Amanda Kotheimer, Rick Cuckovich, and Tom Rudnicki. Your gentle guidance through this process of compilation and revision is commendable in itself, only more than that, I appreciate your excitement and energy for life and the embodiment of the American Spirit. Others also, too numerous to mention including family and friends, have my life-long gratitude for the role they played in my life.

Table of Contents

List of Figures

List of Tables

1.0 Introduction

1.1 Statement of Hypothesis

The greatest inducements for diverting a portion of MSW from landfills to recycling are: regulations, regularity of pickup, and economics. The ranking of the effectiveness of these inducements in Italy is different from that in the US because of factors that this thesis brings to light.

1.2 History of Waste Management Practices

In the order of least to best waste management practices, are: (1) indiscriminant dumping, (2) scavenging from landfills, (3) disposal/waste isolation, (4) landfilling, (5) incineration, (6) recycling of waste into other useable products, (7) reusing waste as products through materials exchange or reuse of empty containers, (8) reducing waste that is generated (waste minimization), and (9) preventing the generation of wastes altogether (pollution prevention). This study focuses on recycling.

The history of recycling attests to the fact that this concept has been around since the need of resources from waste first occurred. Recycling and waste management have been important issues in Italy for thousands of years (Vehlow et al. 2007). Since the latter part of the 20^{th} century, Italy has maintained a proactive MSW program focused on recycling and waste minimization. The US also strives for MSW reduction, recycling, and minimization. While solid waste management and recycling are considered important and relevant issues today (Costi et al. 2004), there has been little written about comparisons of recycling and solid waste management practices between the US and Italy.

Municipal solid waste management (MSWM) in the US is a system comprised of regulatory, administrative, market, technology, and social subcomponents (Louis 2004). These same components can also be found in Italy; however, there are differences in the MSWM between these two countries.

Italy and the rest of Europe had fewer problems disposing of MSW prior to the industrial revolution, with little generation amounts and small communities (Vehlow et al. 2007). This was the case 2000 years ago. As communities grew and population densities increased, a greater need for MSWM arose. Prior to modern times, waste disposal involved many different methods. Recycling, burning, burying, and open dumping of waste, away from immediate view, were methods used to handle MSW. Although recycling had sometimes been incorporated into MSWM, Europe would not see a change in practices until the late 14th century. This came primarily as a result of epidemics and degradation to human health and the environment due to poor MSWM. The motivation for changing the MSWM system in Europe was driven by the need to protect human life. A correlation between MSWM and the health of the community became apparent. Waste management strategies such as regular collections, waste minimization and recycling became more prevalent. In the 1600's, as cities in Italy and Europe continued to grow, street cleaning practices and directives for waste disposal became more common and a greater emphasis was placed on reuse and recycling (Vehlow et al., 2007).

In the early 1800s, the US was comprised of many rural communities and smaller cities where recycling and waste management did not receive much attention. It was not until after observable, adverse health problems to the public and the environment

occurred that the subject of MSWM became an important, relevant issue (Louis 2004). The troubles facing the US in the 1800s were similar to the problems facing Italy in the 1300s. The burdens of dealing with MSW were the responsibilities of local government. An innovative method of managing waste in the US was used in the 1890s by Commissioner Colonel George Waring. He initiated a MSWM plan for New York City concentrating on waste reduction programs, including recycling, street sweeping and a dedicated uniformed cleaning and collection force (Louis et al. 2007). His policies of MSWM served as a model to other communities.

Europe, in the early twentieth century, saw a greater emphasis on waste recycling and a separation of waste categories (Vehlow et al. 2007). In the Mediterranean region, and the rest of Europe, the separation of waste into specific categories increased the effectiveness of recycling collections. Sorting and separating of waste streams such as paper, textiles, glass, and metals took place. This separation of waste facilitated the recycling of valuable materials and reduced the amount of waste needed to be disposed. Europe took the lead in separating MSW into specific categories and continues to place emphasis on separation of waste streams. Protection of human health and environmental sustainability are primary considerations for MSWM discussion-making in Europe. Italy has a greater population density and fewer locations for MSW landfills than the US, adding to the importance of waste reduction and recycling in Italy.

Recycling in the US continued throughout the twentieth century and especially during the first and second World Wars. Local governments and communities, however, were unable to effectively regulate MSWM. This situation in the US brought about the formation of the Solid Waste Disposal Act (SWDA) of 1965, which was amended and

renamed Resource Recovery Act (RRA) of 1970. The SWDA gave authority to the US Public Health Service (PHS) to enforce regulations for solid waste collection and recycling. The federal government became involved in solid waste management and placed federal emphasis on recycling, resource recovery, and conversion of waste to energy (Luton 1996).

The US continued to have problems managing MSW, which brought about the creation of the Resource Conservation and Recovery Act of 1976 (RCRA), replacing RRA. RCRA established a framework for MSWM by requiring the US EPA to establish regulations to control solid waste disposal. RCRA forced the closure of open dumps nationwide, and required regional planning for MSWM (Louis 2004). The goals of RCRA include:

- *"Protect human health and the environment from the hazards posed by waste disposal;*
- *Conserve energy and natural resources through waste recycling and recovery;*
- *Reduce or eliminate, as expeditiously as possible, the amount of waste generated, including hazardous waste; and*
- *Ensure that wastes are managed in a manner that is protective to human health and the environment."*(Cooper 2003).

While the US was establishing regulations to manage MSW, Italy was forming a partnership with other European countries in an effort to more effectively deal with issues such as commerce, environmental pollution, trade, and health and safety issues. In 1957, the Treaties of Rome were signed by Italy and five other nations: Belgium, France, Luxembourg, the Netherlands and West Germany. This formed the start of the European Union. Today, the waste management and recycling practices in Italy are mandated by EU Directives (Vehlow et al. 2007).

Regulations require MSW in Italy to be free of valuable material and any material that might be useable for energy recovery (Marchettini et al. 2007). This practice greatly reduces the amount of MSW going into landfills. *"Composting is the most important system of material recycling from a mass viewpoint."* (Marchettini et al. 2007). Factors used to determine the benefits of recycling include the economic efficiency of the process and the final product. Pordenone Province, the study area chosen in Italy, has strict policies for separation of recyclable categories and this helps improve the efficiency of composting collections. Separating MSW into like categories at the point of collection can lower the cost of recycling and improve the success of the program (Kipperberg 2006). Whereas Italy emphasizes composting of yard waste, Ohio's landfill space is composed of nearly 8 percent yard waste and 6 percent food waste (ODNR 2004).

1.3 Selection of Study Sites

Pordenone Province and Mahoning County have established recycling programs with curb side and drop off recycling options. The recycling amounts at these two locations were compared, in a per capita distribution. Many recycling determinants including regulations, collection methods and frequency, divisions of the waste categories, and economics were considered. Proposing recycling practices in Italy that may work in the US, and those in the US that may work in Italy, are considered as an approach to MSWM, conserving resources, and protecting health and safety. Italy incorporates recycling, incineration and landfill disposal as methods for MSWM, representing an average of recycling and disposal methods of waste management compared to other EU nations (Figure 1.1).

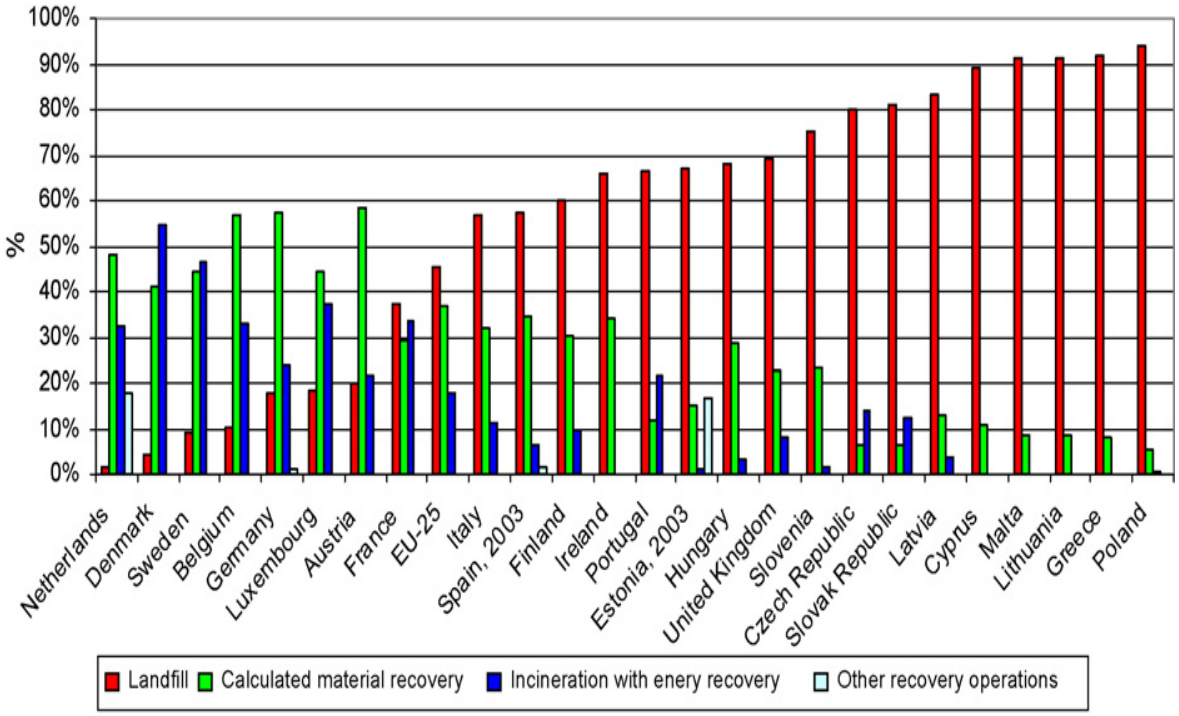

Figure 1.1 Waste disposal methods from EU countries (Mazzanti et al., 2008).

Italy contains twenty (20) regions, similar to states in the US. Each region is then separated into provinces, similar to counties in the US. There are 109 provinces in Italy. The Italian area selected for this study is located in the Friuli-Venezia Giulia region (Figure 1.2). This region, located in northeast Italy, contains four provinces; Gorizia, Udine, Trieste, and Pordenone. Pordenone Province, with an area of 2,273 square kilometers, was examined for this study. This area was selected because it has a similar population size as the US study area. Also, there is an established recycling program in place for this province.

The US contains fifty (50) states, similar to regions in Italy. Each state is further divided into counties, similar to the division of provinces in Italy. The area selected for study of recycling practices is the state of Ohio, located in the mid-western part of the country. Ohio contains eighty-eight counties and the county selected for this study is

Mahoning County, with an area of 109 square kilometers. This area was selected because it has an established recycling program for residents in the county and it also has a population similar to Pordenone Province.

Figure 1.2 Pordenone Province, Italy

Figure 1.3 Mahoning County, Ohio

1.4 Organization of Thesis

This thesis first reviews some literature covering recycling issues in the two study areas and in other countries, found in section 2.0. Data collection sources and interviews concerning recycling are discussed in section 3.0. Inducements of recycling are

discussed in section 4.0. Section 5.0 lists the data collected, including the recycling categories and compared. Section 6.0 discusses the results of this study and the conclusions are presented in section 7.0.

2.0 Literature Review

Many studies agree that MSWM is one of the paramount issues affecting human health and the environment. Vehlow (Vehlow et al. 2007) wrote, *"The development of the system in the EU is a good example of the equally important role that recycling and waste incineration play in an integrated and sustainable waste management system."* Literature review considered for this study includes:

1. Recycling in non-European countries
2. Recycling in Europe
3. Recycling in Italy
4. Recycling in the US

2.1 Recycling in non-European Countries

Non-European countries consider the relevant issues of recycling and waste minimization. This is evident from places such as China, Japan and developing countries investigating recycling factors and MSWM techniques. A study in China incorporated the Monte-Carlo mathematical model in finding the most effective methods to manage MSW (TIAN et al. 2007). Inputs into the Monte-Carlo model included such factors as waste composition, land availability, energy recovery, and waste separation.

Using a multi-sectored economic model, the Tokyo Institute of Technology sought to find the best methods for handling MSW taking into account economical as well as environmental considerations (Masui et al. 2000). In the model, waste generation, waste reduction, recycling, and final disposal were considered. Cost was considered with MSWM, and while the cost of recycling may be greater than incineration

of MSW, environmental preservation and material recovery may greater show the benefits of recycling activities (Masui et al. 2000).

A recent case study investigated the MSWM methods of twenty-three (23) developing countries where recycling influences were identified. As part of the study, the influencing recycling factors include: government policy, government finances, waste characterization, waste collection and segregation, household education, household economics, MSWM (municipal solid waste management) administration, MSWM personnel education, MSWM plan, local recycled-material market, technological and human resources, and land availability (Troschinetz et al. 2009).

2.2 Recycling Practices in Europe

Recycling practices in Europe are well established and documented. The EU regulates recycling and waste management policies to protect human health and the environment for member countries. With the goal of encouraging MSW recycling in the EU, five recycling determinants were examined including: producer responsibility, voluntary agreements, legislative requirements, information programs and waste taxes (Jacobsen et al. 2002). Jacobsen et al. investigated what recycling practices are effective and how other EU countries can incorporate valuable recycling and waste minimization practices.

Material recovery and recycling are needed to comply with EU waste directives. Evidence suggests recycling and incineration are both essential parts of integrated waste management systems (Vehlow et al. 2007).

A study was conducted on MSW practices in Finland. The implementation of a modeling program, Tool for Analyzing Separation Actions and Recovery (TASAR), was

used to assist Finland in identifying effective MSWM programs (Tanskanen et al. 1999). Finland's recycling goals exceed those set by EU policy. In order to accomplish recycling goals, TASAR were utilized to identify MSWM strategies and how source separation activities of waste producers effect recycling (Tanskanen et al. 1999).

2.3 Recycling Practices in Italy

The EU directive on landfilling, discussed in section 4.0 of this study, prompts Italy to place a value on waste, considered from here on as waste valorization. Using this method of waste valorization is one economic determinant of recycling in Italy. One specific waste management option utilized in Italy is the VAMP project (VAlorization of building demolition Materials and Products (Sára et al. 2000). The VAMP project concentrates on reusing, recovering and recycling waste of value, thereby reducing the amount of waste disposed of in landfills. While the VAMP system of managing waste is specifically targeted for building and demolition wastes, similar approaches and goals are utilized for MSW.

One waste management model utilized in southern Italy is the MARKAL (MARket ALlocation) model. This study, conducted in the Basilicata region of Italy, evaluates the influence of landfilling fees on MSWM decisions (Salvia et al. 2002). Environmental sustainability, economic affordability and efficiency are considerations for this model.

Another mathematical model used in Italy compares renewable resources and waste recycling. This model considers the production of a final output, the accumulation of human capital, and the waste recycling industry (Di Vita 2004). Taxes and subsidies

levied on natural resources and granted for secondary materials and their role in waste recycling were discussed.

2.4 Recycling in the United States

A recent study (2006) by Grom Kipperberg, from Colorado State University, examined the recycling practices between Norway and the US Kipperberg's study focused on three factors influencing recycling practices: waste disposal fees, community recycling program systems, and socioeconomic and demographic factors. Concerning waste disposal fees and the amount of MSW recycling in the US, the results were mixed. Some studies indicate that offering a lower waste disposal fee for residents who reduced nonrecyclable waste by recycling or reducing waste generation, had no effect on recycling, whereas other studies suggested the opposite effect (Kipperberg 2006). Socioeconomic and demographic variables did not appear to be influencing factors concerning recycling practices between Norway and the US. The awareness of recycling programs and the convenience of recycling were important factors in the recycling activity for the US whereas it was less of a factor for Norwegian households (Kipperberg 2006). Curb-side and drop-off recycling options in the US influence recycling behavior in contrast with Norway. Convenience appears to be a greater factor for recycling in the US than in other countries.

In the US, waste inventory models are also used to study and help increase recycling behaviors. One specific model was created to find ways to increase recycling rates and reduce MSW recycling costs (Louis 2004). This model also helps municipalities to achieve targeted recycling rates.

Life cycle assessments and management are being used for MSWM decision making. With new technology and filtering processes, the US burns more MSW than in the past (Subramanian 2000). Because different types of plastics exist, their use as a recycled commodity is more difficult. Determining the most effective method of plastics disposal may include chemical recycling, in the case of nylon and polyesters, and disposal of contaminated mixtures of plastics by incineration (Subramanian 2000).

3.0 Data Collection Sources

Data from both study areas came from several different sources described below. The records and practices concerning recycling for both study areas is a matter of public record.

3.1 Sources of Data – Pordenone Province

Recycling data for Pordenone Province, Italy were acquired from personal interviews, available text and printed material, and personal observations.

3.1.1 Personal Interviews

The principal investigator conducted several interviews with Mr. Alessandro Medici, the Municipal Coordinator for Roveredo-in-Piano, Italy. Roveredo-in-Piano is one of the fifty-one (51) communities in Pordenone Province. Medici identified waste minimization and recycling as important issues for communities in Italy (Medici 2004). "The amount of packaging of goods is reduced as much as possible, in all aspects, in order to reduce the generation of waste in the first place," Medici commented. Medici gave a tour of a near-by material recovery facility that collected recyclables and separated mixed waste containing recyclable materials. This process is necessary to maintain compliance with recycling mandates in Italy. The material recovery facility that was toured also accepted and processed yard waste from Roveredo-in-Piano and neighboring communities. By composting yard waste and food scraps, large volumes of compostable materials are diverted from landfills and utilized as mulch and fertilizers.

Medici also pointed out that construction projects are handled differently in Italy when compared to the US stating, "In Italy, there is less emphasis on the demolishing of dwellings and more emphasis on restoring and retrofitting." Medici was helpful in

obtaining the recycling data and explaining the enforcement of recycling in Roveredo-in-Piano.

3.1.2 On-line Documentation

In Italy, recycled and non-recycled waste amounts are part of a report known as Modello Unico di Dichiarazioni Ambientali (which is the Model of Environmental Statements). This report presents the recycled and non-recycled MSW categories in Italy as well as the amounts, in metric tons. The waste generation amounts for each community in Pordenone Province are a matter of public record and were accessible on line from the following web address: http://www.provincia.pordenone.it/index.php?id =279&no_cache=1&sword_list[]=rifiuti (Appendix A).

The regulations concerning MSW and recycling policies were located on line from the EUR-Lex web site at http://eur-lex.europa.eu/en/index.htm. EUR-Lex translates the Official Journal of the European Union and European Union Laws. The recycling and waste management regulations for Italy are discussed and compared to those of the US. Several text books translated into English have also been referenced for the regulations governing Pordenone Province (Gillies 1999, Palframan et al. 1995, Smith, 1993).

3.1.3 Direct Observations

In 2004, the principal investigator observed recycling practices in Roveredo-in-Piano, Aviano, Barcis, Cordenons, Fontanafredda, Pordenone, and Sacile, all communities in Pordenone Province. Recycling activities among the different communities share key components, including the abundance of recycling bins and the

separation of recyclable categories. Curb-side recycling in Fontanafredda and yard waste collection from Roveredo-in-Piano are also discussed below.

In every community, large numbers of drop-off recycle bins were available to residents. Nearly every street and street corner had different bins for specific recyclable wastes. Abundant drop off-bins were found even in communities with residential curb-side pick-up, such as in Fontanafredda.

Every community in Pordenone is required to separate yard waste from MSW collection. This is accomplished by collections exclusively of yard waste and by maintaining a compost collection site. The collection of yard waste, as well as the compost collection site, was directly observed in the community of Roveredo-in-Piano where yard waste is regularly collected. This recyclable, along with yard wastes from neighboring communities, is recycled at the compost facility. This material is composted and considered a commodity, ultimately be used as mulch or a soil fertilizer.

3.2 Sources of Data – Mahoning County

Recycling data for Mahoning County, Ohio were acquired from personal interviews, publicly available text/printed material, and personal observations from the primary investigator.

3.2.1 Personal Interviews

The principal investigator conducted several interviews with Mr. James Petuch, the Recycling Director for Mahoning County. Petuch discussed each of the recycling categories collected in Mahoning County and the trends of recycling. He emphasized the importance of accurate data collection and record keeping and acknowledged that accurate recycling data were not collected during the time frame of this study (2004-

2006). In order to achieve accurate data, better communication between recycling collection facilities and the Mahoning County Recycling Division should exist.

Mr. Daniel Kuzma was also interviewed for recycling data on Mahoning County. Kuzma is Manager of Recycling at Youngstown State University (YSU). He was familiar with the one public food composting facility in the county (Poland) and established a food composting facility at YSU. Kuzma was instrumental in continually increasing the recycling amounts at YSU from 2004-2006. For those three successive years, the recycling program at YSU alone collected 377, 414, and 505 tons, respectively.

3.2.2 On-line Documentation

The Ohio Environmental Protection Agency (Ohio EPA) provided the majority of on-line data on Ohio required to complete this study. Recycling data from Ohio were found on the Ohio EPA web site under the Division of Solid and Infectious Waste Management section (Appendix B). Retrievable documents contain the summary of solid waste management for each community in Ohio. Included in this document are the recycling categories, the amounts recycled, and the total amount of non-recycled waste.

Regulations governing recycling in Mahoning County can be found from several different sources. The Ohio EPA State Solid Waste Management Plan (SWMP) for 2001 contains solid waste recycling goals, policies and objectives (Ohio EPA 2001). The 2001 Ohio SWMP is the same plan used during the study period (2004-2006), as the SWMP is only required to be revised every four to six years. This information is a matter of public record and was found on line (Ohio EPA 2001).

Recycling regulations not included in the Ohio EPA literature can be found in the Ohio Revised Code and Ohio Administrative Code, which are available on-line at http://codes.ohio.gov/.

3.2.3 Direct Observations

Recycling practices in Mahoning County were also observed from direct observation by the principal investigator. Curb-side recycling is one option that residents have to recycle MSW. Although curb-side recycling is available to many residents in the study area, not all residents participate in this option. Residents may be taking their recyclables to a drop-off location in place of the curb-side pick-up option or not recycling altogether.

Community drop off centers are placed in strategic locations around the county. They provide convenient access for residents to drop off recyclable materials. The county also operates a Recycling Division to direct and answer recycling questions and issues of the public.

3.3 Data Conversions – Rate of Recycling (kg/person/year)

It was necessary to convert the mass of recycled material collected from Mahoning County and Pordenone Province into the same units, i.e. metric units. As the data from Mahoning County are in US tons and from Italy are in metric tons, the US data were converted to the metric equivalent in order to maintain like units of material collected. This is accomplished by multiplying the US tons by (.9072), i.e., one (1) US ton equals .9072 metric tons. Therefore, (1.00 US ton) times (.9072) equals one (1) metric ton. As a note, one (1) metric ton equals 1,000 kilograms (kg). Another conversion necessary to evaluate the two sets of data is to find a per capita recycling rate.

This must be performed to accurately identify and compare a rate of recycling between Mahoning County and Pordenone Province, as there are not equal numbers of people in each location.

The per capita rate of each recycled material investigated, as well as the non-recycled waste collected, was calculated by dividing the amount of material in question (in metric tons) by the population of the test area. The population from Pordenone Province was determined from the Modello Unico di Dichiarazioni Ambientali (Appendix A). For Mahoning County, the population was determined from the Ohio EPA Division of Solid and Infectious Waste Management reports. The per capita recycling rates, (Section 5.0), were used to compare how recycling rates differ.

In order to compare total recycling between each site, the amount recycled is expressed as a percentage of the total waste generated. This is found by dividing recycled (differentiated) waste by the total waste generated (recycled + non-recycled) and multiplying by one hundred.

4.0 Inducements Affecting Recycling

The recycling practices of Mahoning County and Pordenone Province focuses on and assesses the following recycling issues: recycling regulations, regularity of recyclable pick-up, and economics associated with recycling. A discussion of each issue examines how these recycling determinants differ and how these differences impact recycling numbers. The intention is to discover both how recycling is different and to identify what is effective in reducing waste sent to landfills.

4.1 Recycling Regulations

Both Pordenone Province, Italy and Mahoning County, Ohio have established waste management policies governing MSW. Pordenone Province is subject to follow national, regional and local MSW regulations and is required to follow regulations governing the European Union. Mahoning County must comply with all federal, state and local MSW policies, primarily regulated by the EPA.

4.1.1 Pordenone Province

Italy was one of six countries (Belgium, France, Italy, Luxembourg, the Netherlands and West Germany), which signed two treaties on March 25, 1957. These treaties, known as the Treaties of Rome, established the European Economic Community and the European Atomic Energy Community. The European Union (EU) is an economic and political union of 27 member states, located primarily in Europe (Figure 4.1). It was established by the Treaty of Maastricht on 1 November 1993, upon the foundations of the pre-existing European Economic Community. The EU governs a wide range of social, economical and environmental issues. One of the most notable policies involves the currency used by many EU nations, i.e., the euro. In regards to recycling

legislation, the EU created the European Environmental Agency. This department creates legislation concerning recycling policies and practices. Any EU member can follow more stringent recycling policies than those of the EU; however, they must comply with the EU mandated regulations.

Figure 4.1 European Union Nations

Recycling regulations affecting EU countries are administered by the European Parliament and the Council of the European Union (Table 4.1). Directive 75/442/EEC established the framework and the authority of the EU to regulate MSW and maintain procedures for monitoring, evaluating and adjusting MSW disposal operations. The goals of this directive focus on recycling waste and the reduction of waste generation. The European Parliament created a flexible plan to achieve these goals and states:

> *1. Member States shall take appropriate steps to encourage the prevention, recycling and processing of waste, the extraction of raw materials and possibly of energy therefrom and any other process for the re-use of waste.*
>
> *2. They shall inform the Commission in good time of any draft rules to such effect and, in particular, of any draft rule concerning: (a) the use of products which might be a source of technical difficulties as regards disposal or lead to excessive disposal costs;*

(b) the encouragement of: - the reduction in the quantities of certain waste,

- the treatment of waste for its recycling and re-use,

- the recovery of raw materials and/or the production of energy from certain waste;

(c) the use of certain natural resources, including energy resources, in applications where they may be replaced by recovered materials.

Member States shall take the necessary measures to ensure that waste is disposed of without endangering human health and without harming the environment, and in particular: - without risk to water, air, soil and plants and animals,

- without causing a nuisance through noise or odours,

- without adversely affecting the countryside or places of special interest.

Member States shall establish or designate the competent authority or authorities to be responsible, in a given zone, for the planning, organization, authorization and supervision of waste disposal operations.

The competent authority or authorities referred to in Article 5 shall be required to draw up as soon as possible one or several plans relating to, in particular: - the type and quantity of waste to be disposed of,

- general technical requirements,

- suitable disposal sites,

- any special arrangements for particular wastes.

The plan or plans may, for example, cover: - the natural or legal persons empowered to carry out the disposal of waste,

- the estimated costs of the disposal operations,

- appropriate measures to encourage rationalization, of the collection, sorting and treatment of waste (Directive 75/442/EEC).

EU Directive 94/62/EC, pertaining to packaging and packaging waste, place strict requirements for disposing of packaging waste. As of June 2001, 50 percent of all packaging waste must be recovered (Gillies 1999). This includes packaging wastes of plastic, wood, cardboard and paper products.

EU Directive 91/157/EEC addresses batteries and accumulators containing dangerous substances. Accumulators, like dry-cell batteries, store energy and include rechargeable batteries and lead-acid batteries. Italy prohibits all batteries and accumulators from MSW landfills. All batteries must be collected separately and

recycled. In addition to diverting batteries from landfills, this directive also addresses the materials used to make batteries. Italy must, in order to be in compliance with this directive, reduce the heavy metal content of batteries and promote the marketing of batteries and accumulators manufactured with smaller quantities of dangerous substances. This directive is also intended to stimulate research and development of more efficient and less polluting batteries. Italy must also reduce the overall impact of batteries and make information about batteries available to the public (Gillies 1999).

Directives 2002/95/EC and 2002/96/EC, enacted by the European Parliament and of the Council 27 January 2003 and 27 January 2003 respectively, establish strict regulations concerning collection, disposal and use of certain hazardous substances in electrical and electronic equipment. The EU has an acronym, WEEE, for waste electrical and electronic equipment. WEEE covers household appliances with electronics, telecommunications equipment, consumer equipment, lighting equipment, electrical and electronic tools, toys, sports equipment, and monitoring and control electronics (Directive 2002/96/EC). Pordenone Province follows the EU policy of reusing WEEE, and its components, wherever practical. In order to achieve the highest amount of reuse, and to properly recycle WEE where reuse is not an option, Pordenone Province has separate collections for WEEE. In addition, heavy metals including lead, mercury, hexavalent chromium, and cadmium are minimized from WEEE products and flame retardants such as polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) must be substituted with safer alternatives. The primary objective for the electronic waste regulations is the protection of human life and reduction of negative impacts to the

environment. Secondary objective include conservation of natural resources and pollution prevention.

Two directives, EU Directive 75/439/EEC and EU Directive 87/101/EEC, regulate the collection, storage, recovery and disposal of waste oils. Waste oils include lubricant oils for vehicles, turbines, gearboxes and engines, and hydraulic oils. These two directives aim to protect surface water, groundwater, and soils from waste oil contamination. Also, these directives set guidelines for the combustion of oils. When burning waste oils in waste to energy systems, air pollution and waste residues, resulting from the processing of waste oils, are regulated to insure protection to residents and the environment. These directives on oil waste require all EU countries to collect and dispose of waste oil properly and they must give priority to the processing of waste oils by regeneration, i.e. by refining.

EU Directive 2005/64/EC and directive 2000/53/EC regulate the recyclability and recovery of motor vehicles at end–of–life. Directive 2005/64/EC addresses the requirements for the recyclability of motor vehicles. This policy supports the end-of-life vehicle Directive 2000/53/EC approved by the European Parliament and of the Council in September 2000. This policy ensures vehicles are reusable and/or recyclable to a minimum of 85 percent by mass and are reusable and/or recoverable to a minimum of 95 percent by mass.

Decree 22/97 integrates waste management policies and address, more rigorously, the prevention of waste generation and material and energy recovery from waste. The decree established that permits for incineration plants should be granted only if the plant had an energy recovery system and that waste disposal must be reduced as much as

possible. The issuing of decree 22/97 helped spur other waste prevention and recycling policies in Italy, in particular in the field of packaging waste, where specific measures have been enacted by producers of packaging design and materials in order to favor re-use and recycling.

Table 4.1 European Union Directives

Directive 75/442/EEC (75JUL15)	Framework for MSWM
Directive 94/62/EC (94DEC15)	Packaging Waste
Directive 91/157/EEC (91MAR18) and Directive 93/86/EEC (93OCT04) and DIRECTIVE 2006/66/EC	Batteries and accumulators
Decree 22/97 integrate waste management policy set up by the European Waste Strategy	Prevention of waste generation Material and energy recovery from waste
Directive 91/156/EEC	Considerations for: water, air, soil and plants and animals, nuisance through noise/ odors, minimal adverse affect to countryside or places of special interest
Directive 2002/96/EC	Electrical and electronic equipment
Directive 75/439/EEC	regulates the disposal of waste oils
Directive 2005/64/EC and Directive 2000/53/EC	regulate the recyclability and recovery of motor vehicles at end–of–life
1999 Landfill Directive	reduce the amount of waste going to landfill, establish consistent engineered controls to prevent landfill wastes from causing harm to the environment

4.1.1.1 Penalties (Fines) for Failure to Recycle

In Pordenone Provence, recycling MSW is required. Failure to recycle MSW in Italy can result in a citation. The citation could consist of a warning, a monetary fine or other legal actions (Medici 2004).

In Mahoning County, there are no penalties or fines for not recycling. If a household makes the decision not to recycle, there are no legal or economic penalties. Recycling MSW, either from curb-side pick-up or community drop-off, is strictly voluntary in Mahoning County.

4.1.2 Mahoning County

One of the most substantial recycling regulations for Mahoning County, and the entire state of Ohio, is the passage of House Bill 592 (H.B. 592) in June 1988. This created a statewide waste reduction and recycling policy directed by the Ohio Environmental Protection Agency (Ohio EPA) known as the state solid waste management plan. The Ohio EPA oversees the state waste management plan and incorporates eight (8) waste management goals in the state plan. They include: 1) access to alternative waste management opportunities to at least 90 percent of the residents, 2) a 25 percent reduction and/or recycling of residential and commercial MSW and a 66 percent reduction and/or recycling of solid waste from industry, 3) promote waste reduction, 4) provide information and assistance on recycling, reuse and composting opportunities, 5) landfill bans on household hazardous wastes (HHW), scrap tires, yard waste and lead-acid batteries from MSW facilities, 6) economic incentive analysis to evaluate the feasibility of incorporating economic incentives into source reduction and recycling programs, 7) solid waste management districts (SWMD) are encouraged to conduct market development activities to promote reuse and recycling participation, and 8) SWMDs must evaluate the implementation of their recycling programs and the progress made toward the waste reductions (Ohio EPA 2001).

House Bill 592 also requires each county in Ohio, either independently or in conjunction with a neighboring county, to form a solid waste management district. Mahoning County formed an individual SWMD and must prepare a solid waste management plan that follows the state plan. Ohio MSWM consists of fifty-two (52) individual SWMDs (Figure 4.2).

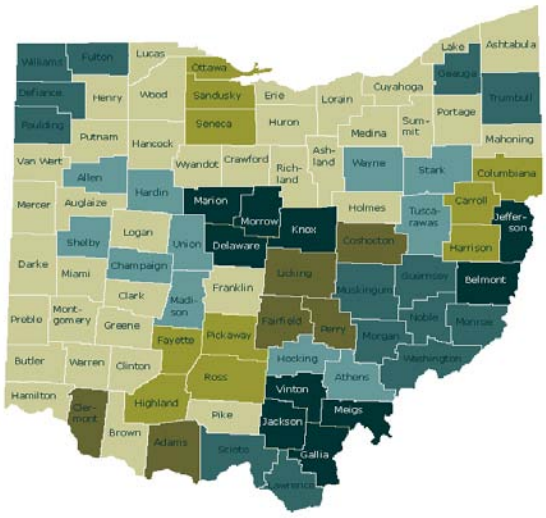

Figure 4.2 Map of Ohio's Solid Waste Management Districts (http://www.dnr.state.oh.us/recycling/)

Mahoning County is required to follow Ohio's yard waste policy which became effective February 1995. Yard waste is defined by the OEPA as solid waste that includes only leaves, grass clippings, brush, garden waste, tree trunks, tree stumps, holiday trees, and pruning from trees or shrubs. Yard waste does not include industrial or agricultural processing wastes. This regulation prohibits landfills from accepting yard waste unless alternatives for yard waste disposal are not readily available. Yard waste recycling is available for Mahoning County and is a recycling category filed under the Mahoning County Solid Waste Management Plan (Ohio EPA 2005). Enforcement of this regulation has not been effective and waste audits and observations from curb-side pick-up of MSW, particularly in the spring and fall, reveal yard waste is easily disposed of in MSW. Also, if yard waste is mixed with nonrecyclable waste, it can be landfilled.

Another recycling regulation governing Mahoning County prohibits the disposal of lead-acid batteries in MSW landfills (Ohio EPA 2005). Two benefits of this

legislation include increasing the practice of recycling and diverting environmentally hazardous components such as acids and heavy metals from MSW landfills. However, like the regulation designed to divert composting, enforcement strategies may not be sufficient to keep batteries out of landfills.

Effective January 1, 1991, as directed by Ohio Administrative Code (OAC) 3745-27-91, all plastic bottles and containers manufactured or distributed for use in the state of Ohio had to have been labeled to identify the type of plastic bottle or container. This is known as the plastic labeling law. This regulation does not require plastics to be recycled; however, it allows plastics to be separated by the type of plastic used. The different plastics categories are identified by a stamp on the plastic product. Table 4.2 lists the plastic labeling codes.

Table 4.2 Code numbers and letters for plastic bottles and containers in Ohio

polyethylene terephthalate	"PETE"	1
high density polyethylene	"HDPE"	2
vinyl	"V"	3
low density polyethylene	"LDPE"	4
polypropylene	"PP"	5
polystyrene	"PS"	6
other plastic	"OTHER"	7

Youngstown, which is the county seat for Mahoning County, enacted ordinance 747.11 in 2005. This regulation set forth requirements for all persons purchasing scrap metals to maintain an inventory of the amounts, types and dates material was collected. This regulation was adopted to keep better track of the metal materials being recycled. This city ordinance as well as the other Mahoning County recycling regulations can be found on Table 4.3.

Table 4.3 Mahoning County Recycling Regulations

Ohio House Bill 592 (88JUN) on Waste	Provides framework for state solid waste management plan
Ohio Administrative Code 3745-27-19 (04JUL01) yard waste	Source separated yard waste Lead-acid batteries Waste tires, whole and shredded tires
3734 of the Ohio Revised Code - Lead acid batteries in MSW landfills	Prohibits lead-acid batteries from MSW landfills
Ohio plastic bottle labeling law	Requires stamp identification on plastics
Youngstown Ord. 747.11 RECORD OF PURCHASES; DAILY REPORT (05FEB11)	Recycling data recovery law
Ohio Revised Code Section 3734.50(C)	Yard waste
Chapter OAC 3745-279 Used Oil Management Standards	Oil collection and handling

4.1.3 Recycling Goals

Pordenone Provence and Mahoning County both set goals for recycling. They both have a percentage goal of the waste stream to be diverted from waste disposal methods such as landfill or incineration. In Italy these goals are imposed by the EU. For Mahoning County, the benchmark goals have been established by the Ohio EPA. These goals are described below.

4.1.3.1 Pordenone Province

The EU requires each member country to achieve a level of waste reduction and recycling. For the three year study period, Italy had to have achieved a 50 percent recovery of packaging waste. Other benchmark goals included a mandate to achieve a 65 percent separation of recyclable collections by 2012. By 2018, 65 percent of biodegradable materials must have been diverted from landfills according to the EU Landfill Directive. Other goals include a 60 percent recovery for paper and glass, a 50

percent recovery for metals, a 22.5 percent recovery for plastics, and a 15 percent recovery for wood.

Pordenone Province has set landfill bans on waste categories such as waste oil, household hazardous waste (HHW), and batteries. For these categories, the goal is 100 percent recovery. Specific goals for recovery of electronics and electrical appliances are regulated by Directive 2002/96/EC. It established the following goals:

> *By 31 December 2006, the rate of recovery by an average weight per appliance must be at least 80% in the case of large domestic appliances and automatic dispensers, 70% in the case of small domestic appliances, lighting equipment, electrical and electronic tools, toys, leisure and sports equipment and monitoring and control instruments, and 75% in the case of IT and telecommunications equipment and consumer equipment. By the same date, the rate of component, material and substance reuse and recycling by an average weight per appliance must be at least 80% in the case of discharge lamps, 75% in the case of large domestic appliances and automatic dispensers, 50% in the case of small domestic appliances, lighting equipment, electrical and electronic tools, toys, leisure and sports equipment and monitoring and control equipment, and 65% in the case of IT and telecommunications equipment and consumer equipment* (Directive 2002/96/EC).

4.1.3.2 Mahoning County

Recycling goals are specifically addressed in the 2001 State of Ohio Solid Waste Management Plan (Ohio EPA 2001). This document is generated by the Ohio EPA and provides specific requirements for each SWMD. In 1989, Ohio's goal was a 25 percent reduction in total waste generation sent to MSW landfills. This was accomplished by reducing, reusing and recycling MSW. In 1995, a goal of 50 percent reduction in total solid waste generation sent to MSW landfills was established with a target goal completion date of 2000. To achieve this goal, the OEPA targeted a 25 percent reduction from MSW from reduce, reuse and recycle methods and a 50 percent reduction or recycling of industrial solid wastes. For the relevant years of this study, from 2004-2006,

the OEPA has mandated a 25 percent reduction in waste generated by residential and commercial sectors. This mandate could have been accomplished by a reduction in waste generation, an increase in recycling or a combination in the two. Also, during this period, at least 66 percent of solid waste from the industrial sector was to be diverted from landfills by reducing waste, recycling or a combination of the two. The Ohio EPA also placed an objective for each SWMD to reduce and/or recycle at least 50 percent of the solid waste generated in Ohio by the year 2005 (Ohio EPA 2001).

4.2 Regularity of Recycling Pick-Up

The methods used to collect recyclable materials for each site area were examined. This discussion includes curb-side and drop-off locations. Both study areas have detailed collection methods for both curb-side and drop-off recycling. It is desired to have the most efficient and socially acceptable collection program to maximize recycling.

4.2.1 Curb-Side Pick-Up

Curb-side pick-up refers to the collection of recyclable materials from residential homes. This involves manpower to physically place collected recyclables into vehicles and transporting the recyclables to facilities requesting such items. The manpower could involve one or two personnel and the vehicles used are designed for the collection and carrying of recyclable materials.

4.2.1.1 Pordenone Province

Pordenone also provides curb-side pick-up services for some of their communities. Those communities receiving curb-side pick-up services have several different plastic bins in varying sizes designed for specific recyclable materials. Some

communities have bar codes on their recycle bins allowing the collector to record the weight of the recyclable materials upon pick-up and scan that information into a computer for thorough record keeping. Fontanafredda is one specific community that maintains a bar code inventory system for the recyclable curb-side pick-up operations.

4.2.1.2 Mahoning County

Mahoning County provides curb-side recycling services for ten (10) of the cities and townships (Table 4.4). Collection trucks drive through these communities on a specific schedule, picking up recyclable materials placed next to the road by residence. The recyclable materials are placed in a rectangular plastic tub provided to residents receiving curb-side pick-up services.

Table 4.4 Mahoning County communities with curb-side pick-up

Youngstown	Campbell	Lowellville	New Middletown	Canfield
Struthers	Poland Township	Poland Village	Austintown	Boardman

Curbside pick-up of recyclables in Mahoning County is done on a bi-weekly schedule. On the designated days, every other week, recyclable materials including paper, beverage cans, other cans, glass and plastics are all collected together at the same time for those residents participating in recycling. If a resident does not want to keep recyclables in their home for that span of time, they have the option of going to a recycling drop-off center. Nonrecycled MSW pick-up for residents occurs on a weekly schedule. Selected communities will have seasonal yard waste collection. This is typically only a few weeks in the fall season for leaf collection and tree collections after the Christmas season.

4.2.2 Drop – Off Sites

Recycling drop-off sites consist of collection bins strategically located within a community, allowing many residents to deposit recyclables at a convenient, centrally located site. The locations are intended to be easily accessible for residents in order to maximize recycling amounts. The drop-off sites have different containers for specific types of recyclables. These containers come in a variety of manufacturing materials, shapes and sizes. Once the recycle containers are filled or according to a predetermined pick-up schedule, the recycled materials are collected and transported to a recycling processing center. The recyclable materials are transported in one of two ways. The recyclable materials, along with the collection bin holding the items, are picked up and brought to a recycling processing center, while an empty bin is dropped off. Alternately, the recycling materials are transferred from the bin to a truck at the drop-off site and the empty bin immediately returned to service.

4.2.2.1 Pordenone Province

Pordenone Province has more drop-off sites than Mahoning County. In Italy, different drop-off bins are frequently seen at street corners and along roadsides. Many recycle bins located in Italy are able to be emptied into a collection truck and the empty bins returned to the site. This process of picking up the materials can be done with one person operating hydraulic lifting equipment to pick up the bin and empty the contents into the loading truck. Pordenone Province conducts weekly curb-side pick-up of recyclables and collects different recyclable materials on different days.

4.2.2.2 Mahoning County

Presently, Mahoning County maintains forty-two (42) drop-off sites. At these sites, residents can deposit all paper publications, newspapers, aluminum and steel cans, glass, plastics numbers 1-7 and corrugated cardboard (Petuch 2009). While some of the drop-off bins are able to be emptied into a collection truck at the site, many collection containers are roll-off bins. These require the entire bin, with the recyclable contents included, to be collected by a flat-bed truck for delivery to a recycling processing center. Typically, prior to picking up the bin with recyclable materials, this same truck drops off an empty bin.

4.3 Economics of Recycling

The economic influence is a complex determinant of recycling. This study concluded that the limited space available for new landfills in Europe forces an increase in recycling behavior. Conversely, the relative abundance of landfill space in Mahoning County, currently operating three (3) MSW landfills, lowers the cost of MSW disposal and does not encourage recycling. Waste valorization is practiced in Italy to reduce MSW being sent to landfills and to meet EU mandates. Also, the recycling categories and sorting methods employed by each country are related to efficient operations of MSWM.

4.3.1 Waste Valorization Practices

To valorize a category or process or system means to assign it value and in the case of waste valorization, it refers to placing an economical value on waste.

Italy incorporates this practice of waste valorization on MSW. The 1999 Landfill Directive governing EU countries requires the treatment of biodegradable wastes prior to

landfilling. The directive focuses specifically on material and energy recovery from waste. In an effort to divert MSW from landfills, Italy removes recyclable materials that have value. According to the valorization process, much of the waste remaining from this process is converted into refuse derived fuel (RDF).

The US does not have any ordinance or legislation requiring pretreatment of waste for the purpose of waste valorization.

4.3.2 Recycling Categories

The categorization of recyclable materials is different in each of the study areas. The organization of recyclable categories are discussed for each area and compared in section 5.0.

4.3.2.1 Pordenone Province

The Pordenone Province separates their recycling waste into 72 different categories for the year 2004, 70 categories for the year 2005 and 87 categories for the year 2006. Unlike the US, Italy maintains a greater division of recyclable sections increasing the degree of detail of materials recycled. For example in Pordenone Province, there are three (3) specific recycling categories for items containing HHW and three (3) specific recycling sections for appliances. This separation of recycling categories is maintained throughout the recordkeeping process. Each category is given a recycle name and six (6) digit identification codes (Appendix A).

4.3.2.2 Mahoning County

The Mahoning County curb-side recycling program collects five (5) categories of materials including paper, beverage cans, other cans, glass and plastic. The county collects thirteen (13) categories at drop-off sites; newspapers, corrugated cardboard,

plastic, beverage cans, other cans, glass, magazines, phone books, batteries, ferrous metals, oil, cardboard and office paper. As one can observe, four (4) of the curb-side and drop-off categories are the same. It should be noted that the Mahoning County Green Team divides items to recycle into more categories on their official list (Table 4.5). However, these many categories are condensed into a much smaller number of combined sections for the final computation of recycled materials. The OEPA organizes each solid waste district's data into twenty-three (23) categories (Ohio EPA 2005). Curb-side pick-up and community drop-off locations account for fourteen (14) categories. The other recycling categories are from specific recycling drives separate from curb-side and drop-off methods e.g., for lead-acid batteries, tires, HHW, and yard waste.

Table 4.5 Recycling items accepted for Mahoning County, Ohio

acetylene	aluminum	aluminum cans	antifreeze
appliances (no refrigerant)	appliances (useable)	baby items	ballasts
baskets	batteries (household)	batteries (rechargeable)	batteries (vehicle)
beds / mattresses / cribs	blankets & linens	books	boxes
brush	bubble wrap (clean)	candles (any condition)	canning jars
cardboard	cars	cell phones	chargers
chemicals	children books	cleaning supplies	cleaning supplies (used)
clothing	compact discs	coffee cans	computer paper
computer paper (unused)	computers	computers (useable)	construction supplies
copper	copy machines (useable)	costumes	craft supplies
cribs	desks	egg cartons (clean)	electronics
eyeglasses	fax machines	fax machines (useable)	fireworks
flags	flower pots	fluorescent light bulbs	food items
food scraps	furniture	gasoline	glass bottles and jars
grass clippings	greeting cards	hazardous waste	health & beauty aids

high-intensity bulbs	infectious waste collection	inkjet printer cartridges	insulin needles
knick knacks	lace table cloths	laser printer cartridges	laserjet toner
leaves	mercury	metal	microwaves
microwaves (usable)	miscellaneous items	motor oil	newspaper
office electronics	office electronics (useable)	office paper	office paper
oil filters	oily water	oxygen tanks	pagers
paint (latex-based)	paint (latex-based)	paint (oil-based only)	paint (usable quantities)
pallets	pipes (metal)	plastic bags	plastics
printer cartridges	printers	printers (useable)	propane tanks
remodeling supplies	shredded paper	styrofoam (clean)	styrofoam chunks (clean)
styrofoam peanuts	televisions	televisions (useable)	textiles
tin	tires	toiletries (unopened)	toys and games
trophies	twigs	vinyl siding	vinyl siding (useable)
wood waste (clean)	yard waste	Marinara sauce	

4.3.3 Sorting

Both Italy and the US sort recyclable materials. This involves separating the recycling categories from one another. The degree of separating, however, differs. Each country seems to be trying to find the most efficient method of collecting, transporting and delivering recyclables to a viable market. In Italy there is more separating of recyclable materials than in the US.

4.3.3.1 Pordenone Province

Communities in Pordenone Province are required to separate their recyclable materials, which are collected at different times. Communities that participate in curb-side recycling programs are given separate recycle bins for different recyclable

categories. This practice makes subsequent processing of materials more efficient as the need for separation after pick-up is eliminated.

Drop-off sites in Pordenone Province contain multiple bins, separating plastics, glass, aluminum and paper products. There are also bins for food wastes and regular recycling of yard wastes.

4.3.3.2 Mahoning County

For curb-side pick-up of recyclable materials, residents are given a plastic container to place recyclables which they take out to the curb at designated pick-up times. There is only one separation requirement for residents. They are asked to place paper and publications in bags. There is no further separation of recycling materials required. With this practice, containers may include any or all of the six (6) categories collected. For these recycled materials to be used and reprocessed, they must be separated into categories elsewhere.

In regard to drop-off sites for Mahoning County, recycle collection bins are only somewhat separated according to categories. Paper and cardboard may be separated. However, cans, plastics and glass are often comingled into one container. As with the curb-side recyclables, these materials must be separated into like categories.

5.0 Data

The following data compares recycling rates, in materials recycled per capita per year for sixteen (16) categories between the two study areas.

5.1 Appliances

Domestic appliances include any machine or electrical device that is used for a specific purpose around the home. Items such as dishwashers, washing machines and vacuum cleaners would be examples in this category. Pordenone Province has three category in this section: 1. refrigerators, freezers, air conditioners, 2. televisions, computers, printers, washing machines, dishwashers, stoves, and 3. Durables, products not bought frequently, and electrical and electronic equipments, i.e., 200123, 200135 & 160211. Mahoning County placed all recycled appliances into one category. Over the three year study, 2004-2006, Pordenone Province had a slight increase in the weight of appliances recycled in each year. Mahoning County collected the smallest quantity of appliance recyclables in 2004, just one third the appliance recycle rate, per person, for Pordenone. In 2005, the US recycled 3,911 tons of appliances, compared to just 133 tons one year earlier, far surpassed the quantity of appliances recycled for Pordenone. In 2006, the Mahoning County recycled 209.5 metric tons of appliances. This resulted in a lower per capita recycling rate than that obtained for Pordenone in 2006.

Italy, as the US, recycles appliances, diverting them from landfills, wherever possible.

For Mahoning County, appliance collection is driven by the economy. Appliances containing metal are desired for sale to scrap metal dealers. In 2005,

Mahoning County sponsored several appliance recycling drives which accounted for the large spike in the amount of appliances collected that year (Figure 5.1).

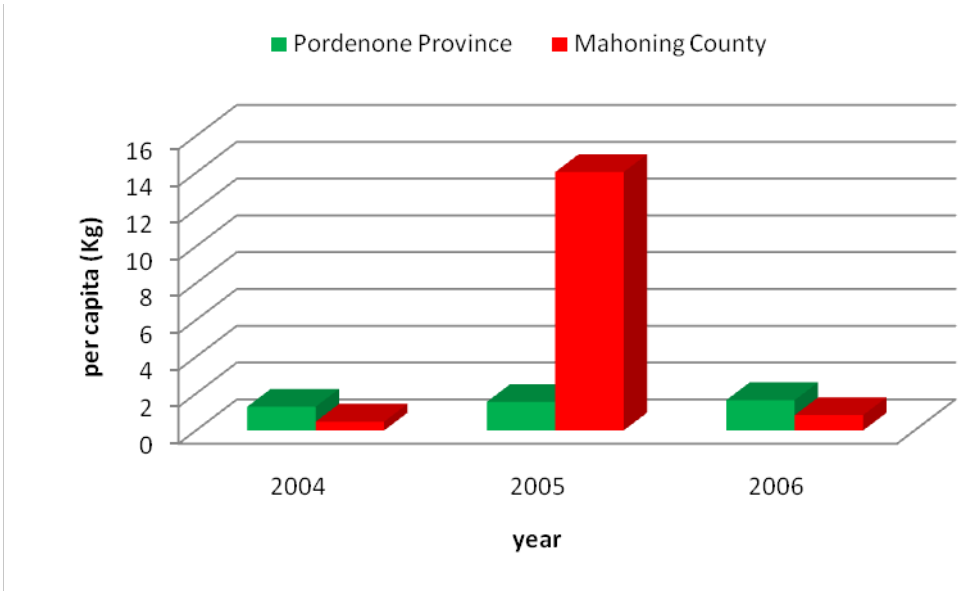

Figure 5.1: Appliances recycled in Pordenone Province, Italy and Mahoning County, US

5.2 Cardboard

Each country has corrugated cardboard in one collection category. Pordenone includes this recyclable under paper and paperboard, i.e., 150101. Corrugated cardboard is generally referred to by the general public as "cardboard" and is a well known recyclable packaging material with economic value. Corrugated cardboard consists of a top and bottom cardboard with a wavy, corrugated strip running through the middle. Paperboard which is flat, pressed, stiff paper is also often called cardboard by the general public. Paperboard does not have a corrugated strip and is of a lower quality paper. Mahoning County recycled over twice the amount of cardboard, per capita, than the per capita collection of cardboard for Pordenone. The cardboard recycled in Mahoning County increased for each of the three years of this study whereas Pordenone Province collected less cardboard in 2006 than the other two previous years (Figure 5.2).

Two legislative rules influence the corrugated cardboard recycling in Italy. The Landfill Directive and the Packaging Directive both have legal implications and determine the use and disposal of cardboard for Italy. The Landfill Directive, Council Directive 1999/31/EC of 1999, requires Italy to separate biodegradable wastes from MSW landfill waste. A resident disposing of cardboard in nonrecycled waste collection is not allowed to do this and, if found to be in noncompliance, is subject to fines.

The EU Directive on packaging and packaging waste, Directive 2004/12/EC (http://europa.eu/scadplus/leg/en/lvb/l21207.htm) restricts the amount of cardboard used in packaging and forces used cardboard to either be recycled or incinerated at waste incineration plants with energy recovery.

There are no mandatory restrictions for the Mahoning County on the use and disposal of cardboard.

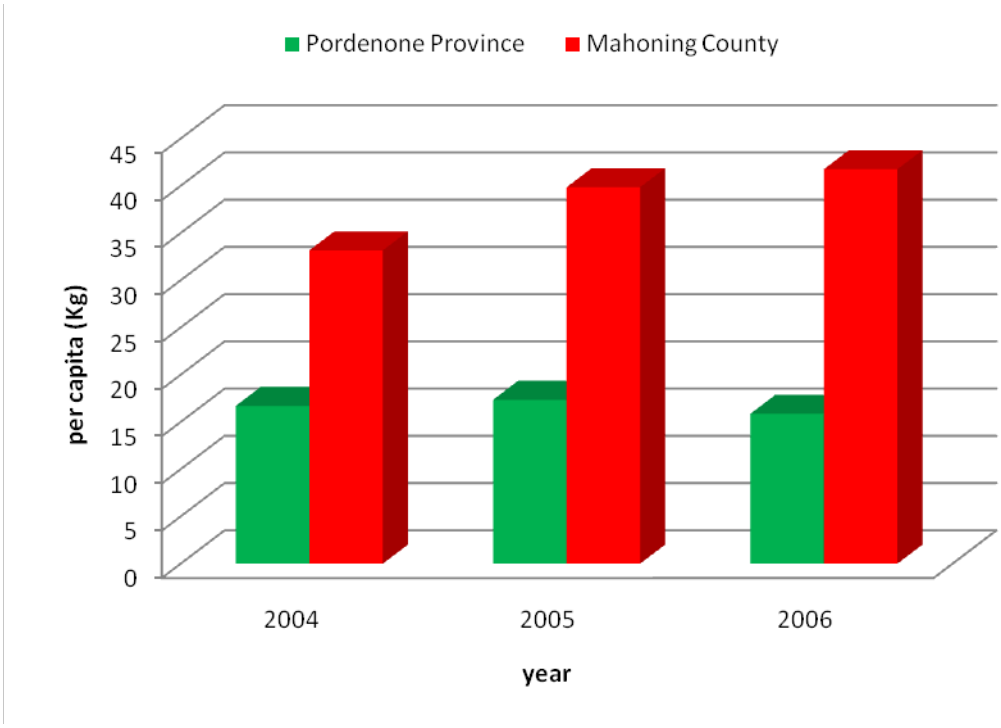

Figure 5.2: Cardboard recycled in Pordenone Province, Italy and Mahoning County, US

5.3 Dry-Cell Batteries

Dry cell batteries differ from lead-acid batteries in the type of electrolyte used. As the name implies, a dry cell battery does not contain a liquid electrolyte. This type of battery is used in a wide variety of equipment, including flashlights, electronic toys, radios, watches and other electronic/mechanical devices. Pordenone separates dry cell batteries into three different sections: 1. batteries for various electrical appliances, excluding car batteries, 2. lead batteries, nickel-cadmium, mercury, and 3. other batteries and accumulators, i.e., 200134, 200133 and 160605. The data from this recycling category indicate that Pordenone collected nearly eight (8) times the weight of dry cell batteries than that collected in Mahoning County per capita. Over the three year study, Mahoning County collected roughly the same quantity of batteries in each year of the study whereas Pordenone experienced a doubling of the amount recycled in 2006, compared to the previous two years (Figure 5.3). This doubling can be explained by the EU Directive 91/157 (regulating how Italy must recycle batteries). Revisions that went into effect in 2006 mandated that all batteries (lead-acid and dry cell) be recycled. Although access to dry cell battery recycling locations is easily accessible in Mahoning County, participation is not mandatory and it is apparent that these expired batteries are placed for disposal in MSW sites.

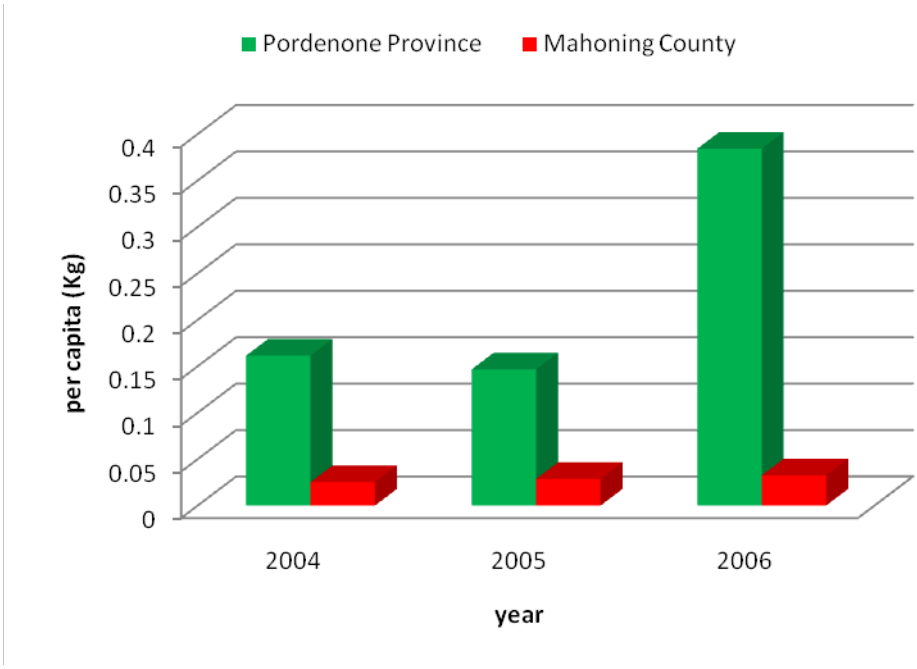

Figure 5.3: Dry cell batteries collected in Pordenone Province, Italy and Mahoning County, US

5.4 Lead-Acid Batteries

Lead-acid batteries include those used in automobiles, tractors and other machinery. This type of battery contains electrodes made of lead and an electrolyte consisting of sulfuric acid. These two components are valuable commodities and can be diverted from landfills and recycled. Pordenone's recycling category is identified as lead batteries for cars, i.e., 160601. The 2004 and 2005 lead-acid battery recycling was nearly constant for Pordenone while the third year recycling decreased by half (Figure 5.4). Mahoning County shows a continuous increase in the recycling rate of lead-acid batteries with the third year in the study exceeding the collection in Pordenone. The recycling data from the combined three year period, however, shows Pordenone Province has recycled three times the amount of lead-acid batteries, per capita, as the amount of lead-acid batteries collected, per capita, for Mahoning County.

Batteries must be collected and recycled in Italy. This is regulated by the EU Directive 91/157 which regulates how Italy must recycle batteries. This legislation prohibits batteries from being placed in MSW landfills. Battery disposal legislation for Italy has been in place since 1991. However, more stringent legislation for battery disposal for the EU went into effect in 2006. Based on increasing the effectiveness of prior battery regulations, the European Parliament and the Council enacted Directive 2006/66/EC in 2006. This directive addresses the impact that batteries, accumulators and waste batteries have on the environment, and seeks to develop innovative manufacturing and disposal methods to protect and preserve and improve the quality of the environment. Batteries and accumulators containing hazardous substances must be eliminated and collection and recycling of waste batteries and accumulators is compulsory. This directive also initiated goals for industry to manufacture more efficient and longer lasting batteries.

Some states and specific counties in the U.S. have mandatory lead-acid battery recycling requirements. The lead-acid battery restriction in Ohio prohibits lead-acid batteries from being disposed in incinerator facilities. The Ohio EPA has concluded that few lead-acid batteries end up in MSW landfills and no further mandatory recycling legislation is needed. As a result, no such regulations are in place for Mahoning County. An explanation for the Mahoning County recycling data for lead-acid batteries must determine if retail battery service centers and scrap metal recycling centers include the amount of lead-acid batteries collected towards the county battery recycling totals. Mahoning County has not consistently included batteries returned to retail dealers and auto stores that sell batteries or batteries collected from scrap metal yards in the total

lead-acid battery collection amounts (Petuch 2009). Efforts are currently under way in Mahoning County to insure complete and accurate data collection for lead-acid batteries. This requires more communication between the county governments (SWMDs) and facilities that collect lead-acid batteries. Since 2006, there has been greater cooperation in accurately recording the amount of batteries recycled. This was achieved largely from the efforts of Jim Petuch, Director of the Recycling Division of Mahoning County.

Based on 2006 records, Mahoning County had 258,733 registered motor vehicles. From personal observations, there are far fewer automobiles in the Pordenone Province than in Mahoning County. Communities are more centrally located in Italy and their use of public transportation is greater than in the US. From this assessment, one could imagine that the US should recycle more lead-acid batteries; however, the data do not support this.

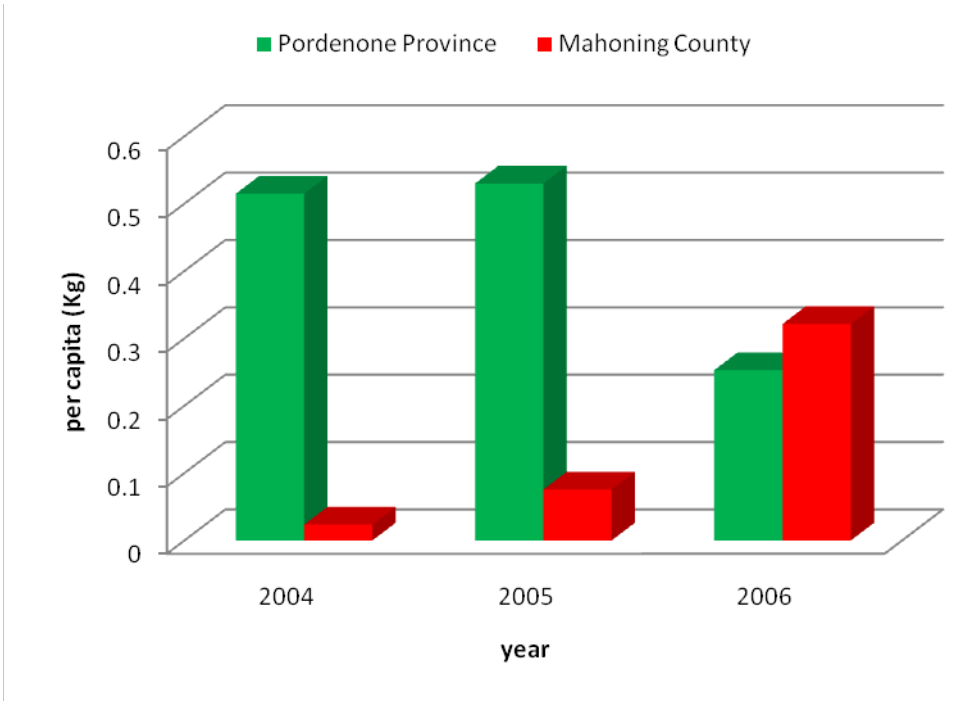

Figure 5.4: Lead-acid batteries recycled in Pordenone Province, Italy and Mahoning County, US

5.5 Electronic Waste

The electronics recycling category includes televisions, video cassette recorders, radios, computers and monitors, phones and other electrical or battery-operated equipment. They may have motors, windings, soldered components, capacitors, resistors and diodes. The electronics category for Italy is further subdivided into the following sections: 1. electronics and electronic equipment, 2. televisions, monitors, computers (refrigerators, freezers, air conditioners, washing machines, dishwashers, cables, adapters and electrical and electronic equipment, etc.), and 3. durables and electrical / electronic equipment, i.e., 200136, 160214, 160213. Some of the recycled electronic materials in Italy are included in different US categories, namely the ferrous metal category. Therefore, the recycling numbers for this category are difficult to compare and may be misleading. Nevertheless, Pordenone Province recycled more electronics in 2004 and 2006 than electronics recycled in Mahoning County. In 2005, the average collection, per person, of electronics for Mahoning County was four (4) times the average collection, per person, of electronics collected for Pordenone Province.

Italy must comply with the EU Directive 2002/96/EC which prohibits the disposal of electrical and electronic components in MSW landfills. Improper disposal of electronics will result in fines in Italy.

The US does not have regulations prohibiting the disposal of electrical and electronic wastes components in MSW landfills. In 2005, several aggressive electronics collection drives were held in Mahoning County. This diverted five (5) times the amount of electronics collected in the preceding and following years (Figure 5.4) of this study from disposal into MSW landfills (Petuch 2009).

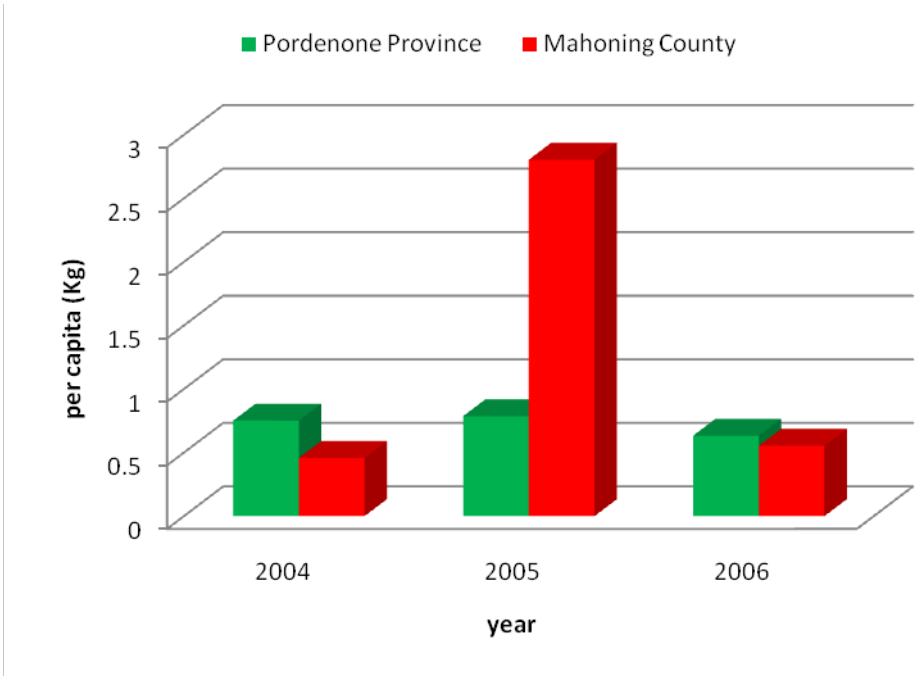

Figure 5.5: Electronics collected in Pordenone Province, Italy and Mahoning County, US

5.6 Food Waste

Food wastes include any food materials from residential or commercial kitchens. Mahoning County also includes in this category retail foods which are discontinued from sale and donated to charities that help the underprivileged. Pordenone divides food waste into two categories, 1. organic household - wet fraction harvested separately, and 2. wet waste from markets, i.e., 200108, 020304. Both countries have increased the amount of food waste going into compost over the three year study. The average of the three year study for the amount of food waste collected per person from Pordenone Province is over nine (9) times the amount of food waste collected per person from Mahoning County.

Italy's enforcement of the EU Landfill Directive, Council Directive 1999/31/EC of 26 April 1999, helps explain the large amount of food waste recycled. Because food is

a biodegradable waste, it must be separated from MSW and is prohibited from MSW landfills. A resident is not allowed to dispose of food waste in non-recycled waste collection and if found to be in noncompliance, is subject to fines. The method in which Italy collects food waste facilitates large collections of this category.

Pordenone Province has separate collection containers and regular collection schedules to collect food wastes. This includes the communities with residential curb-side pick-up services as well as communities which utilize drop-off locations for food waste. This food waste is mixed with yard waste and converted into a commodity of mulch and fertilizer. Italy makes better use of food waste than the US.

Mahoning County has no such regulations governing food waste disposal. The amount of food for Mahoning County diverted from landfills comes from three sources: (1) a single food composting site located in Poland Township (part of Mahoning County), (2) isolated residents across the county participating in home composting endeavors, and (3) food discontinued from retail and wholesale food stores and donated to needy residents in the community.

The sole food composting site was located in one of the more affluent communities in Mahoning County. They accepted compostable waste from residents who voluntarily took their food wastes to the drop-off location.

The estimated portion of food waste collected for Mahoning County is based on citizens who sign-up and make a commitment to recycle food wastes. Those citizens are given food waste recycling bins and training on how to effectively compost food. This is also performed on a voluntary basis. Food donated to local charities to feed the needy is the final factor for this category. When the shelf life of retail and wholesale foods expire,

that is, the designated expiration date has passed, it is no longer able to be sold, yet may still be edible. The food diverted from landfills and given to local charity groups and food banks is included in the total amount of food collected for the US.

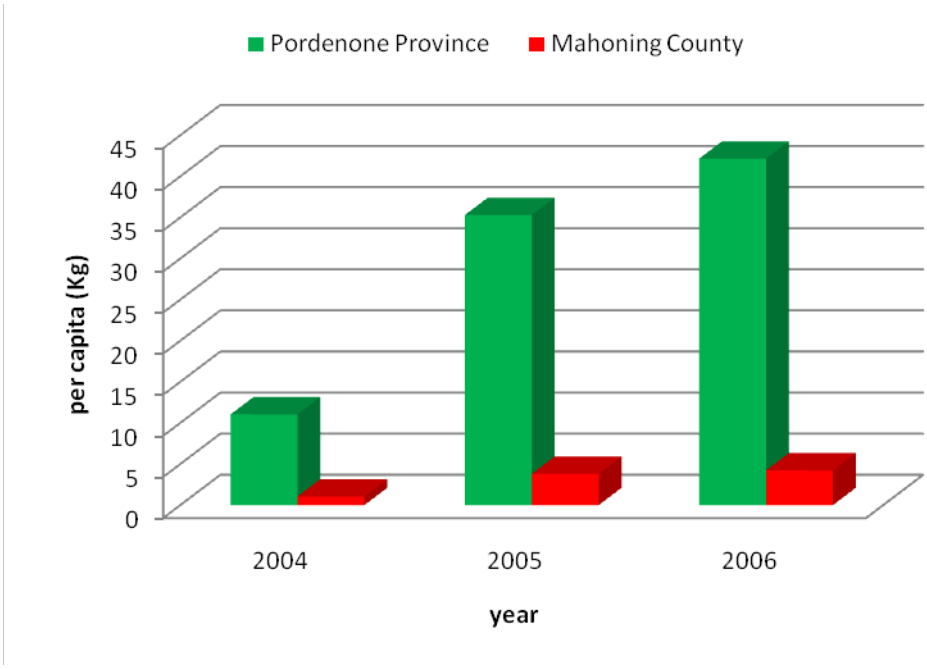

Figure 5.6: Food waste recycled in Pordenone Province, Italy and Mahoning County, US

5.7 Glass

The glass recycling categories for both study areas do not differentiate glass based on colors. Other European Union countries, for example Germany, do separate colors of glass. Mahoning County places all glass into one category whereas Pordenone has two sections: 1. fragments of glass, and 2. bottles, glass jars, etc., i.e., 200102 and 150107. Pordenone Province continually increased the per capita rate of recycling glass. Mahoning County maintained a relative constant rate over the three years, collecting approximately one third the amount of glass per capita as Pordenone.

Both Italy and the US maintain goals for recycling, however neither has a specific regulation focusing on glass. To examine the difference in the recycling quantities of glass, it was important to examine the collection methods of each country. Pordenone Province has a separate collection for both drop-off and curb-side residential recycling for this category, there is one container or bin where only glass is discarded. In Mahoning County, both community drop-off and curb-side residential pick-up locations have a comingled collection of glass, plastic and metal cans which require sorting and separating after pick up.

A MSW audit or a study of glass and glass container consumption and use would be needed to determine the percent of glass recycled compared to glass not recycled in each country. This graph (Figure 5.6) indicates a lack of glass recycling in Mahoning County. The explanation apparently is not the lack of recycling opportunities for this category, but rather a lack of interest in recycling.

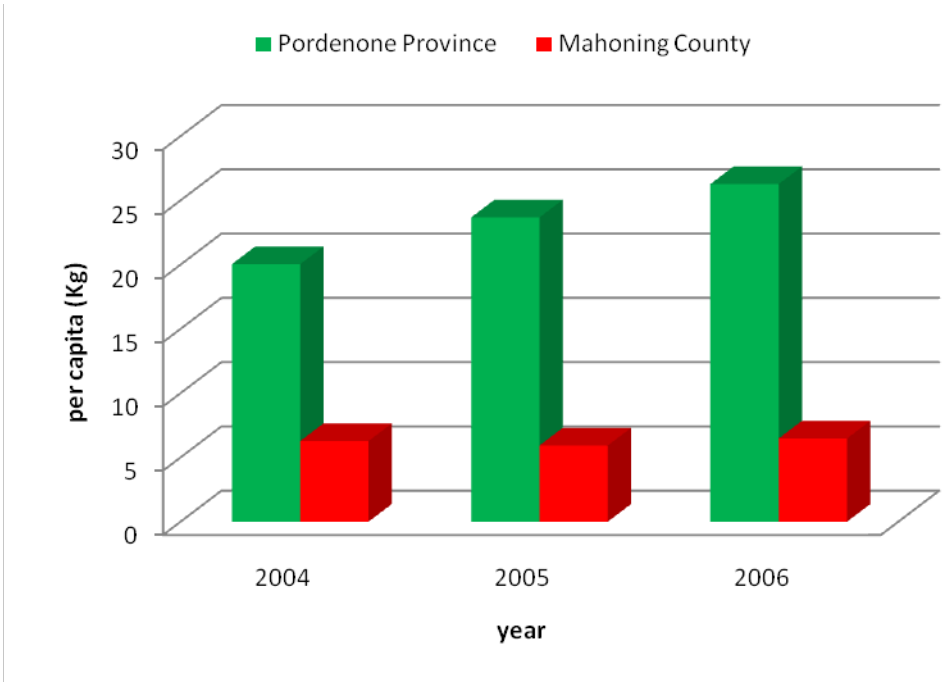

Figure 5.7: Glass recycled in Pordenone Province, Italy and Mahoning County, US

5.8 Household Hazardous Waste

Household hazardous waste (HHW) includes items such as paints, thinners, aerosols and automotive products. Items in this category are meant to be treated differently and are not intended for MSW landfills. Hazardous components can be flammable, corrosive, toxic or radioactive and can increase risks to public health and the environment. Both study areas collect HHW. In Pordenone, there are three individual categories which include: 1. fluorescent tubes and other waste containing mercury, 2. paints, inks, adhesives containing dangerous substances, and 3. paint and varnish waste, i.e., 200121, 200127 and 080111. Mahoning County continually collected less HHW per capita during the three year study. Pordenone, over this period, increased their collection of these wastes. The first year, Mahoning County collected over 100 times that collected by Pordenone Province per capita (.13 kg. : .092 g.). However, in 2006, Pordenone Province collected nearly three (3) times the amount of HHW, per capita, than was collected in Mahoning County (.042 kg. : .014 kg.).

If the US is properly discarding less HHW and if Italy is properly discarding more HHW, that would explain this graph. Further research is needed to identify the total amounts (proper disposal and improper disposal) of discarded HHW for each country. Pordenone Province has drop off locations that accept HHW open continually, throughout the year. In Mahoning County, there is only one or two weekends allocated for the entire year for HHW collection.

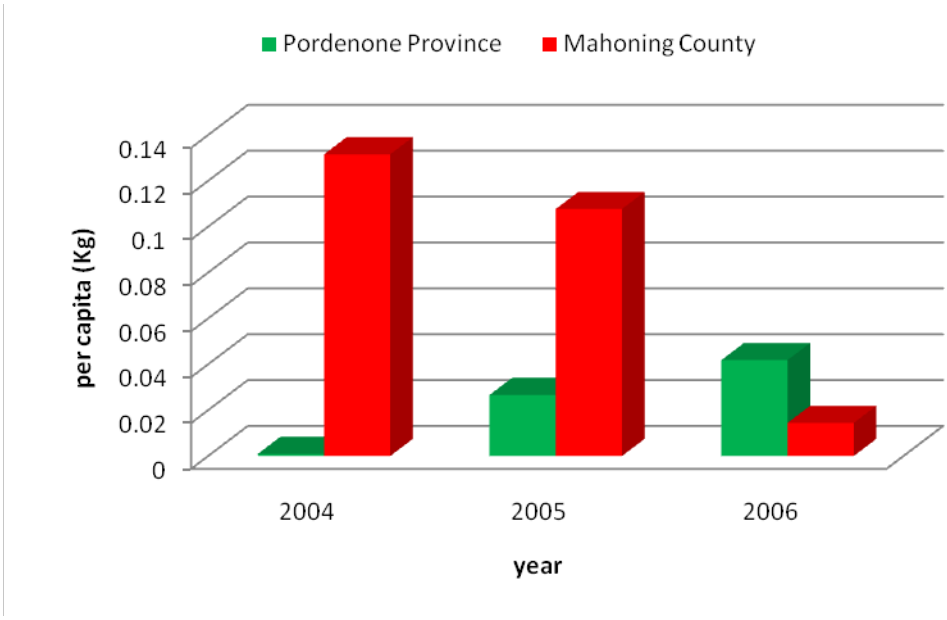

Figure 5.8: Household hazardous waste collected in Pordenone Province, Italy and Mahoning County, US

5.9 Metals

Both countries have ferrous and nonferrous metal recycling categories. Ferrous metal contains iron, Fe^{2+}, and includes steel, iron and alloys of iron with other metals. A non-ferrous metal describes metals other than iron and alloys that do not contain iron, Fe^{2+}. Examples from this section include iron, steel, scrap metal, aluminum cans and other metal containers. Pordenone Province divides their ferrous metal into five separate categories: 1. ferrous materials, 2. scrap metal, iron and steel, 3. mixed metals, 4. cumbersome recovery – iron, and 5. metal powders, i.e., 200140, 170405, 170407, 200307, 120102. Nonferrous metals are divided into two categories: 1. tinned domestic iron, aluminum cans, aluminum, and 2. aluminum, i.e., 150104 & 170402. Ferrous metals were included with the nonferrous category for Pordenone as they separated recyclable metals based on its use in packaging, which included both ferrous and nonferrous metals. For this reason, the per capita recycling amounts for both types of

metal were combined. Mahoning County recycled over 47 times the per capita amount of metals than the per capita amount of metals collected for Pordenone.

From direct observation and contacts in Italy, it is known that there are fewer vehicles in Italy than in the US. This would result in less metal waste generation and lower recycle amounts. The lower metal collection numbers for Pordenone are also a result of larger scrap metal recycling centers operating outside the study area in Italy. For example, a large automotive shredder residue (ASR) facility is located in the Verona Province, outside the Pordenone Province, where data were collected. Metals from recycled automobiles would, therefore, not be included in the metal recycling amounts. Also, there is less construction, demolition and rebuilding in Italy which results in less waste metal generation.

Scrap metal recycling in the US is determined by the economy which offers money for both ferrous and nonferrous metals. All metals can be collected and sold to recycling centers where the current market dictates the amount per pound different qualities of metal will bring. In 2005, a city ordinance was issued for Youngstown, Ohio which required, by law, that all scrap metal dealers in the city document and file with the County, the total amounts and types of metals collected. In 2006, a scrap metal operator was found to be in noncompliance and cited for failure to properly document metal recycling operations.

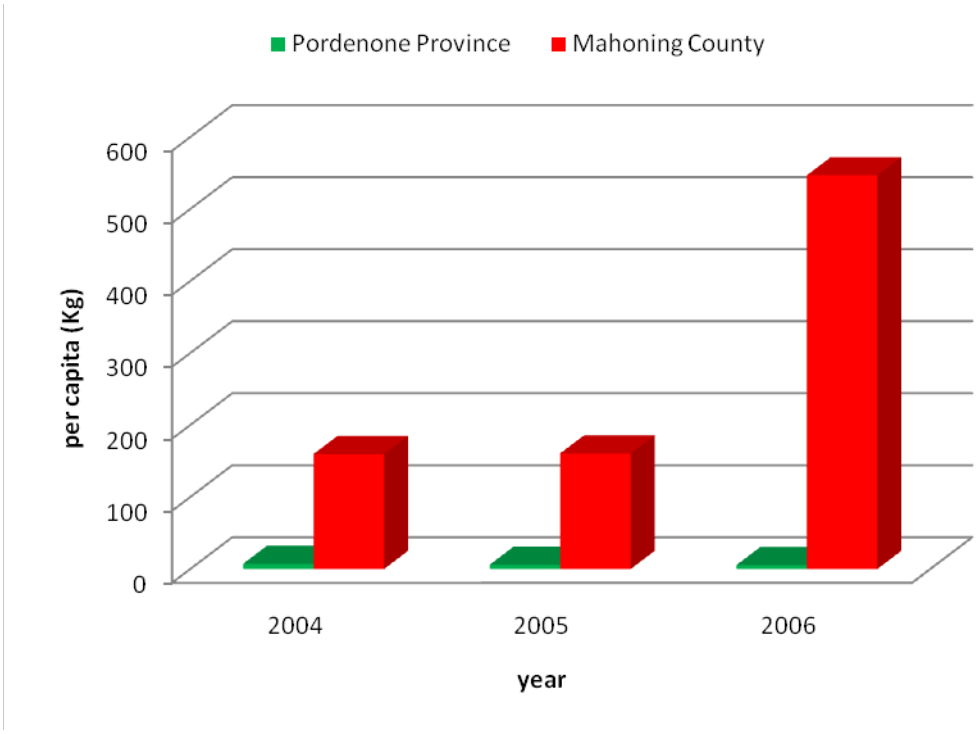

Figure 5.9: Ferrous and nonferrous metal recycled in Pordenone Province, Italy and Mahoning County, US

5.10 Paper

Both countries have one category for paper recyclables even though there are different grades and qualities of paper. Pordenone includes newspapers, magazines and paper packaging, i.e., 200101 into this paper section. Mahoning County includes all paper products except for corrugated cardboard. The first year of the study, both study areas recycled near the same amount of paper per person. The second and third year of the study show an increase in Mahoning County recycling volume while for the same time Pordenone Province shows a slight decrease in paper recycled.

Paper recycling in Italy is influenced by the EU Directive on packaging and packaging waste, Directive 2004/12/EC, and the method of collection for paper products. The packaging regulation restricts the amount of paper used in packaging and requires

used paper either to be recycled or incinerated at waste incineration plants with energy recovery. Paper in Pordenone is also separated by the residents and collected separately from other MSW categories. Paper has its own collection bins at drop off locations and communities with curb-side pick-up have separate containers for paper. Collecting paper separately from other recycled materials at the point of collection eliminates further handling and labor to separate this commodity prior to sale.

Mahoning County recycled more paper, per person than the per capita paper collection for Pordenone, although no regulations exist for recycling paper in Mahoning County, where drop-off collection sites accept all types of paper. Paper products in Mahoning County are also collected in communities with residential curb-side pick-up services.

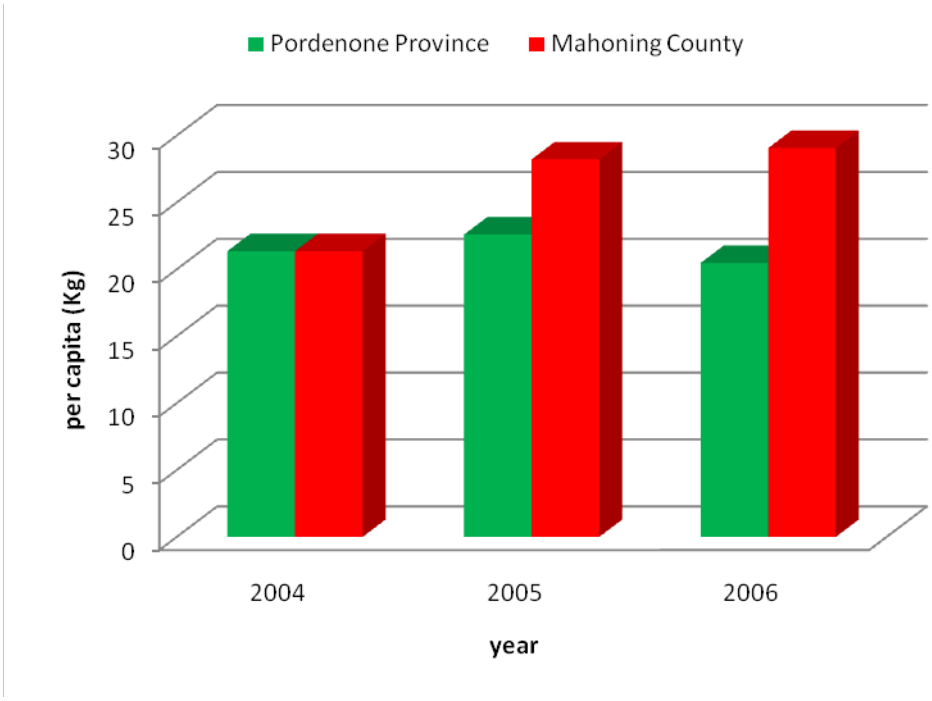

Figure 5.10: Paper recycled in Pordenone Province, Italy and Mahoning County, US

5.11 Plastics

Plastics have become very important in both countries. They are used in drink and food containers, plastic food wraps, clothing, packaging, automobile manufacturing plexi-glass and bags. Plastics, polymers or chains of molecules created from petroleum products, can be manufactured from synthetic or organic materials and manufactured for strength or elasticity. Pordenone Province has three divisions for plastics: 1. plastic packaging, bottles, containers, 2. plastic bags, plastic waste, and 3. plastic containers, plastic film, i.e., 200139, 150102 & 020104. The data indicate that Pordenone recycles a much greater percentage of their plastics than the US. In 2004 and 2005, Pordenone Province recycled nearly eight (8) times more plastics, per person, than Mahoning County. In 2006, Mahoning County increased the plastic recycling rate, per person, by 67 percent from the year before and still recycled less than 20 percent the amount of plastics, per person, than in Pordenone Province.

Pordenone's plastic recycling category represents an average of 6.6 percent, by weight, of the total for all recycling categories compared for the three year study. Two reasons to suggest Pordenone's large plastic recycling numbers seem to be a result of the EU Directive on packaging and packaging waste, Directive 2004/12/EC, and the collection method for plastics. Directive 2004/12/EC restricts the amount of plastics used in packaging and forces used plastics to either be recycled or incinerated at waste incineration plants with energy recovery.

Plastics in Pordenone are also separated by the residents and collected separately from other MSW categories. Plastics have their own collection bins at drop off locations and communities with curb side pick-up have separate containers for plastics.

Plastic recycling in Mahoning County represent an average of .36 percent, by weight, of the sixteen recycling categories, for the three year study. The US regulation, Ohio Administrative Code 3745, requires all plastic bottles and plastic containers to be stamped with a plastic recycling code that identifies the type of plastic used in manufacturing. There are seven (7) plastic types which allow consumers and those recycling the plastics to identify recycling and post consumption options. However, no regulations exist for disposal of plastics in Mahoning County. The drop-off recycling centers may mix plastics with glass and cans which requires separation of the plastics at recycling centers. In curb-side pick-up, plastics are also mixed with other recyclable materials which add extra steps in separating materials to be recycled.

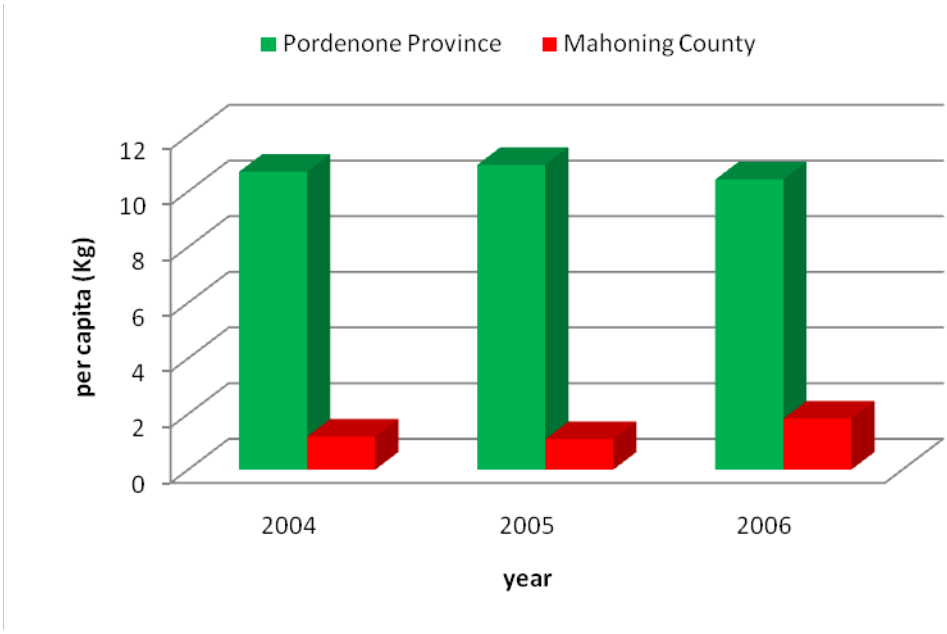

Figure 5.11: Plastics recycled in Pordenone Province, Italy and Mahoning County, US

5.12 Textiles

The textiles category includes clothing and rags. Pordenone Province has just one category for textiles, clothing, i.e., 200110. In 2004 and 2005, Mahoning County

recycled over 3 times the amount of textiles per person than the amount of clothing recycled in Pordenone Province. In 2006 both areas experienced a decrease in clothing collection. Pordenone decreased the per capita clothing collection by 19 percent while Mahoning County decreased clothing collection by 74 percent for 2006.

Pordenone and the Mahoning County utilize drop-off locations around the community to collect clothing. Taking used clothing to recycle locations is voluntary for each study area.

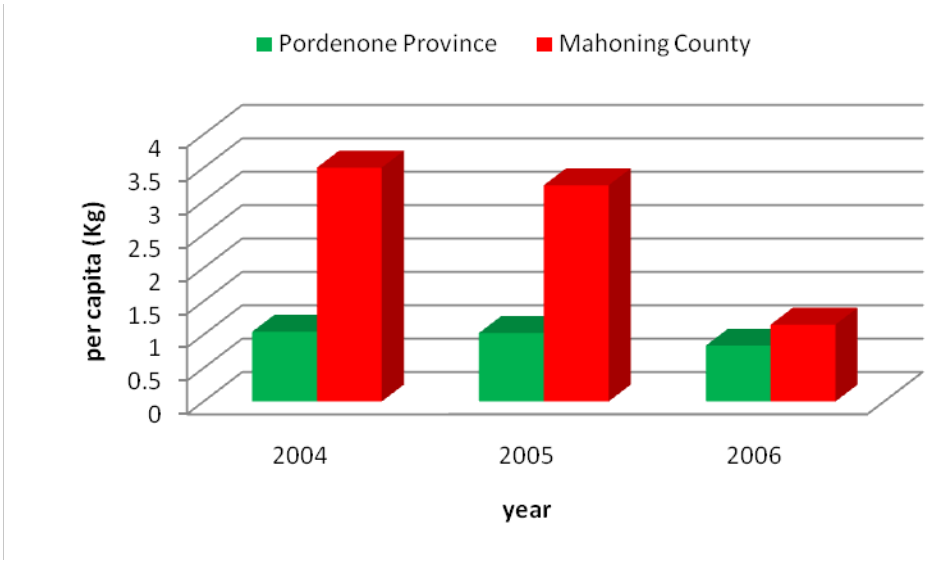

Figure 5.12: Textiles collected in Pordenone Province, Italy and Mahoning County, US

5.13 Tires

The tires category includes all used and worn-out tires from trucks, automobiles, farm machinery, and motorbikes. Pordenone experienced a threefold increase in their tire collection from 2004 to 2005. In 2006, Pordenone did not collect any tires. Mahoning County continually increased their tire collection in each of the three years of the study and each year, the amount of tire collection, per person, increased. In 2006, the amount of tire collection increased by nearly four (4) times the amount collected in 2005.

The mass transportation system works effectively in Italy and thus the need for personally owned vehicles is less. Bus services, both local and regional, as well as rail systems effectively transport the public and ultimately generate fewer used tires. Another aspect that influences tire recycling in Italy is the central location of their communities. The necessities such as food stores, government offices, pharmacies and churches are centrally located and within walking distance for a large percent of the community.

In the US, for 2006, Mahoning County had 258,733 registered motor vehicles. Many US communities are more spread out and public transportation is not as effective as in Italy. There is a greater dependence on personally owned vehicles. While tires are prohibited from MSW landfills, the collection numbers in 2004 and 2005 indicate improper storage and disposal of tires. Used and unwanted tires for these two years were collected and not disposed of properly. In 2006, Mahoning County sponsored several tire recycling drives, collecting many of the tires that accumulated over the last two years.

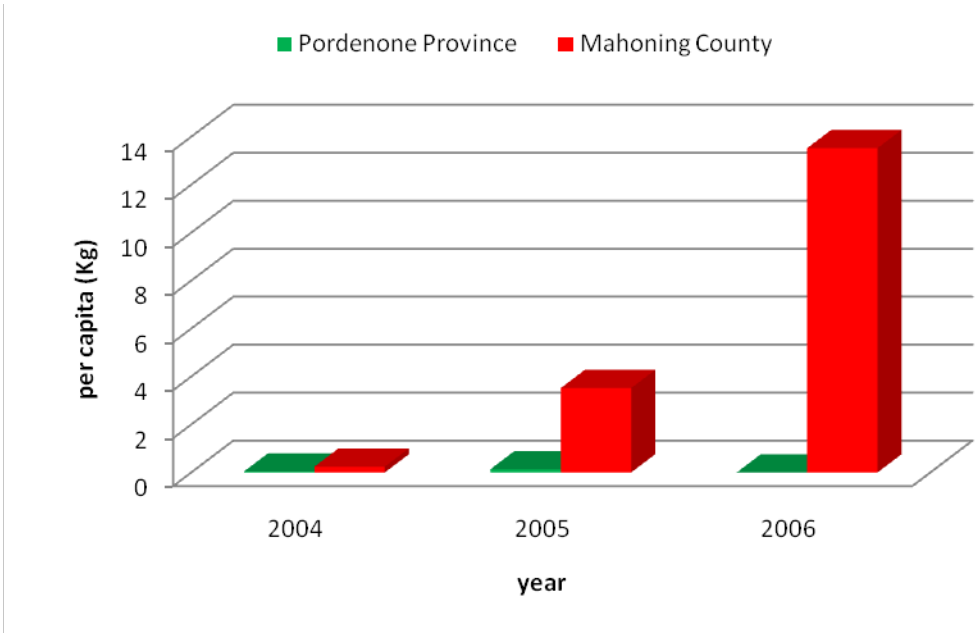

Figure 5.13: Tires collected in Pordenone Province, Italy and Mahoning County, US

5.14 Waste Oil

Used oil is any oil that has been refined from crude oil or any synthetic oil that has been used and as a result of such use is contaminated by physical or chemical impurities. The majority of this oil is generated from the automobile industry. Pordenone Province has just one category for oil, waste mineral oil for engines, gear lubrication and non-chlorinated, i.e., 130205. Both countries prohibit used motor oil from being disposed into MSW landfills. From the data listed, Pordenone and Mahoning County collected similar amounts of used oil in the first two years of the study. In 2004, Pordenone collected twice the amount of oil, per person than the per capita amount collected for Mahoning County. In 2005, Mahoning County collected used oil 1.7 times the amount of oil collected, per person, for Pordenone. In 2006, the oil collection in Mahoning County increased by nearly three times the 2005 amount while Pordenone Province remained relatively constant in their used oil collection capacity.

The mass transportation system works effectively in Italy and the need for personally owned vehicles is less than in the US, as noted previously. Bus services, both local and regional, as well as rail systems effectively transport the public and ultimately generate less used oil waste. Another factor in Italy is the central location of their communities. The necessities such as food stores, government offices and churches are centrally located and within walking distances for a large percent of the community.

In the US, for 2006, Mahoning County had 258,733 registered motor vehicles. There were similar numbers of registered motor vehicles in the previous two years. Used oil collection data were not accurately maintained in Mahoning County and many used oil collection stations did not report the oil collected for 2004 and 2005. In 2006, the collection data were more accurate as independent waste oil collection stations began

recording their waste oil collection amounts to the Mahoning County Recycling Division where they were included into a total used oil waste collection amount. The US communities are more spread out and public transportation is not as effective as Italy, as stated previously. Therefore there is a greater dependence on personally owned vehicles and ultimately more used oil to recycle.

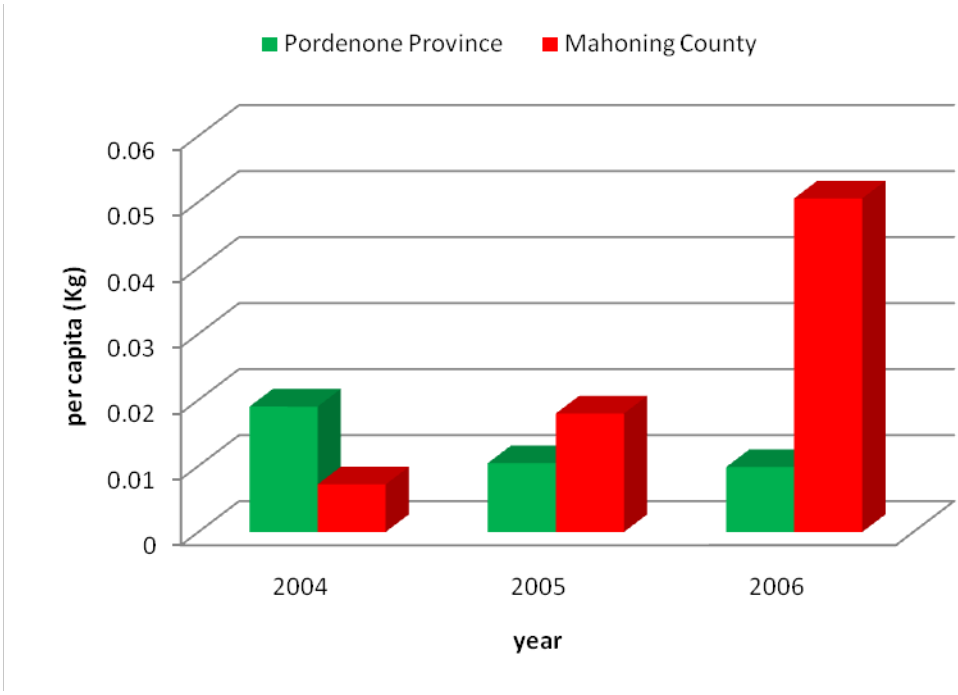

Figure 5.14: Oil collected in Pordenone Province, Italy and Mahoning County, US

5.15 Wood Waste

Wood waste includes pallets, logs and wooden posts. Pordenone Province subdivides this category into two sections of wood, i.e., 200138 & 150103. For the three-year study, Pordenone Province continually increased the amount of wood recycled per person while Mahoning County continually decreased the amount of wood recycled per person. However, each year Mahoning County still recycled more wood, per person, than their Italian counterparts. In 2004, Mahoning County recycled twice the amount of

wood, per person, than the amount of wood, per person, collected in Pordenone. In 2006, the amount of wood collected in Mahoning County was just slightly more than 25 percent greater than the amount of wood collected for Pordenone.

Italy must recycle wood under the EU Landfill Directive, Council Directive 1999/31/EC of 26 April 1999. Because wood is a biodegradable waste, it must be separated from MSW and prohibited from landfills. A resident is not allowed to dispose of wood waste in nonrecyclable waste collection and if found to be in noncompliance, is subject to fines.

Another regulation concerning the recycling of wood in Italy is the Packaging Directive, Directive 2004/12/EC. This regulation restricts the amount of timber used in packaging and forces used wood either to be recycled or burned in an energy recovery plant.

Wood from yard waste in Ohio is regulated under the Ohio Administrative Code 3745-27-19 which prohibits yard waste from MSW landfills. When the Ohio State Legislature passed this regulation, they included an exemption clause which makes the enforcement of this restriction ineffective. The exemption states that if there is any MSW materials mixed with wood waste, the entire combination of non-separated waste, wood waste and MSW, is acceptable for MSW disposal. Another exemption allows waste haulers to collect wood waste for MSW landfill disposal in temporary situations resulting from storm damage.

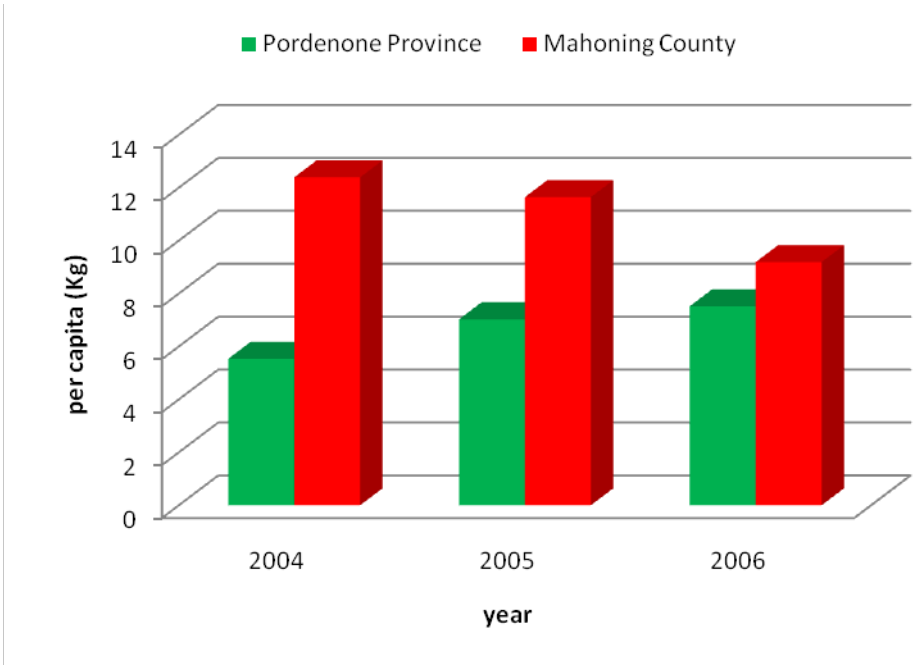

Figure 5.15: Wood recycled in Pordenone Province, Italy and Mahoning County, US

5.16 Yard Waste

Yard waste is composed of grass clippings, leaves, branches, discarded plants and other plant trimmings. Pordenone has just one category for yard waste i.e. 200201. Over the three year study, Pordenone consistently collected more yard waste per person than the per capita collection of yard waste by Mahoning County.

The driving factors for yard waste recycling in Italy can be explained by the EU Landfill Directive and the collection methods for yard waste. The Landfill Directive, Council Directive 1999/31/EC of 26 April 1999, requires Italy to separate biodegradable wastes from MSW landfills. A resident cannot dispose of yard waste in nonrecyclable waste collection, and if found to be in noncompliance, is subject to fines. Also, in Pordenone Province, there are regular pickup services of yard waste throughout the entire

year. The yard waste collected in Pordenone is brought to a Material Recovery Facility (MRF) and stored until used as a mulch or soil fertilizer (Medici, 2004).

In Ohio, legislation under the Ohio Administrative Code 3745-27-19, operational criteria for a sanitary landfill prohibits yard waste from MSW landfills. Yard waste is not to be accepted by waste haulers for disposal in MSW landfills if sufficient composting sites are available to the residents. In 1996 when the Ohio State Legislature enacted OAC 3745-27-19 into law, exemption clauses were included which makes it difficult to restrict yard waste from entering landfills. One exemption states that if there are any MSW materials mixed with yard waste, the entire combination of non-separated waste, yard waste and MSW, is acceptable for MSW disposal. Another exemption allows waste haulers to collect yard waste destined for MSW landfill disposal in temporary situations resulting from storm damage.

Other explanations for the lack of recycling yard waste in Mahoning County includes less frequent, if any, collections specifically and solely for yard waste. Few communities in Mahoning County fund yard waste collections and those that provide this service will only offer the pickup of yard waste on infrequent schedules such as a few weeks for leave collection in the fall or for Christmas tree collection after the Christmas holiday. Finally, personal composting is encouraged for those able to compost at their personal residence. Determining the amount of yard waste collected in home composting sites would be difficult in either country.

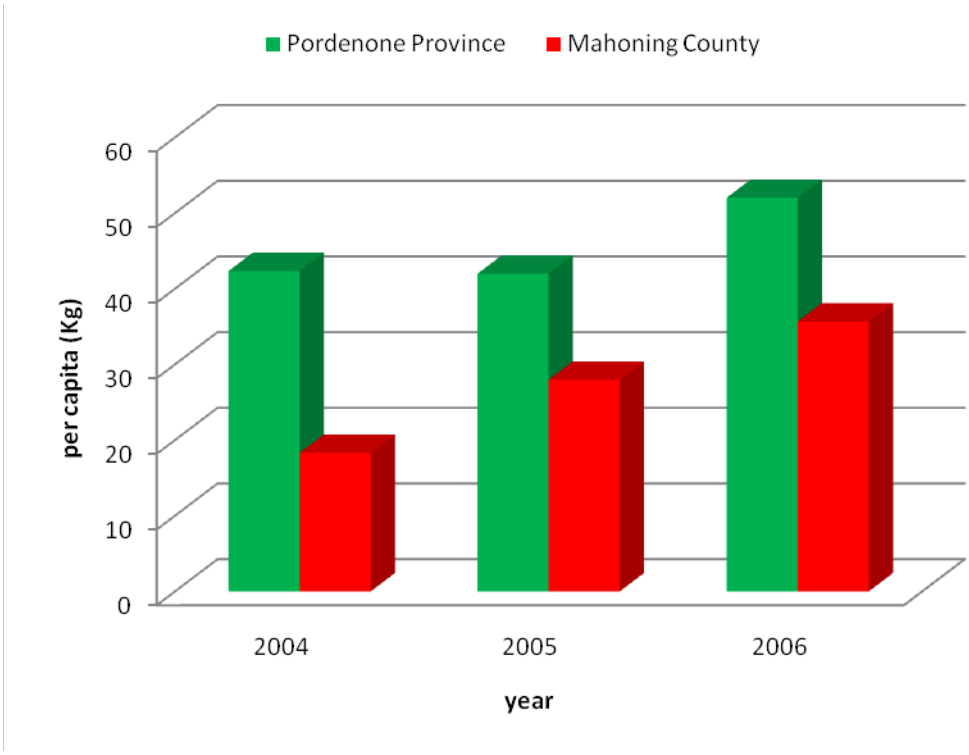

Figure 5.16: Yard waste recycled in Pordenone Province, Italy and Mahoning County, US

6.0 Discussion and Results

This data indicate that each country generates waste, a portion of which gets recycled or not recycled. This section examines each of the sixteen (16) categories for each test site. The three year average recycled amounts, given as a percentage of each country's sixteen (16) categories, indicate the distribution of those materials. Finally, the total of the recyclable materials (kg. per capita per year) and the total non-recyclable materials (kg. per capita per year) for each study area are provided and compared. This yields the percent recycled for each of the three years and for the three year average.

For both study areas, the fraction recycled is found by dividing the total amount recycled by the total waste generated. Multiplying this answer by one hundred (100) expresses the amount recycled as a percent. Table 6.1 lists the data needed to calculate the percent recycled for each year and for the average of the three year study. In addition to examining the percent of MSW recycled, spikes and major changes in the sixteen (16) categories will be analyzed (noted), first within each study area and then among both study areas.

6.1 Distribution of Recycled Materials

The composition of recycled materials in the Pordenone Province is more evenly distributed between the different categories. For the three (3) year study, yard waste comprised the most recycled material for the province, accounting for 30, 24, and 28 percent of the sixteen (16) compared categories. The next four (4) greatest collected categories for the three years include paper, food waste, glass, and cardboard (Figure 6.1).

Evaluation of the sixteen (16) compared categories reveals the composition of recycled materials in the US is greatly weighted towards metals and cardboard. Mahoning County's ferrous and nonferrous metal collection comprised the most recycled material for each of the three years, accounting for 62, 53, and 79 percent of the recycled items compared. The second most recycled item for Mahoning County was cardboard, accounting for 13, 13, and 6 percent of the materials recycled (Figure 6.2).

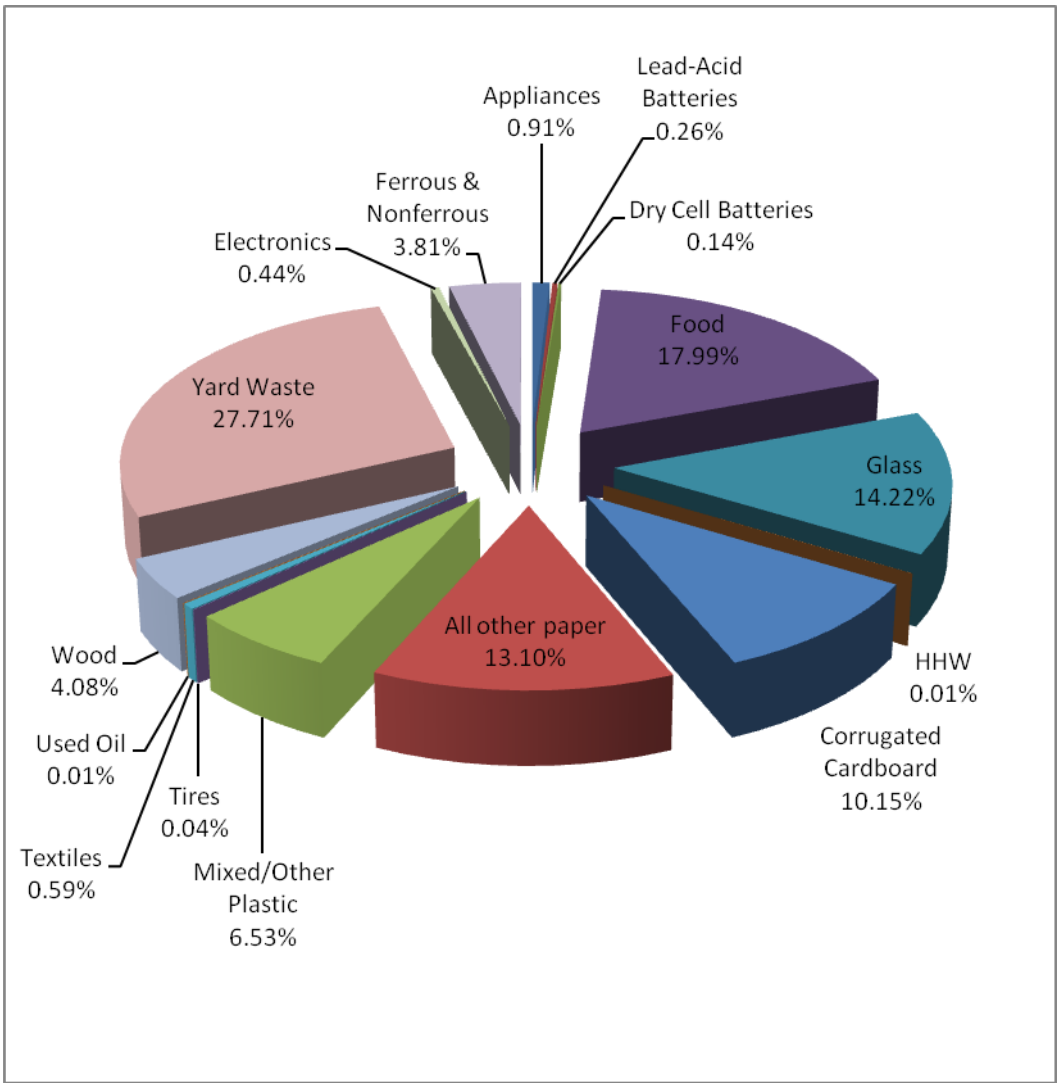

Figure 6.1 Average distribution of recycled material for three year average, Pordenone Province, Italy

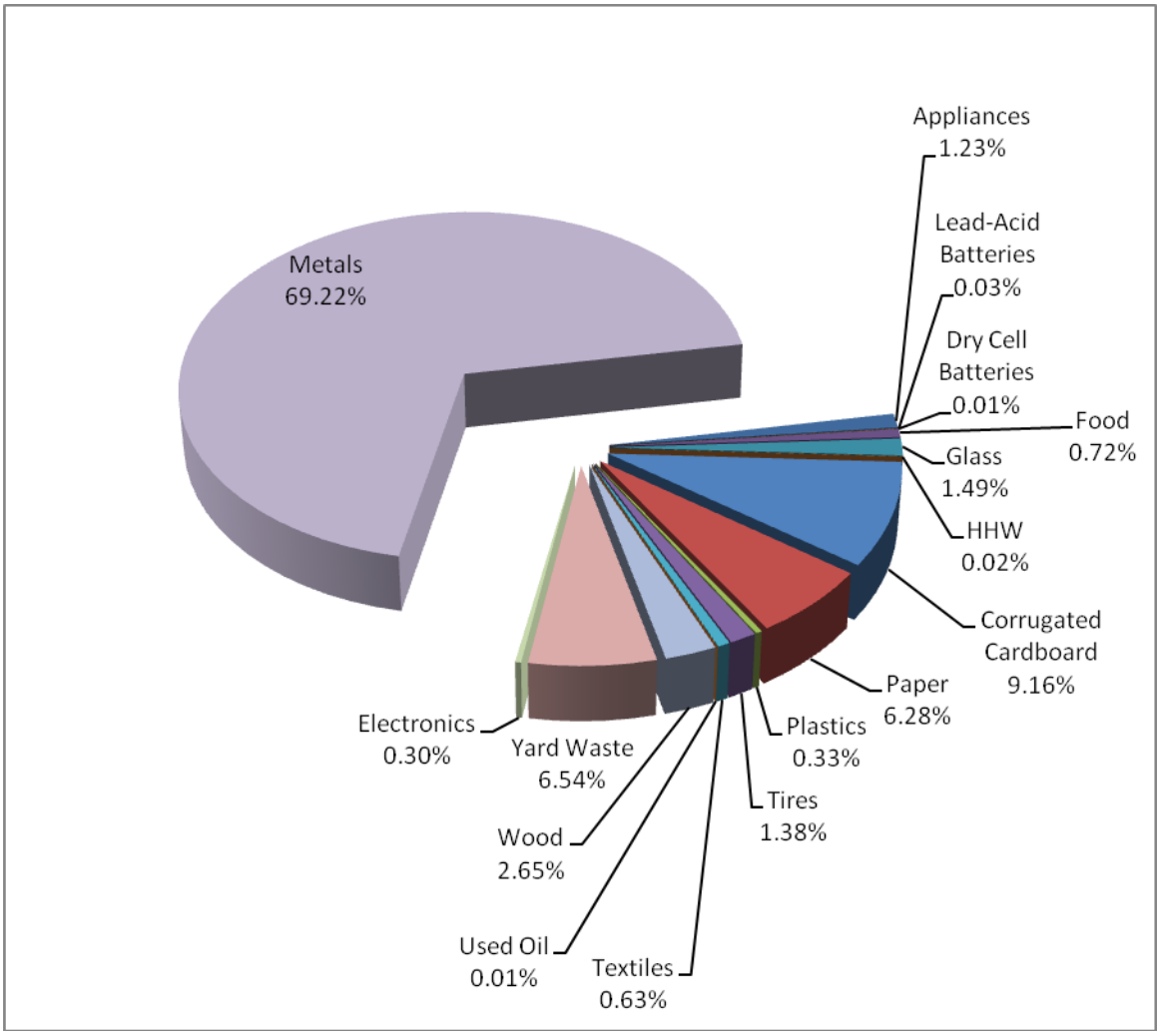

Figure 6.2 Average distribution of recycled material for three year average, Mahoning County, US

6.1.1 Pordenone Province Summary

Pordenone Province increased the amount recycled for each of the three year study. The percent recycled for each year was 35, 43, and 47 percent with an average amount of recycled MSW totaling 42 percent (Table 6.1).

Three categories from section 5.0 indicated a significant fluctuation for Pordenone Province, including: HHW, Food Waste, and Dry-Cell Batteries.

The HHW collection showed a continuous and noteworthy increase from 2004 through 2006 (Figure 5.8). Food waste collection also showed a sharp increase during the three year study (Figure 5.6). The third category that showed a sharp change in collection was dry-cell batteries. There was a slight decrease in collection between 2004 and 2005; however, the amount collected in 2006 doubled (Figure 5.3).

Table 6.1 Percent of total recyclables 2004-2006

	Total waste Generated = Total Recycled plus Undifferentiated (metric tons)	Total Waste Differentiated (metric tons)	Percent of Compared Recyclable	Percent of Noncompared Recyclable	Percent of Total Recyclables
Percent of total recyclables 2004-2006, Pordenone, Italy					
2004	138494.23	49050.65	29.83%	5.59%	35.42%
2005	135455.23	57917.44	37.48%	5.27%	42.76%
2006	137942.31	65301.15	40.44%	6.90%	47.34%
total	411891.77	172269.24	35.90%	5.92%	41.82%
Average	137297.26	57423.08	35.90%	5.92%	41.82%
Percent of total recyclables 2004-2006, Mahoning County, US					
2004	476119.43	72674.88	13.65%	1.61%	15.26%
2005	470772.39	76824.42	16.26%	0.06%	16.32%
2006	488578	175379.90	35.57%	0.33%	35.90%
total	1435469.82	324879.21	21.97%	0.67%	22.63%
Average	478489.94	108293.07	21.97%	0.67%	22.63%

6.1.2 Mahoning County Summary

Mahoning County continually increased the amount of recycled materials between 2004 through 2006. The amount of recycled MSW composed 15 percent, (2004), 16 percent, (2005), and 36 percent, (2006), of the total waste generated. From section 3.3 of this report, total waste generated is the sum of recycled and non-recycled waste. The average amount of recycled material for Mahoning County is 23 percent (Table 6.1).

Mahoning County have nine (9) categories that fluctuated significantly during the three year study, including: HHW, Tires, Metals, Food Waste, Textiles, Appliances, Electronics, Lead-Acid Batteries, and Oil.

The appliance and electronic recycling categories experienced a sharp spike in the amount collected during 2005, whereas the previous and following years maintained relatively consistent collection amounts. The appliance collection experienced a seventeen fold increase per person over the amount collected per person in 2006 (Figure 5.1) and the electronics collection in 2005 experienced a five (5) fold increase per person over the amount of electronics collected in 2006 (Figure 5.5).

Lead-acid batteries, oil, and metal collection all experienced significant increases in the amount recycled over the study period (Figures 5.4, 5.14, and 5.9).

Tire collection for Mahoning County showed a continuous increase in the amount collected per capita with a sharp spike in 2006 (Figure 5.13).

Both HHW and textiles experienced a continuous decreasing trend in the per capita recycling amounts for the three year study period (Figure 5.8 and 5.12).

6.2 Comparison of Recycled Materials Categories

In comparing the ratio between the weight per capita of recycled materials in the defined categories, the data fall into two groups. The weight per capita from Mahoning County is greater than the weight per capita from Pordenone in the following categories:

- **Appliances**
- **Cardboard**
- **Electronics**
- **HHW**
- **Metals**
- **Paper**
- **Textiles**
- **Tires**
- **Oil**
- **Wood**

In comparing the ratio between the weight per capita of recycled materials in the defined categories, the data fall into two groups. The weight per capita from Pordenone Province is greater than the weight per capita from Mahoning County in the following categories:

- **Dry-cell batteries**
- **Food waste**
- **Glass**
- **Lead-acid batteries**
- **Plastics**
- **Yard waste**

When comparing the per capita categories between each location, sharp differences are observed in seven (7) categories: Food Waste, Glass, Plastics, Dry-Cell Batteries, Metals, Tires, and Cardboard. Mahoning County collects a much greater amount, per person of metals, cardboard, and tires than that collected, per person, in Pordenone Province. Furthermore, Pordenone Province collected a much greater amount, per person, of glass, dry-cell batteries, plastics, and food waste than that collected, per person, in Mahoning County.

Three categories, yard waste, wood, and paper have closer per capita collection amounts for the two study areas during the three year study period. Pordenone Province collected more yard waste while Mahoning County collected slightly more in the wood and paper categories (Figure 6.3).

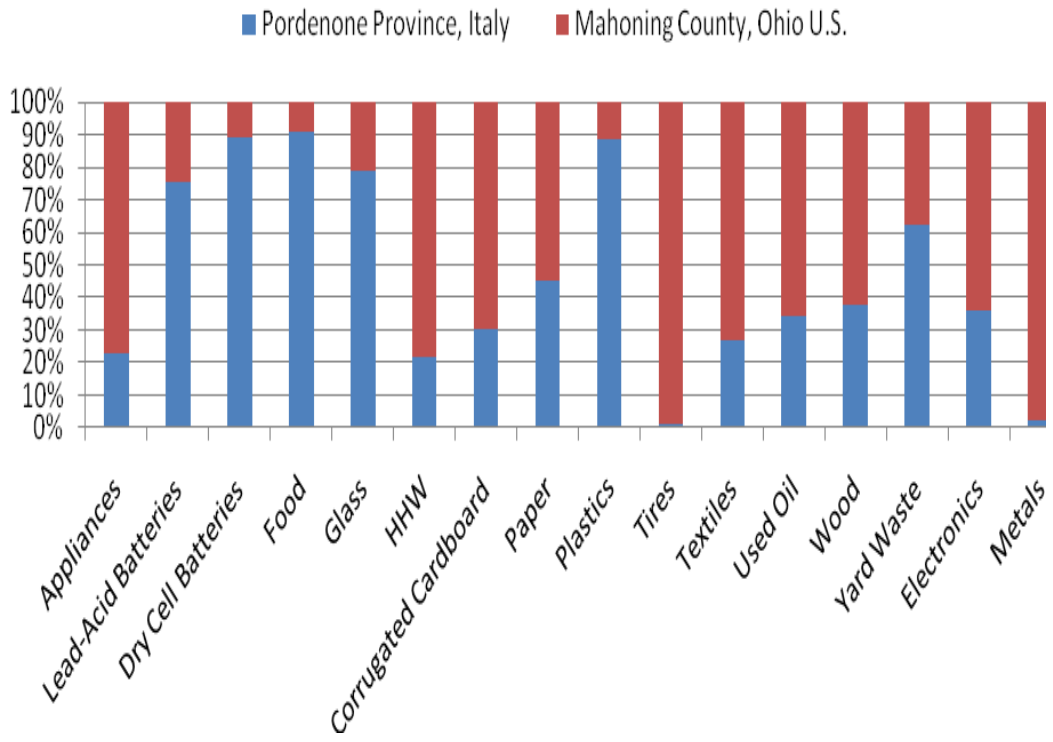

Figure 6.3 Three year average per capita comparison of recyclables

6.3 Comparison of Recycling and Waste Generation

Although Mahoning County collected a higher amount per capita of recyclables in ten (10) of the sixteen (16) categories, (Figure 6.3), and the amount of recyclable waste per capita increased, (Table 6.1), the amount of total waste generated per capita increased from 2004 to 2006. In 2004, the amount of total waste generated, per capita, was 1,892 kilograms. In 2006, this amount increased to 1,944 kilograms per capita. Although the amount of MSW recycled increased, the amount of MSW generated also increased. Comparing the total waste generation of Mahoning County with Pordenone Province shows a notable disparity (Figure 6.4).

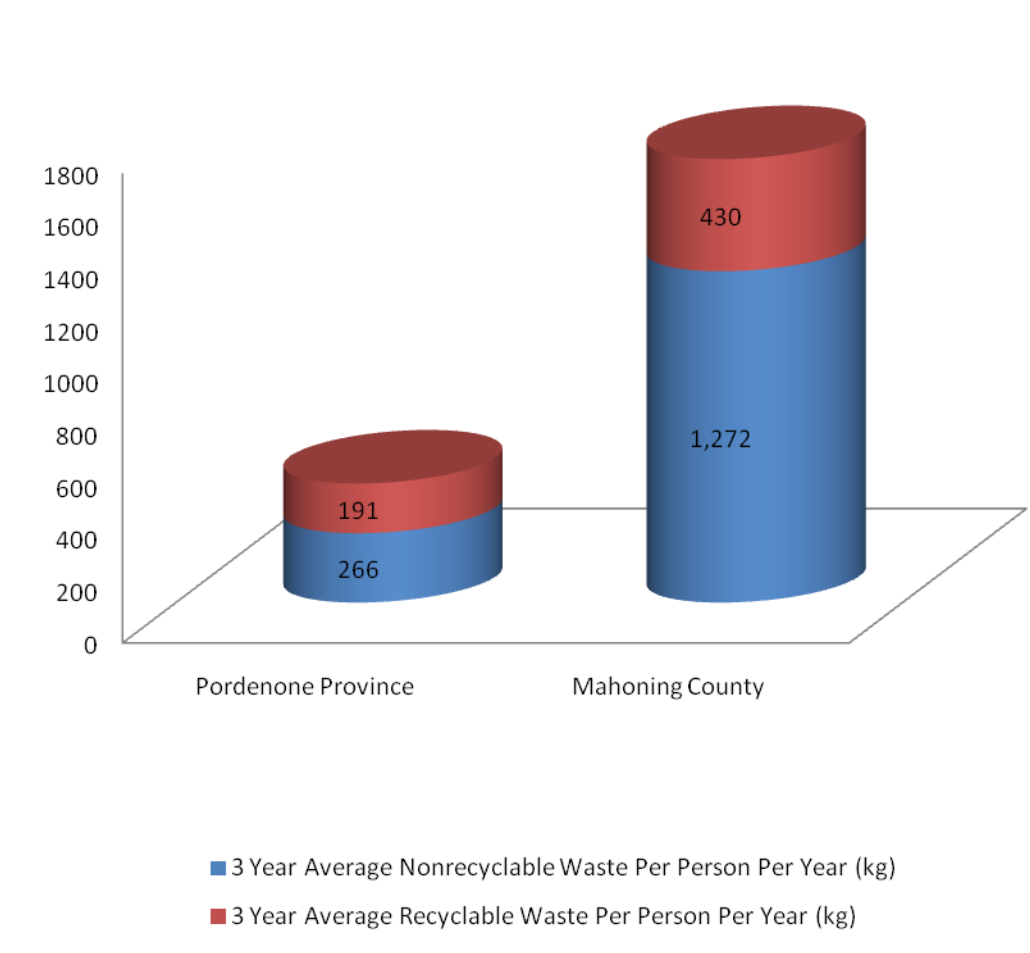

Figure 6.4 Three year average of non-recyclable waste and recyclable materials

Mahoning County has an average of 1,900 kilograms of total waste generated per capita for the three year study compared to 457 kilograms of total waste generated, per capita for Pordenone Province. Although the mass, per capita, of recycled material collected in Mahoning County is greater than that collected in Pordenone Province, the amount of recyclable material from Mahoning County as a percentage is about one half of the recycled percent from Pordenone Province (Table 6.1).

7.0 Conclusions

From this study it was determined that regulations, regularity of pick-up, and economics are the most influential determinants affecting the percentages of waste that are recycled as compared with waste that is landfilled or incinerated. The importance of each varies between Italy and the US. There may be reason to believe practices that can maximize recycling in each country may be transferred to the benefit of the other country.

7.1 Inducements from Regulations

The recycling regulations for Pordenone Province are imposed by the European Union. This substantial legal framework imposes strict fines for noncompliance of recycling mandates. The goals behind the EU recycling regulations include the reduction of MSW and protection of human health and the environment.

Mahoning County recycling is controlled by mandates from the federal and state EPAs, enforced by state and local regulations. The recycling regulations for Pordenone Province discussed in section 4.0 are highly effective in MSWM to maximize recycling. The recycling regulations governing Mahoning County are less effective in MSWM because they are fewer and not enforced.

7.2 Inducements from Economics

Italy has a much smaller land mass area than the US making landfill space scarcer. Consequently, there is a greater emphasis on reducing the amount of MSW generated and the amount of MSW being landfilled. In the US, land space is more abundant and more easily acquired for landfill constructions, meeting the demand for

MSW disposal. The cost of landfill disposal in Mahoning County is lower than disposal for Italy. This appears to have a negative result on recycling for Mahoning County.

Separating waste streams into specific, individual categories at the point of collection increases recycling profitability and creates better record keeping of materials recycled. Pordenone divides their recycled material categories to a greater extent than Mahoning County (more categories). This practice appears to increase recycling in Pordenone Province, specifically at community drop-off sites.

7.3 Inducements from Regularity of Pick-Up

Pordenone Province and Mahoning County each have curb-side pick-up service and drop-off collection centers for recycling. Although the amounts of community drop-off bins are more abundant in Pordenone Province communities, the lesser number of drop-off bins does not appear to be a significant factor in Mahoning County recycling. A more likely factor influencing the recycling percentages for Pordenone Province and Mahoning County is regularity of pick-up.

Pordenone Province has regular collections of yard waste pick-up throughout the year. Not only is yard wasted prohibited from landfills, it is valued as a composting and fertilizer commodity. Yard waste is the most collected material in Pordenone Province. In Mahoning County, although yard waste is banned from landfills, weak regulations, infrequent collections, and inconvenient composting facilities causes much yard waste to go directly to landfills.

Recycling drives in Mahoning County have been effective in the past. The appliance and electronics drives in 2005 and the tire drives in 2006 greatly increased the recycling amounts of these categories. Diverting MSW from landfills, in the absence of

regulations, requires frequent collections and an increase in the regularity of pick-up services.

A schematic flow chart represents the progression of MSW from generation to disposal. Regularity of pick-up services, regulations, valorization of waste, and economics also directly impact recycling (Figure 7.1). Notice that the volume of waste going to landfills is progressively decreased (note the size of boxes in the figure).

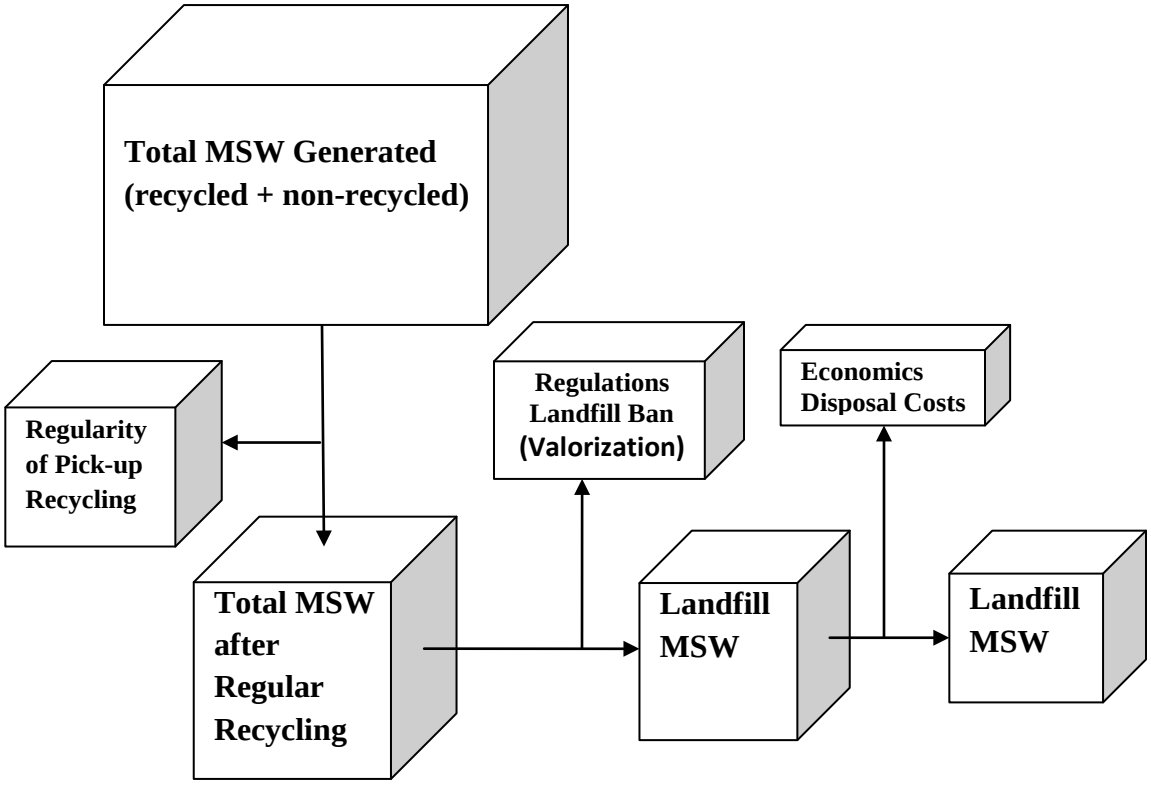

Figure 7.1 Flow chart of MSW removal: from generation to landfill disposal

From examining the recycling data and recycling influences, the relative importance of each measure is given an approximate numerical value. This value represents the importance and influence each determinant has on recycling. Regulations represent an effective MSWM strategy for Pordenone Province, followed by economics

and regularity of pick-up services. Economics had the greatest influence on recycling in the US, followed by regularity of pick-up and finally regulations (Table 7.1).

Table 7.1 Effectiveness of Recycling Inducements

	Recycling (%)		Disposal via Landfill (%)		Disposal via Incineration (%)	
	Pordenone Province	Mahoning County	Pordenone Province	Mahoning County	Pordenone Province	Mahoning County
(A) REGULATIONS	24	3	30	0	5	0
(B) REGULARITY of PICK-UP	3	5	8	17	0	0
(C) ECONOMICS	5	15	20	60	5	0
(A)+(B)+(C)*	**32**	**23**	**58**	**77**	**10**	**N/A**

***Note: (A) + (B) equals percent not landfilled**

7.4 Evaluating What Does and Does Not Work

The recycling determinants are either supported or not supported based on the data (Figure 7.2). Recycling regulations work well in Pordenone Province. EU regulations are detailed, enforceable, and expected to be followed. Regulations in Mahoning County are limited, and enforcement is difficult. For example, as mentioned earlier, yard waste can be sent to landfills if comingled with other MSW. The collection methods seem effective for each location. Curb-side and community drop-off collection routes are well established. Although Mahoning County collects curb-side recyclables on a bi-weekly schedule, it is an effective method for the collection of metals, plastics, glass, and paper. Where curb-side collection in Mahoning County is less effective is the infrequent or lack of yard waste collection. Pordenone Province maintains a regular collection of yard waste pick-up, diverting this category from landfills and recycling this into useful products.

Dividing recyclables into multiple categories works well for both study areas. Dividing the recyclable materials into specific categories seems more effective both to track specifically what is being recycled and to increase the percent of MSW recycled.

Valorization of waste streams effectively increases the percent of MSW that is recycled. In Italy, valorization is implemented to meet the regulation requirements for recycling. In Mahoning County, there is no valorization of MSW, and market demand only targets a few recyclable categories effectively, i.e., metals and cardboard. This is driven by the economic demand for these resources.

Economics is an effective determinant in encouraging recycling in both areas, but in different ways. In Pordenone Province the higher number of recyclable categories helps to find markets for the recyclable materials. The higher cost for land acquisition for landfills encourages less generation of waste at the source and less total MSW destined for landfills. In Mahoning County the relatively low cost of land acquisition for landfills does not create an urgency to reduce consumption at its source or to reduce the waste stream by recycling.

Table 7.2 Effectiveness of Inducements

	Pordenone Province	**Mahoning County**
Regulations including Valorization	EFFECTIVE	NOT EFFECTIVE
Regularity of Pick-Up	EFFECTIVE	SOMEWHAT EFFECTIVE
Economics: Market forces and land acquisition	EFFECTIVE	EFFECTIVE

7.5 Transferability of Recycling Determinants

When considering the influences of recycling in the two study areas, some practices from one country may work effectively in the other country and vice versa. Conversely, some practices from one country may not work in the other country and vice versa (Table 7.3).

Table 7.3 Transferability of Practices to Encourage Recycling

EXISTING PRACTICES: PORDENONE PROVINCE	TRANSFERABILITY: MAHONING COUNTY		TRANSFERABILITY: PORDENONE PROVINCE	EXISTING PRACTICES: MAHONING COUNTY
Regulations	Yes		No	**Regulations**
Regularity of Pick-Up	Yes		No	**Regularity of Pick-Up**
Economics including Collection Methods	Yes		No	**Economics including Collection Methods**

8.0 Recommendations

Recommendations resulting from this study are as follows:

1. Enforce existing regulations on yard waste and lead-acid batteries in Mahoning County.
2. Mahoning County should increase the frequency of pick-ups of yard and special wastes.
3. In each site, increase collection fees for landfill disposal.
4. Impose fines for noncompliance of recycling regulations.
5. Increase the number of categories of recyclable materials.
6. Require valorization of the waste streams for Mahoning County.
7. Increase the frequency of review and adjustments concerning recycling regulations in each study area.

In order for Mahoning County to achieve an increase in recycling and a reduction in the amounts of MSW landfilled, which are policies of the Ohio EPA, changes in recycling policies and behavior must occur. Specifically, more effective recycling regulations must be applied that are enforceable with penalties for noncompliance. Reducing landfilled wastes is a positive step in improving the economy and the environment.

9.0 References

Costi P, Minciardi R, Robba M, Rovatti M, Sacile R. 2004. An environmentally sustainable decision model for urban solid waste management. Waste Management [Internet]. [cited 2009 February 02]; 24(3):277-295. Available from: http://journals.ohiolink.edu/ejc/article.cgi?issn=0956053x&issue=v24i0003&article=277_aesdmfuswm&search_term=%28author%3D%28Costi+P%2C+Minciardi+R%2C+Robba+M%2C+Rovatti+M%2C+Sacile+R%29%29 .

Council Directive 75/442/EEC of 15 July 1975 on waste. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31975L0442:EN:HTML.

Directive 2002/96/EC http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0096:EN:HTML.

Di Vita, G. 2004. Environmental Modeling and Assessment. Renewable Resources and Waste Recycling 9: 159–167.

Gillie D. 1999. A Guide to EC Environmental Law Earthscan Publications Ltd, (London).

Jacobsen H, Kristoffersen, M. 2002. Case studies on waste minimization practices in Europe. European topic centre on waste. European Environment Agency [Internet]. [cited 2009 March 11]. Available from: http://www.compost.it/materiali/EEA_Report_290103.pdf.

Kipperberg G. 2007. A comparison of household recycling behaviors in Norway and the United States. Environmental and Resource Economics [Internet]. [cited 2009 February 13]; 36(2)215 – 235. Available from: http://journals.ohiolink.edu/ejc/article.cgi?issn=09246460&issue=v36i0002&article=215_acohrbinatus&search_term=%28author%3D%28Kipperberg%29%29.

Louis G. 2004. A historical context of municipal solid waste management in the United States. Waste Management & Research [Internet]. [cited 2009 February 02]; 22(4)306-322. Available from: http://journals.ohiolink.edu/ejc/article.cgi?issn=0734242x&issue=v22i0004&article=306_ahcomswmitus&search_term=%28author%3D%28Louis%2C+Garrick+%29%29.

Louis G, Shih J. 2007. A flexible inventory model for municipal solid waste recycling. Socio-Economic Planning Sciences [Internet]. [cited 2009 February 02]; 41(1)61-89. Available from: http://journals.ohiolink.edu/ejc/article.cgi?issn=00380121&issue=v41i0001&article=61_afimfmswr&search_term=%28author%3D%28Louis+G%2C+Shih+%29%29.

Luton LS 1996. The politics of garbage: A community perspective on solid waste policy making. Pittsburgh (PA): University of Pittsburgh Press p.23-24.

Marchettini N, Ridolfi R, Rustici M. 2007. An environmental analysis for comparing waste management options and strategies. Waste Management [Internet]. [cited 2009 February 02]; 27(4)562-571. Available from: http://journals.ohiolink.edu/ejc/article.cgi?issn=0956053x&issue=v27i0004&article=562_aeafcwmoas&search_term=%28author%3D%28Marchettini+N%2C+Ridolfi+R%2C+Rustici+M%29%29.

Massimiliano M, Zoboli R. 2008. Waste generation, waste disposal and policy effectiveness evidence on decoupling from the European Union.

Masui T, Morita T, Kyogoku J. 2000. Analysis of recycling activities using multi-sectoral economic model with material flow. European Journal of Operational Research [Internet]. [cited 2009 February 13]; 122(2)405-415. Available from: http://journals.ohiolink.edu/ejc/pdf.cgi/Masui_T.pdf?issn=03772217&issue=v122i0002&article=405_aoraumemwmf.

Medici A. 2004. Municipal Coordinator for Roveredo-in-Piano, Italy. Personal Communication.

Ohio Department of Natural Resources (ODNR) 2004. State of Ohio waste characterization study. [Internet]. [cited 2009 March 23]; Available from: http://ohiodnr.com/Portals/15/tools/pubs/wastecharfinalreport.pdf.

Ohio Environmental Protection Agency 2001. State solid waste management plan 2001. [Internet]. [cited 2009 February 17]. Available from: http://web.epa.state.oh.us/dsiwm/document/swmdclear/2001_state_plan.pdf.

Ohio Environmental Protection Agency 2005. Summary of solid waste management in Ohio: recycling, reduction, incineration and disposal tables. Available from: http://www.epa.state.oh.us/dsiwm/document/swmdclear/rrd_2005.pdf.

Palframan D, Tank A. 1995. Environmental law in a growing European Union. The Conference Board. Report No. 1106-95-CR. 32pp.

Sára B, Antoninib E, Tarantinic M. 2000. Application of Life Cycle Assessment (LCA) methodology for valorization of building demolition materials and products aLCA consultant, Via Martiri di Monte Sole, 4 - 40129 Bologna, Italy (Qualification and Development of Constructing), Via Zacconi, 16 - 40127 Bologna, Italy cENEA (The Italian National Agency for New Technology, Energy and the Environment) Via Martiri di Monte Sole, 4 - 40129 Bologna, Italy

Salvia M, Cosmi C, Macchiato M, Mangiamele L. 2002. Waste management system optimisation for Southern Italy with MARKAL model. Resources, Conservation and Recycling [Internet]. [cited 2009 February 17]; 34(2002)91–106. Available from: http://journals.ohiolink.edu/ejc/pdf.cgi/Salvia_M.pdf?issn=09213449&issue=v34i0002&article=91_wmsofsiwmm

Smith T. 1993. Understanding European environmental regulations. The Conference Board. Report No. 1026. 40pp.

Subramanian PM. 2008. Plastics recycling and waste management in the US. Resources, Conservation and Recycling [Internet]. [cited 2009 March 15]; 28(2000)253–263. Available from: http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6VDX-3YDGBVH-9-1&_cdi=5994&_user=7778428&_orig=browse&_coverDate=02%2F29%2F2000&_sk=999719996&view=c&wchp=dGLbVlb-zSkzV&_valck=1&md5=a190ebd774849feda851ac1cf14c14f3&ie=/sdarticle.pdf.

Tanskanen JH, Melanen M. Modelling separation strategies of municipal solid waste in Finland. Waste Management & Research [Internet]. [cited 2009 March 06]; 17(2)80-92. Available from: http://journals.ohiolink.edu/ejc/pdf.cgi/Tanskanen_Juha-Heikki.pdf?issn=0734242x&issue=v17i0002&article=80_mssomswif

Tian B, Si J, Zhaoy Y , Wang H, Hao J. 2007. Approach of technical decision-making by element flow analysis and Monte-Carlo simulation of municipal solid waste stream. Journal of Environmental Sciences [Internet]. [cited 2009 March 13]; 19 633–640: Available from http://journals.ohiolink.edu/ejc/pdf.cgi/TIAN_Bao-guo.pdf?issn=10010742&issue=v19i0005&article=633_aotdbesomsws.

Troschinetz A, Mihelcic J. 2009. Sustainable recycling of municipal solid waste in developing countries. Waste Management [Internet]. [cited 2009 April 08]; 29(2)915-923. Available from: http://journals.ohiolink.edu/ejc/pdf.cgi/Troschinetz_Alexis_M.pdf?issn=0956053x&issue=v29i0002&article=915_sromswidc.

Vehlow J, Bergfeldt B, Visser R Wilén C. 2007. European Union waste management strategy and the importance of biogenic waste. Journal of Material Cycles and Waste Management [Internet]. [cited 2009 February 02]; 9(2):130–139. Available from: http://journals.ohiolink.edu/ejc/article.cgi?issn=14384957&issue=v09i0002&article=130_euwmsatiobw&search_term=%28author%3D%28Vehlow+J%2C+Bergfeldt+B%2C+Visser+R+Wil%C3%A9n+%29%29.

Appendix A

Recycling Data for Pordenone Province, Italy

2004, 2005, 2006

ATTIVITA' DI RACCOLTA DATI DI PRODUZIONE RU ANNO 2004

note	Comuni	Abitanti (ISTAT anno 2004)	Indifferenziati						Beni durevoli (art. 44, D.Lgs. 22/97)									Frazione umida		
			Indifferenziati						Beni durevoli (art. 44, D.Lgs. 22/97)									Frazione organica a recupero		
			rifiuti indifferenziati	scarti da multimateriale	rifiuti di mercati	residui di pulizia delle strade	altri rifiuti non compostabili	rifiuti ingombranti (plastica, materiali misti) a smaltimento	frigoriferi, congelatori, condizionatori		TV, computer, stampanti,lavatrici, lavastoviglie, cucine economiche, …			tubi fluorescenti ed altri rifiuti contenenti mercurio	apparecchiature fuori uso contenenti HC	apparecchiature fuori uso contenenti componenti pericolosi	Umido	Verde	scarti di tessuti vegetali
			20 03 01	20 03 01	20 03 02	20 03 03	20 02 03	20 03 07	20 01 23*	20 03 07	20 01 35*	20 01 36	16 02 14	20 01 21	16 02 11*	16 02 13*	20 01 08	20 02 01	02 01 03
			rifiuti urbani non differenziati	rifiuti urbani non differenziati	rifiuti di mercati	residui di pulizia delle strade	altri rifiuti non biodegradabili	rifiuti ingombranti	apparecchiature fuori uso contenenti clorofluorocarburi	rifiuti ingombranti	apparecchiature elettroniche ed elettromeccaniche fuori uso, diverse da quelle di cui	apparecchiature elettroniche ed elettroniche fuori uso, diverse da quelle di cui alle voci da 16 02 09 a 16 02 13	apparecchiature fuori uso diverse da quelle di cui alle voci da 16 02 09 a 16 02 13	altri rifiuti contenenti mercurio	apparecchiature fuori uso contenenti HC	apparecchi fuori uso contenenti componenti pericolosi	rifiuti biodegradabili di cucine e mense	rifiuti biodegradabili	scarti di tessuti vegetali
fa il MUD	ARBA	1,261	437.20														2.38		
fa il MUD	ARZENE	1,693	147.33		0.33			47.78	2.66								14.37	84.54	
fa il MUD	AVIANO	8,747	3,453.77		8.07	53.76		240.48	10.52		8.81	0.39		0.16	3.46	6.10	61.34	500.34	
non fa il MUD	BARCIS	293	175.60			4.22											2.18		
fa il MUD	BUDOIA	2,311	469.40					76.70	4.52		1.04							16.06	
fa il MUD	CANEVA	6,374	637.86					328.08	5.02		2.69	4.53			1.91	0.79	42.46	50.50	
fa il MUD	CAVASSO NUOVO	1,513	527.53			6.50		55.48										20.80	
fa il MUD	CIMOLAIS	462	190.60					13.36									3.59		
fa il MUD	CLAUT	1,135	420.68					24.58											
fa il MUD	ERTO E CASSO	419	152.30					14.54											
fa il MUD	FANNA	1,553	451.93			3.44		51.82										32.18	
fa il MUD	FRISANCO	693	222.00	1.00						18.02									
fa il MUD	MANIAGO	11,471	4,351.10		5.28	333.28		319.02									560.64	494.68	
fa il MUD	MONTEREALE VALCELLINA	4,606	816.67			23.16		104.98	7.78		10.18	0.22			1.28	1.52	14.80		
fa il MUD	POLCENIGO	3,205	1,230.88						3.58			51.96					15.16	27.28	
fa il MUD	PORCIA	14,316	4,236.98		2.14	104.28		92.34	13.85		5.99	1.28					81.48	1,020.10	
fa il MUD	PRATA DI PORDENONE	7,453	2,155.57		2.12	97.36		334.84	14.19		5.36	4.25			1.99	1.02	40.52	392.94	
non fa il MUD	ROVEREDO IN PIANO	5,113	1,936.56		2.26	97.34			4.14								31.68	515.12	
fa il MUD	SAN GIORGIO DELLA R.	4,442	1,175.93					56.52										125.72	
fa il MUD	SAN QUIRINO	3,996	1,625.78			7.68		172.42									15.98	299.56	
fa il MUD	SPILIMBERGO	11,635	4,487.32			286.64				404.12							32.50	466.00	
fa il MUD	VAJONT	1,560	485.80					84.36									3.42		
fa il MUD	VIVARO	1,302	487.76					39.00											
fa il MUD	ANDREIS	308	167.38																
fa il MUD	AZZANO DECIMO	13,711	4,907.19			144.16			11.78	465.52			15.18				197.43	579.33	
fa il MUD	BRUGNERA	8,503	2,356.82		19.56	88.10		93.82	18.23		33.07						47.58	453.22	
fa il MUD	CASARSA DELLA DELIZIA	8,235	902.72			113.55		244.13	5.12			9.98	8.70				123.76	697.45	
fa il MUD	CHIONS	4,896	607.24		0.84			109.01	2.26			4.80	0.40				45.00	283.48	
fa il MUD	CORDOVADO	2,629	316.43		0.42	58.82		111.18	1.84								48.08	286.69	
fa il MUD	FIUME VENETO	10,652	1,161.55		1.11	54.21		193.16	7.91				17.56				119.89	535.85	
fa il MUD	FONTANAFREDDA	10,081	1,338.40					301.90	15.20								518.96	727.16	
fa il MUD	MORSANO AL T.	2,830	320.15		2.78	40.08		81.77	2.08			3.64					26.77	196.94	
fa il MUD	PASIANO DI PORDENONE	7,547	776.27		2.06			199.62	8.40								81.61	240.97	
fa il MUD	PRAVISDOMINI	2,923	232.87		0.49	57.05		41.36	2.14				2.26				25.74	51.49	
fa il MUD	SACILE	19,379	2,744.78			285.00		305.86	22.94				34.53				677.90	558.50	
fa il MUD	SAN MARTINO AL T.	1,449	141.62		0.64			51.97	1.40								13.55	43.15	
fa il MUD	SAN VITO AL T.	13,686	1,994.96		5.43	151.51		495.86	10.08			11.30	28.00				258.05	1,234.22	
fa il MUD	SESTO AL REGHENA	5,675	533.49		0.97	46.54		142.80	4.66								42.99	314.26	
fa il MUD	VALVASONE	2,095	215.73		0.47			104.27	2.20				2.56				28.43	182.49	
fa il MUD	ZOPPOLA	8,231	971.13		1.21	98.94		181.71	6.06			5.80	5.22				89.82	374.70	
non fa il MUD	**AMBIENTE SERVIZI**																		
non fa il MUD	CASTELNOVO DEL FRIULI	928	258.63					2.90											
non fa il MUD	CLAUZETTO	422	139.63					1.38											
non fa il MUD	MEDUNO	1,737	486.02			21.94		2.54											
non fa il MUD	PINZANO AL T.	1,672	439.00					2.10											
non fa il MUD	SEQUALS	2,187	747.85			22.98		2.54											
non fa il MUD	TRAMONTI DI SOPRA	406	143.38					0.72											
non fa il MUD	TRAMONTI DI SOTTO	444	142.30					1.09											
non fa il MUD	TRAVESIO	1,816	420.19					2.14											
non fa il MUD	VITO D'ASIO	922	232.22					1.01											
fa il MUD	**COMUNITA' MONTANA FRIULI OCCID.**																		
non fa il MUD	CORDENONS	17,738	6,557.99						57.39		28.94						16.00	1,312.62	
non fa il MUD	PORDENONE	51,044	22,922.24						22.12		12.03							481.05	
fa il MUD	**GEA S.p.A.**																		
	TOTALI	**297,699.00**	**82,454.72**	**1.00**	**56.19**	**2,200.54**		**4,731.13**	**268.06**	**887.66**	**108.10**	**98.15**	**116.09**	**0.16**	**8.63**	**9.43**	**3,284.06**	**12,599.36**	

Frazione secca																					oli vegetali	
Carta / Cartone		Vetro		Plastica		Metalli			Legno			Abiti / Stracci			Altri tipi di imballaggi			altro		oli vegetali	
Carta e cartone da RD (giornali, riviste, ...)	imballaggi in carta e cartone	Vetro da RD	imballaggi in vetro (bottiglie, vasellame, ...)	plastica da RD	imballaggi in plastica (bottiglie, contenitori, ...)	metallo da RD	imballaggi metallici	Ingombranti a recupero ferro	legno da RD	imballaggi in legno (cassette, ...)	Ingombranti a recupero legno	abiti	stracci	imballaggi in materia tessile	imballaggi in materiali compositi (ad es. poliaccoppiati)	imballaggi in materiali misti (ad es. multimateriale)	imballaggi contenenti residui di sostanze pericolose o contaminati da tali	altro specificare	altro specificare	oli vegetali esausti	oli e grassi diversi da 200125
20 01 01	**15 01 01**	**20 01 02**	**15 01 07**	**20 01 39**	**15 01 02**	**20 01 40**	**15 01 04**	**20 03 07**	**20 01 38**	**15 01 03**	**20 03 07**	**20 01 10**	**20 01 11**	**15 01 09**	**15 01 05**	**15 01 06**	**15 01 10***	**20 01 99**	**20 01 99**	**20 01 25**	**20 01 26***
carta e cartone	imballaggi in carta e cartone	vetro	imballaggi in vetro	plastica	imballaggi in plastica	metallo	imballaggi metallici	rifiuti ingombranti	legno, diverso da quello di cui alla voce 20 01 37	imballaggi in legno	rifiuti ingombranti	abbigliamento	prodotti tessili	imballaggi in materia tessile	imballaggi in materiali compositi	imballaggi in materiali misti	imballaggi contenenti residui di sostanze pericolose o contaminati da tali	Carta, plastica, alluminio	multimateriale	oli e grassi commestibili	oli e grassi diversi da 200125
	23.87		37.95		6.89	35.04		36.80													
54.14	6.23			0.08	62.03	2.34			13.10			7.11				70.84					0.45
	26.62		402.75			138.12			133.50			4.57							889.29	1.57	
	20.44		18.06		3.20			7.18													
138.08		163.99		27.81		33.79															
	211.00				0.01											298.11					
	28.54		42.05		7.43																
	12.68		13.10		3.18																
	25.08		19.40		3.36	29.90															
	11.96		5.31		1.32																
	33.42		45.17		8.30																
	14.93		17.50		2.75	1.00															
	499.54		311.21		79.54	2.28						20.96									
	219.49		213.34		64.07	86.88			60.93			13.33								0.60	
72.33	0.90		164.46		30.96		3.13	24.38												0.50	
1.22	70.26		308.85	1.00		7.76													1,048.63		
	228.47		262.73		64.99							10.23				0.03				0.20	
197.45	186.38		196.00		52.81	32.12	17.42	98.98												0.22	
			209.34				41.82		31.46										445.86		
140.10		106.06		19.77								4.57								0.39	
	356.27		376.09		52.18											0.33					
	26.75		37.15		6.67																
	19.04		35.92		6.61	10.20															
	9.51		10.70		2.88																
269.80	327.87		497.77	0.40	130.17	57.79	2.34		98.38			23.27				0.19				1.87	1.80
	348.92		249.54			25.64			71.60			6.66				0.18			571.00		
370.10	417.67			4.74	258.10	57.98	15.44		142.73			25.14				327.12				2.10	1.40
181.50	76.92			0.48	93.38	8.83			46.82			9.79				199.18				2.10	0.20
124.88	41.54				77.96	32.64			15.78			14.23				97.94				1.20	
458.70	158.01			2.14	213.64	91.22	1.30		113.14			19.67				380.61				3.90	
387.93	50.02				106.79	72.26			74.94							402.75					
125.79	11.70			0.16	76.25				32.66			10.75				129.01				0.47	
213.66	139.35			0.94	130.51	63.67						17.48				296.81				1.55	
117.63	36.60				76.18	8.96						6.71				106.12				0.20	
816.38	273.28		774.70		381.73	127.78	1.90		173.72			39.16				0.91				0.50	0.60
47.82	63.58				49.34							4.39				66.64				0.50	0.30
680.49	199.75		127.61	0.85	353.53	150.20	26.54		142.38	0.76		36.29				454.85				3.40	0.80
233.74	17.04			0.08	111.57	67.73			16.60			13.24				217.81				1.10	
101.44	28.20				52.20	42.38	12.60					9.12				103.57				0.80	
365.19	145.54			1.56	223.62	41.82	11.08		6.06	0.44		14.34				283.56				0.50	0.20
			23.25					18.47										67.53			
			11.42					12.06										35.05			
			44.87					20.36										115.08			
			40.96					37.21										108.38			
			52.64					28.16										148.23			
			11.89					7.10										31.18			
			12.23					13.91										28.19			
			45.47					29.13										124.85			
			22.85					10.76										65.13			
917.18	525.66		260.20		96.58		22.63		13.44												
344.80	80.35		791.36		237.48		68.81		459.59												
6,360.35	4,973.38	270.05	5,693.84	60.01	3,128.16	1,228.33	225.01	344.50	1,646.83	1.20	0.00	311.00	0.00	0.00	0.00	3,436.55	0.00	723.62	2,954.78	23.67	5.75

raccolte selettive																																
medicinali / farmaci	pile / accumulatori					vernici, inchiostri, solventi, pesticidi, oli									gas in contenitori in pressione		altro															
medicinali/farmaci	batterie ed accumulatori					vernici, inchiostri, adesivi			solventi	pesticidi	oli da motori		gas in contenitori in pressione		rifiuti di oli non specificati altrimenti	rifiuti contenenti olio	rifiuti non specificatiltrimenti		ass. materiali filtranti stracci e indumenti	rifiuti organici contenenti sostanze pericolose		rifiuti contenenti altre sostanze pericolose		soluzioni acquose di scarto		polveri di metalli						
20 01 32	**20 01 34**	**20 01 33***		**16 06 01***	**16 06 02***	**16 06 05**	**20 01 28**	**20 01 27***	**08 01 11***	**20 01 13***	**20 01 19***	**13 02 05***	**13 02 08***	**16 05 04***	**16 05 05**	**13 08 02***	**16 07 08***	**16 01 19**	**15 02 02***	**16 03 05***		**16 07 09***		**16 10 01***		**12 01 02**						
medicinali diversi da quelli di cui alla voce 20 01 31	batterie e accumulatori diversi da quelli di cui alla voce 200133	batterie e accumulatori di cui alla voce 160601, 160602 e 160603 nonché batterie e accumulatori non suddivisi contenenti tali batterie		batterie al piombo	batterie al nichel - cadmio	altre batterie ed accumulatori	vernici, inchiostri, adesivi e resine diversi da quelli di cui alla voce 200127	vernici, inchiostri, adesivi e resine contenenti sostanze pericolose	pitture e vernici di scarto, contenenti solventi organici o altre sostanze pericolose	solventi	pesticidi	scarti di olio minerale per motori, ingranaggi e lubrificazioni, non	altri oli per motori, ingranaggi e lubrificazione		gas in contenitori in pressione	altre emulsioni	rifiuti contenenti olio	specificare	ass. materiali filtranti stracci e indumenti	rifiuti organici contenenti sostanze pericolose		rifiuti contenenti altre sostanze pericolose		soluzioni acquose di scarto		polveri di metalli						
0.20	0.13	3.35																														
0.14	0.20			1.40											0.10										0.40							
1.36	1.46			10.65			3.52					1.98					1.73															
0.01	0.00																															
	0.16	0.02																														
0.96	0.67	3.48													0.47																	
0.10	0.11																															
0.04	0.03																															
0.12	0.23			0.72													1.36															
0.03	0.02																															
0.15	0.17																															
0.03	0.03			0.71																												
0.76	1.10			4.37																												
0.70	0.46																															
0.27	0.41			3.48								0.20																				
1.72	1.49			5.03											0.73																	
0.88	0.70			6.29											0.38																	
0.44	0.64			4.87								0.97																				
0.48	0.54			3.07					0.12																							11.56
0.39	0.31	3.08													0.02																	
0.66	1.66														1.33																	
0.11	0.05																															
0.15	0.10	1.57																														
0.03	0.03																															
0.72	1.81			11.93			0.99					0.60			0.65	1.10																	
0.55	0.57			3.34								0.20							0.05													
1.09	0.93			4.49								0.10			0.55					0.07												
0.46	0.30			5.61											0.47																	
0.26	0.22			0.89								1.10			0.14				0.82													
0.96	1.45			10.51		0.53									0.53							16.42										
0.94	1.32			9.24							0.31			0.12																		
0.27	0.38			5.72											0.14																	
0.55	0.61			1.95											0.49																	
0.13	0.25														0.14																	
0.88	3.78			16.34											1.64																	
0.21	0.15			0.77											0.08																	
1.99	2.28			13.24											1.66																	
0.59	0.23														0.34																	
0.28	0.22			0.90											0.14																	
0.89	0.55			4.91								0.50			0.48																	
0.30	0.35																															
0.16	0.19																															
0.54	0.65																															
0.49	0.59																															
0.64	0.76																															
0.17	0.19																															
0.17	0.19																															
0.66	0.66																															
0.31	0.34																															
0.96	1.77			2.10																												
3.13	4.58			20.68																												
27.99	**36.01**	**11.50**		**153.21**		**0.53**	**4.51**		**0.12**		**0.31**	**5.65**		**0.12**	**10.47**	**1.10**	**3.09**		**0.87**	**0.07**		**16.42**		**0.40**		**11.56**						

Pneumatici fuori uso	Rifiuti di dissabbiamento	Veicoli fuori uso	Fanghi da fosse settiche e pulizia fognature			Rifiuti delle operazioni di costruzione e demolizione				Elaborazioni					
Pneumatici						Rifiuti non conteggiati									
pneumatici fuori uso	Rifiuti di disabbiamento	veicoli fuori uso	fanghi provenienti da fosse settiche	fanghi delle fosse settiche	rifiuti pulizia fognature	scorie di cemento, matt	Ferro e acciaio		rifiuti misti dell'attività di demolizione	Totale RU (t/anno)	Totale rifiuti urbani indifferenziati (t/anno)	Totale raccolta differenziata (t/anno)	RD (%)	Rifiuti pro capite (365 giorni) [kg/(abitante x giorno)]	Rifiuti pro capite (365 giorni) [kg/(abitante x anno)]
16 01 03	**200303**	**16 01 04***	**20 03 04**	**19 08 05**	**20 03 06**	**17 01 07**	**17 04 05**	**17 05 04**	**17 09 04**						
pneumatici fuori uso	Rifiuti di disabbiamento	veicoli fuori uso	fanghi provenienti da fosse settiche	fanghi delle fosse settiche	rifiuti della pulizia delle fognature	miscugli o scorie di cemento, mattoni, mattonelle e	ferro e acciaio	terre e rocce	rifiuti misti dell'attività di demolizione						
										583.81	437.20	146.61	25.11%	1.268	462.976
2.40										517.23	195.44	321.79	62.21%	0.837	305.508
										5,964.31	3,756.08	2,208.23	37.02%	1.868	681.869
										230.89	179.82	51.07	22.12%	2.159	788.014
										931.57	546.10	385.47	41.38%	1.104	403.103
										1,588.53	965.94	622.59	39.19%	0.683	249.220
										688.55	589.51	99.04	14.38%	1.247	455.086
										236.58	203.96	32.62	13.79%	1.403	512.076
										525.42	445.26	80.16	15.26%	1.268	462.926
										185.48	166.84	18.64	10.05%	1.213	442.675
										626.59	507.19	119.40	19.06%	1.105	403.469
										277.97	223.00	54.97	19.77%	1.099	401.108
										6,983.75	5,008.68	1,975.07	28.28%	1.668	608.818
										1,640.38	944.81	695.57	42.40%	0.976	356.139
										1,629.88	1,230.88	399.00	24.48%	1.393	508.543
									758.10	7,005.13	4,435.74	2,569.39	36.68%	1.341	489.321
					5.98	51.40				3,625.03	2,589.89	1,035.14	28.56%	1.333	486.385
										3,375.40	2,036.16	1,339.24	39.68%	1.809	660.161
					18.00			77.36		2,102.41	1,232.45	869.96	41.38%	1.297	473.303
										2,396.10	1,805.88	590.22	24.63%	1.643	599.626
										6,465.10	4,773.96	1,691.14	26.16%	1.522	555.660
										644.31	570.16	74.15	11.51%	1.132	413.016
										600.35	526.76	73.59	12.26%	1.263	461.099
										190.53	167.38	23.15	12.15%	1.695	618.607
										7,750.04	5,051.35	2,698.69	34.82%	1.549	565.243
										4,388.64	2,558.30	1,830.34	41.71%	1.414	516.129
0.10			3.00							3,735.16	1,260.40	2,474.76	66.26%	1.243	453.572
							102.13			1,679.07	717.09	961.98	57.29%	0.940	342.948
										1,233.06	486.85	746.21	60.52%	1.285	469.021
			88.18	10.00			1.03		141.66	3,563.96	1,410.03	2,153.94	60.44%	0.917	334.582
5.94										4,008.23	1,640.30	2,367.93	59.08%	1.089	397.603
										1,067.51	444.78	622.73	58.33%	1.033	377.212
1.68									23.30	2,176.49	977.95	1,198.54	55.07%	0.790	288.392
										766.31	331.77	434.54	56.71%	0.718	262.167
									87.00	7,242.80	3,335.64	3,907.16	53.95%	1.024	373.745
										486.10	194.23	291.87	60.04%	0.919	335.469
2.49									118.90	6,386.03	2,647.76	3,738.27	58.54%	1.278	466.610
										1,765.78	723.80	1,041.98	59.01%	0.852	311.150
										887.98	320.47	567.51	63.91%	1.161	423.857
		0.71								2,835.83	1,252.99	1,582.85	55.82%	0.944	344.531
										371.43	261.53	109.90	29.59%	1.097	400.248
										199.89	141.01	58.88	29.46%	1.298	473.673
										692.00	510.50	181.50	26.23%	1.091	398.388
										628.73	441.10	187.63	29.84%	1.030	376.035
										1,003.80	773.37	230.43	22.96%	1.257	458.985
										194.63	144.10	50.53	25.96%	1.313	479.384
										198.08	143.39	54.69	27.61%	1.222	446.126
										623.10	422.33	200.77	32.22%	0.940	343.117
										332.62	233.23	99.39	29.88%	0.988	360.759
							50.12			9,813.45	6,557.99	3,255.46	33.17%	1.516	553.245
							193.20			25,448.22	22,922.24	2,525.98	9.93%	1.366	498.555
				11.73											
12.61		0.71	91.18	21.73	23.98	51.40	346.48	77.36	1,128.96	138,494.23	89,443.58	49,050.65	35.42%	1.27	465.22

ATTIVITA' DI RACCOLTA DATI DI PRODUZIONE RU ANNO 2005 (tonnellate/anno)

		Indifferenziati						Beni durevoli (art. 44, D.Lgs. 22/97)								Frazione umida				
		Indifferenziati						Beni durevoli (art. 44, D.Lgs. 22/97)								Frazione umida				
Comune	Abitanti - ISTAT anno 2005	Rifiuti urbani non differenziati	Rifiuti urbani non differenziati	Rifiuti di mercati non differenziati	Spazzamento strade	altri rifiuti non biodegradabili	Rifiuti ingombranti a smaltimento	Beni durevoli e apparecchiature elettriche ed elettroniche fuori uso	Ingombranti a recupero - beni durevoli	Beni durevoli e apparecchiature elettriche ed elettroniche fuori uso	Beni durevoli e apparecchiature elettriche ed elettroniche fuori uso	Beni durevoli e apparecchiature elettriche ed elettroniche fuori uso	Tubi fluorescenti e altri rifiuti contenenti mercurio	Beni durevoli ed apparecchiature elettriche ed elettroniche fuori uso	Beni durevoli e apparecchiature elettriche ed elettroniche fuori uso	Scarti vegetali derivanti dalla manutenzione del verde	Organico domestico o frazione umida raccolta separatamente all'origine			Rifiuti dei mercat differenziati
		Rifiuti urbani indifferenziati, misti, rifiuto tal quale, secco indifferenziato o residuo non	scarti da multimateriale		Rifiuti derivanti dalla pulizia delle strade		Rifiuti ingombranti a smaltimento	Frigoriferi, congelatori, condizionatori, monitor, televisori, monitor, computer, lavatrici.	Frigoriferi, congelatori, condizionatori	televisori, monitor, computer (frigoriferi, congelatori, condizionatori)	Lavatrici, lavastoviglie cavi, schede e componenti elettrici ed elettronici (televisori,	computer (frigoriferi, congelatori, condizionatori)	Neon e lampade a scarica	Frigoriferi, congelatori, condizionatori	televisori, monitor, computer (frigoriferi, congelatori, condizionatori)				
		200301	200301	200302	200303	200203	200307	200123	200307	200135	200136	160214	200121	160211	160213	200201	200108	02 03 04	02 01 03	200302
Andreis	298	154.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02			-
Arba	1303	391.41	-	-	-	-	35.98	-	-	-	-	-	-	-	-	-	24.77			-
Arzene	1700	111.15	-	-	18.36	-	66.53	1.34	-	-	-	-	-	-	-	104.21	50.76			-
Aviano	8815	2,671.30	-	0.22	51.42	-	222.16	19.86		6.26	6.09	-	0.21	-	-	558.32	545.64	2.53		-
Azzano Decimo	13993	1,104.32	-	-	149.81	-	428.95	23.86	-	-	0.02	27.95	-	-	-	682.79	781.33			-
Barcis	283	156.68	-	-	-	-	7.46	-	-	-	-	-	-	-	-	-	16.86			-
Brugnera	8594	540.22	-	-	81.40	-	179.55	18.81	-	20.74	-	-	-	-	-	296.64	485.61			-
Budoia	2339	353.60	-	-	-	-	56.42	5.80	-	2.08	0.20	-	-	-	-	-	-			-
Caneva	6417	285.88	-	-	-	-	354.74	5.17	-	2.34	2.97	-	-	-	-	44.48	399.68			-
Casarsa della Delizia	8224	526.78	-	-	57.91	-	264.21	5.16	-	-	6.38	9.53	-	-	-	734.77	410.99			-
Cavasso Nuovo	1563	486.30	-	-	13.76	-	62.10	-	-	-	-	-	-	-	-	19.26	0.54			-
Chions	4989	467.38	-	-	-	-	110.39	5.76	-	-	3.90	-	-	-	-	209.66	155.90			-
Cimolais	450	193.82	-	-	-	-	19.34	-	-	-	-	-	-	-	-	-	-			-
Claut	1116	417.82	-	-	-	-	37.74	-	-	-	-	-	-	-	-	-	-			-
Comunità Montana del Friuli Occidentale (Castelnovo del Friuli, Clauzetto, Meduno, Pinzano al Tagliamento, Sequals, Tramonti di Sopra, Tramonti di Sotto, Travesio, Vito d'Asio)	10460	2,827.84	-	-	29.98	-	244.50	-	-	-	-	-	-	-	-	-	-			-
Cordenons	17969	6,503.06	-	-	-	-	-	6.08	-	5.14	-	-	-	-	-	66.69	-			-
Cordovado	2659	169.09	-	-	24.79	-	85.19	1.94	-	-	-	-	-	-	-	291.78	169.28			-
Erto e Casso	411	124.39	-	-	-	-	32.50	-	-	-	-	-	-	-	-	-	-			-
Fanna	1577	455.58	-	-	-	-	-	-	-	-	-	-	-	-	-	27.50	-			-
Fiume Veneto	10783	891.53	-	-	41.79	-	235.08	12.36	-	-	10.24	21.26	-	-	-	707.60	396.42			-
Fontanafredda	10335	988.48	-	-	-	-	198.22	14.44	-	-	-	14.65	-	-	-	550.10	643.26			-
Frisanco	701	203.18	-	-	-	-	13.34	-	-	-	-	-	-	-	-	-	-			-
Maniago	11497	3,983.06	-	30.40	328.24	-	347.02	-	-	-	-	-	-	-	-	455.20	547.24			-
Montereale Valcellina	4611	755.44	-	-	54.52	-	100.28	3.10	-	3.38	-	-	-	-	-	2.10	149.22			-
Morsano al Tagliamento	2843	247.44	-	-	31.46	-	88.85	3.24	-	-	2.49	-	-	-	-	199.68	90.12			-
Pasiano di Pordenone	7561	516.55	-	-	-	-	289.41	7.80	-	-	-	-	-	-	-	306.32	271.77			-
Polcenigo	3190	1,091.02	-	-	21.10	-	91.64	6.86	-	-	5.18	2.40	-	-	-	34.98	175.70			-
Porcia	14535	3,687.00	-	17.92	108.02	-	134.94	14.01	-	7.13	-	-	-	-	-	1,065.62	707.30			-
Pordenone	50926	22,376.09	-	-	-	-	37.07	90.20	-	67.81	-	-	-	-	-	1,092.43	441.91			-
Prata di Pordenone	7716	1,840.62	-	20.40	108.72	-	241.34	17.05	-	9.59	-	-	-	-	-	398.74	376.58			-
Pravisdomini	3023	187.46	-	-	33.36	-	52.11	1.72	-	-	-	0.92	-	-	-	72.93	105.99			-
Roveredo in Piano	5219	1,705.94	-	-	56.50	-	101.88	11.46	-	6.18	-	-	-	-	-	575.90	277.44			18.50
Sacile	19494	2,110.44	-	-	180.44	-	241.55	22.58	-	-	-	28.30	-	-	-	570.02	1,306.74			-
San Giorgio della Richinvelda	4455	1,125.94	-	-	62.92	-	47.58	2.62	-	1.45	-	-	-	-	-	152.10	-			-
San Martino al Tagliamento	1456	94.06	-	-	33.92	-	45.53	1.42	-	-	-	-	-	-	-	44.89	47.65			-
San Quirino	4069	1,492.18	-	-	41.34	-	-	3.60	-	1.38	-	-	-	-	-	351.02	146.22			-
San Vito al Tagliamento	13955	1,296.38	-	-	112.76	-	577.26	11.10	-	-	18.81	37.28	-	-	-	1,573.41	894.81			-
Sesto al Reghena	5753	398.02	-	-	55.32	-	122.39	4.12	-	-	-	-	-	-	-	432.98	154.77			-
Spilimbergo	11686	4,150.18	-	-	557.48	-	402.34	-	-	-	-	-	-	-	-	508.35	302.42			-
Vajont	1603	633.76	-	-	-	-	184.32	-	-	-	-	-	-	-	-	-	38.48			-
Valvasone	2109	149.14	-	-	-	-	82.49	1.78	-	-	-	8.61	-	-	-	157.35	96.06			-
Vivaro	1296	460.90	-	-	-	-	42.98	-	-	-	-	-	-	-	-	1.54	-			-
Zoppola	8262	673.36	-	-	124.14	-	205.14	9.16	-	-	12.80	16.12	-	-	-	312.92	362.39			-
TOTALE	**300238**	**68,998.90**	**0**	**68.94**	**2379.46**	**0**	**6090.488**	**332.38**	**0**	**133.465**	**69.075**	**167.02**	**0.21**	**0**	**0**	**12602.254**	**10573.861**	**2.53**	**0**	**18.5**

Frazione secca, vetro, metalli, abiti, stracci																								oli vegetali	
Carta / Cartone		Vetro		Plastica			Metalli						Legno			Abiti / Stracci			Altri tipi di imballaggi		altro		oli vegetali	
Carta e cartone	Imballaggi in carta e cartone	Vetro	Imballaggi in vetro	Plastica	rifiuti plastici	Imballaggi in plastica	Metallo	Imballaggi metallici	Ingombranti a recupero - ferro	sconie della produzione primaria	polveri e particolato di materiali ferrosi	polveri e particolato di materiali ferrosi	Legno	Ingombranti a recupero - legno	Abbigliamento	prodotti tessili	imballaggi in materia tessile	Imballaggi in materiali misti	Cartucce esauste per fotocopiatrici e stampanti	Altro rifiuto da specificare	Altre frazioni non specificate altrimenti	Oli e grassi vegetali e animali	Oli, emulsioni e grassi minerali
Giornali, riviste, confezioni cartacee	Imballaggi cellulosici	Frammenti in vetro	Bottiglie, vasetti in vetro, ect...	Cassette di plastica, film plastica		Imballaggi in plastica, bottiglie, contenitori, sacchetti in plastica	Materiali ferrosi, rottami metallici	Scatolame domestico in materiale ferroso, lattine di alluminio.				materiali ferrosi			Indumenti			Vetro-alluminio, vetro ferro-alluminio, raccolta della frazione secca riciclabile	Cartucce esauste per fotocopiatrici e stampanti laser e getto		multimateriale	Oli esausti derivanti dalla cottura degli alimenti	Oli derivanti da motori e altri parti meccaniche
200101	150101	200102	150107	200139	020104	150102	200140	150104	200307	100304	120102	120102	200138	150103	200307	200110	200111	150109	150106	150110	200199	200199	200125	200126
-	13.06	-	12.50	-	-	1.82	-	-	-	-	-	3.82	-	-	-	-	-	-	-	-	-	-	-	-
21.70	-	-	35.56	-	-	6.30	37.28	-	-	-	-	-	-	-	-	0.39	-	-	-	-	-	11.44	-	-
52.37	4.22	-	15.57	-	-	55.89	-	-	-	-	-	-	10.29	-	-	7.09	-	-	57.82	-	-	-	0.31	-
-	471.21	-	409.57	-	-	-	118.60	-	-	-	-	-	135.92	-	-	14.44	-	-	-	-	-	499.43	2.50	-
75.56	216.20	-	504.72	10.06	-	50.56	82.76	2.08	-	-	-	-	187.40	-	-	25.68	-	-	842.04	0.42	-	-	2.40	2.27
27.35	-	-	19.69	-	-	1.96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	560.18	-	262.86	-	-	-	54.07	-	-	-	-	-	125.38	-	-	9.52	-	-	0.35	-	684.93	-	0.70	-
146.00	-	153.05	-	25.51	-	-	29.74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
227.10	-	-	-	-	-	-	29.36	-	-	-	-	-	-	-	-	-	-	-	328.56	-	-	-	0.55	-
354.42	435.52	-	74.60	2.70	-	294.22	54.38	2.48	-	-	-	-	138.20	-	-	8.26	-	-	258.53	0.55	-	-	1.80	2.20
40.78	-	-	40.86	-	-	7.83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
184.10	90.16	-	46.40	0.20	-	104.90	34.78	-	-	-	-	-	58.95	-	-	8.24	-	-	152.53	-	-	-	1.10	1.08
-	19.68	-	15.67	-	-	3.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27.53	-	-	18.79	-	-	4.02	28.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	293.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	802.13	-	-
373.80	93.20	-	359.61	-	-	102.76	-	-	-	-	-	-	98.13	-	-	-	-	-	-	-	-	-	-	-
130.30	45.25	-	37.48	-	-	83.71	23.22	-	-	-	-	-	6.78	-	-	13.92	-	-	86.54	-	-	-	1.38	0.20
7.18	-	-	10.21	-	-	1.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43.63	-	-	43.92	-	-	9.37	-	-	-	2.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
475.29	183.00	-	84.72	2.20	-	237.79	57.14	2.42	-	-	-	-	140.96	-	-	21.94	-	-	321.13	0.23	-	-	4.00	0.30
90.12	180.35	-	387.92	0.54	-	25.98	78.18	-	-	-	-	-	81.70	-	-	16.62	-	-	536.11	0.22	-	-	0.90	0.90
16.59	-	-	21.10	-	-	2.89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	490.26	-	319.86	-	-	86.16	-	-	-	-	-	-	-	-	-	21.51	-	-	-	-	-	-	-	-
	209.58	-	195.10	-	-	62.83	75.42	-	-	-	-	-	57.84	-	-	13.70	-	-	-	-	-	-	0.36	-
136.77	16.70	-	23.60	-	-	84.35	-	-	-	-	-	-	43.48	-	-	13.52	-	-	110.11	-	-	-	0.58	-
222.16	136.28	-	61.54	-	-	148.98	45.06	-	-	-	-	-	-	-	-	16.66	-	-	235.69	0.21	-	-	2.20	-
32.22	10.00	-	76.34	-	-	20.64	3.22	1.83	-	-	-	-	-	-	-	1.82	-	-	18.82	-	-	-	-	-
-	119.17	-	354.84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,081.11	-	-
955.74	601.49	-	843.27	-	-	268.87	-	-	-	-	-	-	554.63	-	-	-	-	-	6.75	-	-	-	-	-
-	246.98	-	251.38	-	-	66.30	32.24	-		-	-	-	-	-	-	8.96	-	-	-	-	-	-	0.75	-
114.82	36.55	-	28.40	-	-	86.14	10.22	-	-	-	-	-	-	-	-	9.48	-	-	78.06	0.10	-	-	0.30	-
178.90	219.68	-	190.31	-	-	58.86	65.64	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
886.11	299.82	-	807.54	0.53	-	415.99	134.29	-	-	-	-	-	201.63	-	-	29.28	-	-	6.73	0.88	-	-	1.30	1.70
-	0.04	-	198.42	-	0.11	0.19	-	26.48	-	-	10.32	-	35.12	-	-	-	-	-	0.06	1.64	-	436.93	-	-
56.59	71.07	-	23.73	-	-	49.51	-	-	-	-	-	-	-	-	-	2.22	-	-	61.83	-	-	-	0.80	-
129.02	-	116.57	-	1.10	-	24.94	21.40	-	-	-	-	-	-	-	-	3.74	-	-	-	-	-	-	0.26	-
663.26	202.57	-	211.91	7.68	-	351.05	169.11	7.64	-	-	-	-	143.28	-	-	29.29	-	-	351.95	0.40	-	-	3.90	0.80
260.78	20.05	-	33.74	-	-	140.42	58.82	-	-	-	-	-	23.08	-	-	13.04	-	-	162.11	-	-	-	1.58	-
355.94	-	-	371.76	-	-	52.35	34.50	-	-	-	-	-	-	-	-	-	-	-	0.50	-	-	-	-	-
	22.24		24.98		-	6.88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
102.67	31.12	-	21.58	-	-	67.13	37.60	0.62	-	-	-	-	8.19	-	-	8.40	-	-	98.82	-	-	-	0.90	-
22.86	-	-	37.99	-	-	7.39	6.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
373.77	162.88	-	64.58	-	-	245.03	58.57	0.82	-	-	-	-	58.50	-	-	10.25	-	-	242.98	0.22	-	-	0.75	0.85
6785.43	**5208.48**	**269.62**	**6835.99**	**50.51**	**0.112**	**3238.68**	**1380.3**	**44.37**	**0**	**2**	**10.32**	**3.82**	**2109.44**	**0**	**0**	**307.97**	**0**	**0**	**3958.026**	**4.862**	**684.93**	**2831.04**	**29.31**	**10.3**

raccolte selettive																										altri rifiuti non urbani					Elaborazioni				
medicinali / farmaci	pile / accumulatori						vernici, inchiostri, solventi, pesticidi, oli							gas in contenitori in pressione		altro										Rifiuti da costruzione e demolizione		altro	altro					
Farmaci e medicinali scaduti	Pile e batterie	Pile e batterie al piombo, al nichel-cadmio, mercurio	Accumulatori al piombo per auto	batterie al nichel - cadmio	batterie alcaline	altre batterie ed accumulatori	Vernici, inchiostri, adesivi e resine	Vernici, inchiostri, adesivi contenenti sostanze pericolose	pitture e vernici di scarto	solventi	pesticidi	Scarti di olio minerale per motori, ingranaggi e lubrificazione non clorurati	altri oli per motori, ingranaggi e lubrificazione	Gas in contenitori in pressione	Gas in contenitori in pressione	rifiuti agrochimici	Altre emulsioni	Ritardo	Rifiuti che devono essere raccolti e smaltiti applicando precauzioni particolari per evitare infezioni	sostanze chimiche pericolose	Scorie di cemento, mattoni, mattonelle e ceramiche prive di sostanze pericolose	Ferro ed acciaio	Rifiuti misti dell'attività di costruzione e demolizione,diversi da quelli di cui alle voci 170901,170902 e 170903	Pneumatici fuori uso	Rifiuti di distaccamento e pulizia degli arenili	**Totale RU**	**Totale rifiuti urbani indifferenziati**	**Totale raccolta differenziata**	**RD (%)**	**Rifiuti pro capite (365 giorni) [kg/abitante x anno]**
200132	Pile e batterie diverse da quelle per elettrodomestici, elencate gli	200134	200133	160601	160602	160604	160605	200128	200127	080111	200113	200119	130205	130208	160504	160505	020108	130802	160107	Rifiuti sanitari	180103	180205	Rifiuti inerti provenienti da piccole manutenzioni per civile domestiche raccolte presso gli esercenti	170407	170405	Altri rifiuti dell'attività di costruzione e demolizione	160103	200303					
0.02	0.04	-	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.58	-	-	-	185.42	154.14	31.28	16.87%	622.22
0.10	0.06	-	2.35	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	567.32	427.39	139.93	24.67%	435.39
0.27	0.20	-	-	-				-	-	-	-	-	-	-	0.07	-	-	-	-	-	-	-	-	-	-	-	1.24	-	556.45	196.04	360.41	64.77%	327.32
1.61	2.07	-	11.44	-				4.69	-	-	-	-	2.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,757.59	2,945.10	2,812.49	48.85%	653.16
0.70	1.59	-	12.70	-				-	0.80	-	-	-	-	-	0.09	-	-	-	-	-	-	-	-	-	-	-	2.60	-	5,217.05	1,683.08	3,533.97	67.74%	372.83
0.02	0.01	-	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	230.03	164.14	65.89	28.64%	812.81
0.80	0.88	-	-	-				0.99	-	-	-	-	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,323.87	801.17	2,522.70	75.90%	386.77
-	0.30	1.28	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	773.98	410.02	363.96	47.02%	330.80
0.75	0.68	3.98	-	-				-	-	-	-	-	0.60	-	0.44	-	-	-	-	-	-	-	-	-	-	-	-	-	1,687.28	640.62	1,046.66	62.03%	282.94
1.11	0.98	-	7.70	-				-	-	-	-	-	-	-	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	3,653.50	848.90	2,804.60	76.76%	444.25
0.07	0.09	-	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	671.60	562.16	109.44	16.29%	429.68
0.45	0.53	-	3.98	-				-	-	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-	-	49.33	-	-	-	1,640.47	577.77	1,062.70	64.78%	328.82
0.04	0.03	-	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	251.73	213.16	38.57	15.32%	559.40
0.05	0.04	-	0.76	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88.48	-	-	534.88	455.56	79.32	14.83%	479.29
1.67	1.41	0.65	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,201.55	3,102.32	1,099.23	26.16%	401.68
0.07	-	-	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	83.34	-	-	-	7,606.54	6,503.06	1,105.48	14.53%	423.43
0.26	0.25	-	3.12	-				-	-	-	-	-	-	-	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	1,174.55	279.06	895.49	76.24%	441.72
0.02	0.02	-	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	175.84	156.89	18.95	10.78%	427.83
0.14	0.09	2.54	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	584.77	455.58	129.19	22.09%	370.81
1.04	1.45	-	13.26	-				-	2.78	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	3,865.97	1,168.40	2,697.57	69.78%	358.52
1.04	1.50	-	7.61	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.68	-	3,818.82	1,186.70	2,632.12	68.92%	369.50
0.03	0.02	-	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	257.15	216.52	40.63	15.80%	366.83
0.43	1.14	-	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,610.52	4,688.72	1,921.80	29.07%	574.98
0.67	0.49	-	3.81	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,687.84	910.24	777.60	46.07%	366.05
0.29	0.36	-	4.85	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,097.90	367.75	730.16	66.50%	386.18
0.54	0.75	-	1.40	-				-	0.60	-	-	-	-	-	0.09	-	-	-	-	-	-	-	-	-	16.52	-	-	-	2,263.99	805.95	1,458.04	64.40%	299.43
0.19	0.22	-	3.00	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	202.00	4.32		1,597.17	1,203.76	393.41	24.63%	500.68
1.64	1.27	-	4.58	-				-	-	-	-	-	-	-	1.12	-	-	-	-	-	-	-	-	-	5.56	-	-	-	7,305.59	3,947.88	3,357.71	45.96%	502.62
3.97	5.73	-	17.06	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	219.52	19.58	-	-	27,363.04	22,413.16	4,949.88	18.09%	537.31
0.71	1.06	-	5.70	-				-	-	-	-	-	-	-	0.23	-	-	-	-	-	-	-	88.88	-	-	-	-	-	3,627.34	2,211.08	1,416.26	39.04%	470.11
0.22	0.25	-	-	-				-	-	-	-	-	-	-	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	819.10	272.93	546.18	66.68%	270.96
0.59	0.64	-	2.97	-				-	-	-	-	-	-	-	-	-	-	2.26	-	-	-	-	-	-	-	-	-	-	3,473.64	1,864.32	1,609.32	46.33%	665.58
1.09	2.70	-	13.54	-				-	-	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-	-	-	-	1.40	-	7,263.40	2,532.43	4,730.97	65.13%	372.60
0.54	0.50	-	3.38	-				-	-	0.59	-	-	0.18	-	-	0.001	-	0.06	-	0.13	-	4.28	94.50	4.73	-	-	-	-	2,107.37	1,236.44	870.93	41.33%	473.03
0.28	0.18	-	1.38	-				-	-	-	-	-	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	535.12	173.51	361.62	67.58%	367.53
0.38	0.22	3.23	-	-				-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	2,336.61	1,533.52	803.09	34.37%	574.25
1.47	1.60	-	18.12	-				-	1.68	-	-	-	-	-	0.16	-	-	-	-	-	-	-	-	-	-	223.39	13.68	-	6,687.67	1,986.40	4,701.27	70.30%	479.23
0.40	0.44	-	5.75	-				-	1.34	-	-	-	-	-	0.11	-	-	-	-	-	-	-	-	-	-	6.92	-	-	1,889.26	575.73	1,313.53	69.53%	328.40
0.89	1.53	-	-	-				-	-	-	-	-	-	-	1.30	-	-	-	-	-	-	-	-	-	-	-	-	-	6,739.55	5,110.00	1,629.55	24.18%	576.72
0.10	0.04	-	-	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	910.80	818.08	92.72	10.18%	568.19
0.39	0.20	-	0.91	-				-	-	-	-	-	-	-	0.07	-	-	-	-	-	-	-	-	-	-	3.42	1.74	-	874.02	231.63	642.39	73.50%	414.42
0.12	0.09	-	2.15	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	582.52	503.88	78.64	13.50%	449.48
0.86	0.55	-	7.71	-				-	-	-	-	-	-	-	0.11	-	-	-	-	-	-	-	-	-	-	-	1.88	-	2,944.44	1,002.64	1,941.80	65.95%	356.38
25.996	**32.354**	**11.675**	**159.037**	**0**	**0**	**0**	**0**	**5.679**	**7.2**	**0.59**	**0**	**0**	**3.131**	**0**	**0**	**4.527**	**0.001**	**2.26**	**0.062**	**0**	**0.127**	**88.8**	**386.07**	**638.256**	**40.274**	**0**	**135,455.23**	**77537.789**	**57917.439**	**42.76%**	**451.16**

ATTIVITA' DI RACCOLTA DATI DI PRODUZIONE RU ANNO 2006 (tonnellate/anno)

		Indifferenziati					Beni durevoli (art. 44, D.Lgs. 22/97)												Frazione umida				
		Indifferenziati					Beni durevoli (art. 44, D.Lgs. 22/97)												Frazione umida				
Comune	Abitanti - ISTAT anno 2005	Rifiuti urbani non differenziati	Rifiuti urbani non differenziati	Rifiuti di mercati non differenziati	Spazzamento strade	altri rifiuti non biodegradabili	Rifiuti ingombranti a smaltimento	frigoriferi, congelatori, condizionatori	TV, computer, stampanti,lavatrici, lavastoviglie, cucine economiche, ...							Beni durevoli e apparecchiature elettriche ed elettroniche fuori uso		Tubi fluorescenti e altri rifiuti contenenti mercurio	Beni durevoli ed apparecchiature elettriche ed elettroniche fuori uso	Beni durevoli e apparecchiature elettriche ed elettroniche fuori uso	Scarti vegetali derivanti dalla manutenzione del verde	Organico domestico o frazione umida raccolta separatamente alcrigine			Rifiuti dei mercati differenziati
		200301	200301	200302	200303	200203	200307	200123	200135	200136	20 03 07	20 01 39	20 01 40	20 01 37*	20 01 38	160214	160216	200121	160211	160213	200201	200108	02 03 04	02 01 03	200302
		Rifiuti urbani indifferenziati, misti, rifiuto tal quale, secco indifferenziato o residuo non recuperabile, "sacco nero"	scarti da multimateriale		Rifiuti derivanti dalla pulizia delle strade		Rifiuti ingombranti a smaltimento	apparecchiature fuori uso contenenti clorofluorocarburi	apparecchiature elettriche ed elettroniche fuori uso, diverse da quelle di cui alla voce 20 01 21 e 20 01 23, contenenti componenti pericolosi	apparecchiature elettriche ed elettroniche fuori uso diverse da quelle di cui alla voce 20 01 21, 20 01 23 e 20 01 35	rifiuti ingombranti	plastica	metallo	legno, contenente sostanze pericolose	legno, diverso da quello di cui alla voce 20 01 37	televisori, monitor, computer (rigoriferi, congelatori, condizionatori, lavatrici, lavastoviglie, cavi, schede e componenti elettrici ed elettronici, ecc.)	componenti rimossi da apparecchiature fuori uso	Neon e lampade a scarica	Frigoriferi, congelatori, condizionatori	Televisori, monitor, computer (rigoriferi, congelatori, condizionatori, lavatrici, lavastoviglie, cavi, schede e componenti elettrici ed elettronici, ecc.)					
Andreis	301	152.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.56	0	0	0
Arba	1299	98.49	0	0	0	0	22.995	3.58	2.64	0.5	0	0	0	0	0	2.38	0	0	0	0	9.855	67.58	0	0	0
Arzene	1741	93.14	0	0	223.81	0	40.52	2.24	0.96	1.5	0	0	0	0	0	0.24	0	0	0	0	105.185	63.59	0	0	0
Aviano	8945	2626.48	0	0	48.4	0	245.28	14.03	17.195	4.465	0	0	0	0	0	0	0	0.166	0	0	588.94	601.7	0	0	0
Azzano Decimo	14457	902.975	0	0	167.84	0	309.05	16.24	0	2.54	0	0	0	0	0	17.6	0.169	0	0	0	719.09	866.19	0	0	0
Barcis	279	160.94	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16.12	0	0	0
Brugnera	8711	517.28	0	0	72.1	0	178.81	13.665	12.14	0	0	0	0	0	0	0	0.307	0	0	0	360.84	492.965	0	0	0
Budoia	2415	386.78	0	0	0	0	71.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102.86	0	0	0
Caneva	6489	267.2	0	0	0	0	294.94	0.84	0.5	1.76	0	0	0	0	0	0	0	0	0	0	38.8	425.5	0	0	0
Casarsa della Delizia	8312	514.333	0	0	113.49	0	280.03	5.66	4.52	9.19	0	0	0	0	0	8.05	0.244	0	0	0	679.983	429.94	0	0	9.98
Cavasso Nuovo	1579	48.14	0	0	21.9	0	56.68	0	0	0	0	0	0	0	0	0	0	0	0	0	22.12	6.14	0	0	0
Chions	5045	480.508	0	0	22.74	0	98.025	7.36	2	4.56	0	0	0	0	0	0	0.351	0	0	0	232.93	174.665	0	0	0
Cimolais	438	195.34	0	0	0	0	15.9	0	0	0	0	0	0	0	0	0	0	0	0	0	1.62	0	0	0	0
Claut	1111	428.92	0	0	0	0	30.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Comunità Montana del Friuli Occidentale (Castelnovo del Friuli, Clauzetto, Meduno, Pinzano al Tagliamento, Sequals, Tramonti di Sopra, Tramonti di Sotto, Travesio, Vito d'Asio)	10374	2756.68	0	0	44.82	0	18.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32.3	0	0	0
Cordenons	18247	5748.1	0	0	103.99	0	115.64	5.08	3.47	0	0	0	0	0	0	0	0.158	0	0	0	1523.77	290.56	0	0	0
Cordovado	2660	161.85	0	0	26.82	0	97.865	3.1	0	0	0	0	0	0	0	0	0.062	0	0	0	223.298	174.66	0	0	0.66
Erto e Casso	407	111.8	0	0	0	0	24.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.72	0	0	0
Fanna	1586	447.1	0	0	0	0	55.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fiume Veneto	10903	794.62	0	0	167.2	0	235.28	9.84	0	12.54	0	0	0	0	0	11.95	0.384	0	0	0	701.63	443.57	0	0	0
Fontanafredda	10719	842.6	0	0	134.7	0	267.02	17.95	0	1.6	0	0	0	0	0	7.33	1.239	0	0	0	650.855	569.9	0	0	0
Frisanco	687	199.26	0	0	0	0	18.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.74	0	0	0
Maniago	11632	4080.8	0	0	284.54	0	257.24	0	0	0	0	0	0	0	0	0	0	0	0	0	509.26	563.18	0	0	4.36
Montereale Valcellina	4644	802.04	0	0	36.58	0	97.28	4.59	2.05	0	0	0	0	0	0	0	0.02	0	0	0	0	158.62	0	0	0
Morsano al Tagliamento	2856	261.153	0	0	21.66	0	87.99	2.63	0	1.42	0	0	0	0	0	0	0.016	0	0	0	192.998	91.48	0	0	4.08
Pasiano di Pordenone	7603	443.49	0	0	20.52	0	280.61	6.78	0	0	0	0	0	0	0	0	0.27	0	0	0	398.07	301.725	0	0	0
Polcenigo	3204	341.46	0	0	0	0	122.45	7	0	5.7	0	0	0	0	0	2.88	0.018	0	0	0	120.45	214.44	0	0	0
Porcia	14792	3537.98	0	0	66.29	0	122.4	9.32	6.86	0	0	0	0	0	0	0	0.047	0	0	0	1092.86	743.68	0	0	16.12
Pordenone	50518	20976.79	0	0	0	0	0	93.37	87.69	0	0	0	0	0	0	0	3.766	0	0	0	1607.82	1353.3	0	0	0
Prata di Pordenone	7929	1912.44	0	0	106.38	0	239.38	12.76	6.56	0	0	0	0	0	0	0	0	0	0	0	445.02	397.46	0	0	19.82
Pravisdomini	3189	177.135	0	0	54.9	0	52.87	1.21	0	0.38	0	0	0	0	0	1.02	0.099	0	0	0	76.42	125.29	0	0	0
Roveredo in Piano	5360	1735.14	0	0	89.46	0	0	5.82	6.61	0	38.18	0	0	0	0	0	0	0	0	0	637.24	282.24	0	0	18.04
Sacile	19577	2164.425	0	0	256.76	0	336.32	29.13	0	2.84	0	0	0	0	0	15.98	0.707	0	0	0	635.19	1541.16	0	0	0
San Giorgio della Richinvelda	4456	1128.7	0	0	0	0	0	13.24	9.87	0	42.24	0	0	0	0	0	0.025	0	0	0	250.01	0	0	0	0
San Martino al Tagliamento	1439	80.265	0	0	0	0	37.465	0.96	0	0	0	0	0	0	0	3.86	0.051	0	0	0	17.625	47.73	0	0	0
San Quirino	4086	1439.58	0	0	42.57	0	123.02	8.46	4.5	0	0	0	0	0	0	0	0	0	0	0	421.06	151.98	0	0	0
San Vito al Tagliamento	14241	1295.521	0	0	111.54	0	587.36	13.43	3.46	19.08	0	0	0	0	0	25.93	0.672	0	0	0	1779.83	958.66	0	0	0
Sesto al Reghena	5888	358.565	0	0	32.06	0	104.385	4.95	0	0	0	0	0	0	0	0	0.115	0	0	0	439.335	163.5	0	0	0
Spilimbergo	11733	4162.24	0	0	233.86	0	0	0	0	0	384.38	0	0	0	0	0	0	0	0	0	696.76	308.56	0	0	0
Vajont	1610	405.1	0	0	0	0	207.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39.34	0	0	0
Valvasone	2143	150.6	0	0	0	0	72.96	1.9	0	1.09	0	0	0	0	0	5.88	0.115	0	0	0	161.135	104.06	0	0	2.38
Vivaro	1323	469.02	0	0	0	0	46.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.76	0	0	0
Zoppola	8350	721.305	0	0	117.58	0	183.88	10.02	3.56	9.24	0	0	0	0	0	10.24	0.278	0.339	0	0	431.728	388.075	0	0	0
TOTALE	**303258**	**64.578.97**	**0**	**0**	**2622.51**	**0**	**5439.685**	**325.155**	**174.585**	**78.405**	**464.8**	**0**	**0**	**0**	**0**	**113.34**	**9.113**	**0.505**	**0**	**0**	**15771.727**	**12765.5**	**0**	**0**	**75.44**

Frazione secca, vetro, metalli, abiti, stracci																					oli vegetali	
Carta / Cartone		Vetro		Plastica		Metalli			Legno			Abiti / Stracci			Altri tipi di imballaggi		multimateriale				altro	oli vegetali	
Carta e cartone	Imballaggi in carta e cartone	Vetro	Imballaggi in vetro	Plastica	Imballaggi in plastica	Metallo	Imballaggi metallici	Ingombranti a recupero - ferro	Legno		Ingombranti a recupero - legno	Abbigliamento	prodotti tessili	imballaggi in materia tessile	imballaggi in materiali compositi (ad es. poliaccoppiati)	Cartucce esauste per fotocopiatrici e stampanti	multimateriale	imballaggi in materiali misti	multimateriale	multimateriale	altro specificare	Oli e grassi vegetali e animali	Oli, emulsioni e grassi minerali
200101	**150101**	**200102**	**150107**	**200139**	**150102**	**200140**	**150104**	**200307**	**200138**	**150103**	**200307**	**200110**	**200111**	**150109**	**150105**	**150110**	**15 01 06**	**15 01 06**	**20 03 01**	**20 01 99**	**20 03 99**	**200125**	**200126**
Giornali, riviste, confezioni cartacee	Imballaggi cellulosici	Frammenti in vetro	Bottiglie, vasetti in vetro, ect...	Cassette di plastica, film plastica	Imballaggi in plastica, bottiglie, contenitori, sacchetti in plastica	Materiali ferrosi, rottami metallici	Scatolame domestico in materiale ferroso, lattine di alluminio, alluminio					Indumenti			imballaggi in materiali compositi	Cartucce esauste per fotocopiatrici e stampanti laser e getto d'inchiostro, ecc.	imballaggi in materiali misti	imballaggi in materiali misti	rifiuti urbani non differenziati	altre frazioni non specificate altrimenti	rifiuti urbani non specificati altrimenti	Oli esausti derivanti dalla cottura degli alimenti	Oli derivanti da motori e altri parti meccaniche
3.8	5.1	0	12.57	1.52	1.14	14.34	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
0	0	0	66.8	0	0	17.08	0.14	0	0	0	0	4.38	0	0	0	0.062	21.645	0	0		0	0	0
39.465	5.82	0	19.762	0	62.849	9.94	0	0	15.98	0	0	6.626	0	0	0	0.253	43.672	0	0		0	0.5	0.5
0	387.59	0	418.13	0	0	109.92	0	0	145.88	0	0	13.047	0	0	0	0	318.14	0	0	300.03	0	2.35	0
0	2.69	0	492.24	0	1.11	85	0.92	0	135.7	0	0	15.921	0	0	0	0.458	1290.72	0	0	0	0	5	4.2
13.99	12.66	0	19.4	0.83	1.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	715.99	0	299.555	0	0	53.48	0	0	93.93	0	0	12.778	0	0	0	0	0	0	0	275.35	0	0.5	0
156.3	0	0	140.27	0	37.73	0	0	0	0	0	0	0	0	0	0	0	414.636	0	0	0	0	0	0
118.14	121.86	0	78.88	0	2.24	24.06	0	0	0	0	0	0	0	0	0	0	325.74	0	0	0	0	0	0
274.35	484.295	0	0	0	322.16	56.24	1.01	0	139.575	0	0	3.493	0	0	0	0.393	258.273	0	0	0	0	1.8	2.8
19.82	18.17	0	37.64	8.96	0.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155.94	106.79	0	30.26	0	117.28	95.38	0	0	51.18	0	0	4.125	0	0	0	0.494	196.618	0	0	0	0	2.38	0.28
11.58	14.48	0	13.5	1.73	0.25	62.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15.23	15.88	0	21.01	1.87	3.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	128.02	0	321.143	0	0	0	0	0	0	0	0	0	0	0	0	0	222.94	0	0	433.23	0	0	0
451.97	100.83	0	296.38	0	121.98	0	0	0	114.96	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0
110.56	44.745	0	26.86	0	95.54	25.34	0	0	0	0	0	5.783	0	0	0	0.504	82.618	0	0	0	0	1.8	1.5
2.3	4.12	0	8.1	0.78	1.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19.86	24.32	0	45.92	4.22	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
185.8	100.005	0	294.145	0	130.68	63.46	1.11	0	127.685	0	0	19.415	0	0	0	0.593	586.5	0	0	0	0	4.5	0
0	4.91	0	357.74	0	0	86.87	0	0	96.92	0	0	24.355	0	0	0	0.217	900.182	0	0	0	0	1	0.4
8.3	8.2	0	24.37	1.49	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
235.78	254.59	0	339.91	35.68	50.89	3.6	0	0	0	0	0	20.954	0	0	0	0	0	0	0	0	0	0	0
91.32	105.52	0	197.38	24.65	38.57	0	0	0	59.62	0	0	0	0	0	0	0	0.035	0	0	0	0	0.6	0
101.66	19.27	0	25	0	83.22	9.44	0	0	26.54	0	0	12.876	0	0	0	0	105.4	0	0	0	0	0.6	0
52.04	26.3	0	223.825	0	34.82	72.1	0	0	0	0	0	8.307	0	0	0	0	493.209	0	0	0	0	2.2	0
0	0	0	146.04	0	1.1	8.76	0	0	21.26	0	0	3.981	0	0	0	0.101	284.71	0	0	0	0	0	0
0.1	141.713	0	445.775	0	0	0	0	0	0	0	0	0	0	0	0	0.422	447.68	0	0	680.17	0	0	0
1587.63	498.82	0	950.81	0	312.6	0	0	0	649.29	0	0	0	0	0	0	0	1.34	0	0	0	0	0	0
130.02	127.76	0	255.77	30.3	47.66	53.66	0	0	14.12	0	0	9.002	0	0	0	0	0.029	0	0	0	0	1	0
16.11	5.31	0	92.23	0	13.58	12.22	0	0	0	0	0	6.936	0	0	0	0.31	224.425	0	0	0	0	0.75	0
141.79	240.197	0	194.249	0	60.38	0.96	0	0	47.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
804.56	302.49	0	821.96	0	438.65	120.5	0	0	171.9	0	0	28.921	0	0	0	0.484	0.293	0	0	0	0	1.75	0.8
0	0	0	216.84	0	0	0	24.76	0	30.34	0	0	0	0	0	0	0	111.187	0	0	312.52	0	0	0
36.78	70.395	0	20.749	0	56.09	0.6	0	0	0	0	0	0	0	0	0	0.051	51.583	0	0	0	0	0.2	0
82	83.36	0	133	11.94	20.928	26.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.84	0
554.635	182.31	0	300.07	3.98	387.834	168.42	2.3	0	157.875	0	0	31.408	0	0	0	0.679	303.374	0	0	0	0	4.9	0.18
204.885	20.41	0	31.7	0.89	156.24	57.08	0	0	39.66	0	0	12.06	0	0	0	0.727	161.716	0	0	0	0	1.5	0
173.42	179.62	0	371.73	22.21	33.68	32.32	0	0	0	0	0	0	0	0	0	0	0.397	0	0	0	0	0	0
13.3	13.4	0	25.38	3.18	5.092	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93.69	34	0	25.429	0	72.707	38.21	0.97	0	27.555	0	0	1.212	0	0	0	0.292	78.646	0	0	0	0	1	0
12.8	15.22	0	39.1	3.69	5.81	7.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
289.61	182.86	0	82.86	0	284.3	66.48	1.12	0	113.53	0	0	8.241	0	0	0	0.523	246.992	0	0	0	0	2.3	1.45
6209.535	**4810.02**	**0**	**7964.482**	**157.92**	**3004.93**	**1381.4**	**32.33**	**0**	**2280.62**	**0**	**0**	**253.821**	**0**	**0**	**0**	**6.563**	**7172.8**	**0**	**0**	**2001.3**	**0**	**37.47**	**12.11**

raccolte selettive																				
medicinali / farmaci	pile / accumulatori						vernici, inchiostri, solventi, pesticidi, oli							gas in contenitori in pressione		altro				
Farmaci e medicinali scaduti	Pile e batterie	Pile e batterie al piombo, al nichel-cadmio, mercurio	Accumulatori al piombo per auto	batterie al nichel - cadmio	batterie alcaline	altre batterie ed accumulatori	Vernici, inchiostri, adesivi e resine	Vernici, inchiostri, adesivi contenenti sostanze pericolose	pitture e vernici di scarto	solventi	pesticidi	Scarti di olio minerale per motori, ingranaggi e lubrificazione non clorurati	altri oli per motori, ingranaggi e lubrificazione	Gas in contenitori in pressione	Gas in contenitori in pressione	rifiuti agrochimici	Altre emulsioni	filtri dell'olio	Rifiuti che devono essere raccolti e smaltiti applicando precauzioni particolari per evitare infezioni	sostanze chimiche pericolose
200132	**200134**	**200133**	**160601**	**160602**	**160604**	**160605**	**200128**	**200127**	**080111**	**200113**	**200119**	**130205**	**130208**	**160504**	**160505**	**020108**	**130802**	**160107**	**180103**	**180205**
	Pile e batterie diverse per elettrodomestici, esclusi gli accumulatori delle auto																		Rifiuti sanitari	
0.024	0	0.052	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.14	0.236	0	2.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.184	0.527	0	0	0	0	0	0	0.368	0	0	0	0	0	0	0	0	0	0	0	0
1.214	0.66	1.171	13.03	0	0	0	2.241	2.279	0	0	0	1.9	0	0.01	0	0	0	0	0	0
0.85	1.112	13.09	0	0	0	0	0	1.317	0	0	0	0	0	0	0	0	0	0	0	0
0.016	0	0.026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.683	0.428	0.51	0	0	0	0	0.751	0.402	0	0	0	0	0	0.195	0	0	0	0	0	0
0.24	0.105	0.183	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.724	0	0.756	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.533	0.939	5.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.079	0	0.12	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.394	0.759	4.8	0	0	0	0	0	0.823	0	0	0	0	0	0	0	0	0	0	0	0
0.048	0	1.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.066	0	0.075	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.405	0.896	0.519	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.01	0.95	0	1.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.215	0.559	3.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0.032	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.09	0	0.707	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.353	1.013	12.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.783	3.009	0	11.43	0	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0	0
0.027	0	0.036	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.526	0	1.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.497	0	0.568	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.213	0.713	3.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.43	0.809	0	0.65	0	0	0	0	1.17	0	0	0	0	0	0	0	0	0	0	0	0
0.101	0.305	0	2.8	0	0	0	0	0.603	0	0	0	0	0	0	0	0	0	0	0	0
1.698	0	1.358	5.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.98	3.37	1.341	18.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.193	0	0	5.07	0	0	0	0	0	0	0	0	0	0	0	0	0	21.74	0	0	0
0.185	0.574	0	0	0	0	0	0	0.505	0	0	0	0	0	0	0	0	0	0	0	0
0.559	0.402	0.246	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.187	3.323	9.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.475	0.369	0.233	4.21	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0
0.135	0.373	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.42	0	0.354	4.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.183	1.182	12.17	0	0	0	0	0	2.23	0	0	0	0	0	0	0	0	0	0	0	0
0.399	0.724	4.95	0	0	0	0	0	0	0	0	0	0.18	0	0	0	0	0	0	0	0
0.814	0	2.092	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.061	0	0.096	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.205	0.519	2.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.089	0	0.12	2.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.61	0.704	6.43	0	0	0	0	0	2.277	0	0	0	0	0	0	0	0	0	0	0	0
24.038	**24.56**	**91.965**	**76.62**	**0**	**0**	**0**	**2.992**	**11.974**	**0.2**	**0**	**0**	**2.98**	**0**	**0.205**	**0**	**0**	**21.74**	**0**	**0**	**0**

altri rifiuti non urbani																			Elaborazioni					
Rifiuti da costruzione e demolizione												altro	altro											
Scorie di cemento, mattoni, mattonelle e ceramiche prive di sostanze pericolose								Rifiuti misti dell'attività di costruzione e demolizione diversi da quelli di cui alle voci 170901,170902 e 170903			Pneumatici fuori uso	Rifiuti di disabbiamento e pulizia degli arenili											
170107	17 02 01	17 05 03*	170405	17 04 02	17 04 05	17 04 07	17 04 11	170904	17 06 04	17 06 05*	160103	200303	80318	120199	170504	190805	200304	Totale RU	Totale rifiuti urbani indifferenziati		Totale raccolta differenziata	RD (%)	Rifiuti pro capite (365 giorni) [kg/abitante x anno]
Rifiuti inerti provenienti da piccole manutenzioni domestiche raccolte presso gli ecocentri	legno	terra e rocce, contenenti sostanze pericolose	Ferro ed acciaio	alluminio	ferro e acciaio	metalli misti	cavi, diversi da quelli di cui alla voce 17 04 10	Altri rifiuti dell'attività di costruzione e demolizione		materiali da costruzione contenenti amianto		toner per stampa esauriti	Rifiuti non specificati altrimenti	Terre e erocce	Fanghi prodotti dal trattamento delle acque reflue	Fanghi delle fosse settiche						
0			0					0			0	0	0	0	0	0	0	192.79	152.68	-	40.11	20.80%	640.49
0			0					0			0	0	0	0	8.66	0	0	321.04	121.49	-	199.56	62.16%	247.15
0			0					0			0	0	0	0	0	0	0	737.63	357.47	-	380.16	51.54%	423.68
0			0					0			0	0	0	0	0	0	0	5,864.25	2,920.16	-	2,944.09	50.20%	655.59
0			0					0			0	0	0	0	0	0	0	5,052.02	1,379.87	-	3,672.16	72.69%	349.45
0			0					0			0	0	0	0	0	0	0	238.83	173.94	-	64.89	27.17%	856.03
0			0					0			0	0	0.103	0	0	0	0	3,102.66	768.19	-	2,334.47	75.24%	356.18
0			0					0			0	0	0	0	0	0	0	1,310.58	458.26	-	852.32	65.03%	542.68
0			0					0			0	0	0	0	0	107.9	0	1,702.66	562.14	-	1,140.52	66.98%	262.39
0			0					0			0	0	0	0	0	0	0	3,607.17	907.85	-	2,699.32	74.83%	433.97
0			0					0			0	0	0	0	0	0	0	241.12	126.72	-	114.40	47.45%	152.70
0			10.8					0			0	0	0	0	0	0	0	1,790.64	601.27	10.80	1,189.37	66.42%	354.93
0			0					0			0	0	0	0	0	0	0	318.06	211.24	-	106.82	33.58%	726.16
0			0					0			0	0	0	0	0	66	0	518.71	459.30	-	59.41	11.45%	466.89
0			0					0			0	0	0	0	0	0	0	3,960.17	2,819.72	-	1,140.45	28.80%	381.74
0			66.41					0			0	0	0	0	0	0	0	8,880.75	5,967.73	66.41	2,913.02	32.80%	486.70
0			0					0			0	0	0	0	0	0	0	1,087.43	286.54	-	800.89	73.65%	408.81
0			0					0			0	0	0	0	0	0	0	153.38	136.24	-	17.14	11.18%	376.86
0			0					0			0	0	0	0	0	0	0	598.80	502.96	-	95.84	16.00%	377.55
0			0					94.46			0	0	0	0	0	0	0	3,905.95	1,197.10	94.46	2,708.85	69.35%	358.25
110.88			0					0			0	0	0	0	0	0	0	3,981.91	1,244.32	-	2,737.59	68.75%	371.48
0			0					0			0	0	0	0	0	0	0	261.46	218.10	-	43.36	16.58%	380.59
0			0					0			0	0	0	0	0	0	0	6,642.50	4,622.58	-	2,019.92	30.41%	571.05
0			0					0			0	0	0	0	0	0	0	1,622.74	935.90	-	686.84	42.33%	349.43
0			0					0			0	0	0	0	0	0	0	1,052.29	370.80	-	681.49	64.76%	368.45
0			0					0			0	0	0	0	0	0	0	2,367.33	744.62	-	1,622.71	68.55%	311.37
0			0					0			0	0	0	0	280.8	0	0	1,284.16	463.91	-	820.25	63.87%	400.80
0			0					305.91			0	0	0	0	0	0	16	7,320.26	3,726.67	305.91	3,593.59	49.09%	494.88
0			163					215.36			0	0	0	0	0	0	0	28,149.17	20,976.79	378.36	7,172.38	25.48%	557.21
53			0					0			0	0	0	0	0	0	16	3,827.14	2,248.20	-	1,578.94	41.26%	482.68
0			0					0			0	0	0	0	0	0	0	862.46	284.91	-	577.55	66.97%	272.15
0			0					0			0	0	0	0	0	0	0	3,498.63	1,824.60	-	1,674.03	47.85%	652.73
0			0					0			0	0	0	0	0	0	0	7,688.35	2,757.51	-	4,930.85	64.13%	392.72
0			0					28.5			0	0	0	2.26	0	0	0	2,145.22	1,128.70	28.50	1,016.52	47.39%	481.42
0			0					0			0	0	0	0	0	0	0	424.91	117.73	-	307.18	72.29%	295.28
94			0					104.34			0	0	0	0	0	0	0	2,555.43	1,605.17	104.34	950.26	37.19%	625.41
0			0					0			0	0	0	0	0	0	0	6,910.21	1,994.42	-	4,915.79	71.14%	485.23
0			0					27.68			0	0	0	0	0	0	0	1,796.03	495.01	27.68	1,301.02	72.44%	305.03
0			0					0			0	0	0	0	0	0	0	6,602.08	4,396.10	-	2,205.98	33.41%	562.69
0			0					0			0	0	0	0	0	0	0	712.31	612.46	-	99.85	14.02%	442.43
0			0					0			0	0	0	0	0	0	0	877.22	223.56	-	653.66	74.51%	409.34
0			0					0			0	0	0	0	0	0	0	609.31	515.48	-	93.83	15.40%	460.55
0			0					273.19			0	0	0	0	0	0	0	3,166.53	1,022.77	273.19	2,143.77	67.70%	379.23
257.88	**0**	**0**	**240.21**	**0**	**0**	**0**	**0**	**1049.44**			**0**						**32**	**137,942.31**	**72641.16**	**1,289.65**	**65301.147**	**47.34%**	**454.87**

Appendix B

Recycling Data for Mahoning County, US

2004, 2005, 2006

Division of Solid and Infectious Waste Management
Solid Waste Management District – Annual District Report

RECEIVED
JUN 03 2005
OHIO EPA
DIV. OF SOLID & INFECTIOUS WASTE MGMT.

Calendar Year 2004 Annual District Report

Prepared in accordance with OAC 3745-27-90 (F)

I. Reference Information

1. Name of Primary District Contact	2. Name of Solid Waste Management District (SWMD)
Jim Petuch, Director	Mahoning County Solid Waste Management District

3. Address of SWMD	City	State	Zip
108 Westchester Dr.	Austintown	OH	44515 -

4. Telephone:	6. Does SWMD have a Web site
(330) 740 - 2060 Ext. 7155	☒ Yes ☐ No If yes, list address below:
5. E-mail Address	www.greenteam.cc
jpetuch@greenteam.cc	

7. Name of person responsible for filling out this report.	8. Business relationship of # 7 (left) to SWMD
Louie Vega, MIS	Employee
9. Telephone of # 7 (above)	(If "Other" – Please Explain)
(330) 740 - 2060 Ext. 7159	
10. Address of # 7	
108 Westchester Dr.	
Austintown, Ohio 44515	

II. Name and address of current Policy Committee Chair (District) -or- Board of Trustees Chair (Authority)

1. Name: Commissioner Anthony Traficanti	Phone: (330) 740 - 2130
2. Address Line 1: 21 W. Boardman St. Suite 200	FAX: (330) 740 - 2006
3. Address Line 2:	E-mail: atraficanti@mahoningcounty.gov
4. City: Youngstown 5. State: OH	6. Zip: 44503 -

Please do not write below this line

Data	File
☐ SIIMAN ☐ TVH ☐ IMPS	Program
☐ ODNR ☐ GNW ☐ LT	County
	Fac/Entity
	Subcategory

III. DISTRICT INFORMATION

1. Population of District (2004):	2. Source of Population Information:
251,660	Ohio Department of Development 2003 Estimates

3. Special Circumstances that affected District activities or waste generation in 2004:

Ohio EPA acknowledges that many events outside of a Solid Waste Management District's (SWMD) control can have an impact on its activities. In the space below, please describe any special circumstances that occurred in the SWMD during 2004 that impacted waste generation, reduction, recycling and/or disposal totals. Examples might include: a natural disaster, a major industry closing or opening, a labor dispute, a change in recycling infrastructure, a landfill closing, etc. The District may also use this space to provide any other comments they wish to share concerning the preparation of this report or Ohio EPA's review of this report. Additional spaces for comments have been provided in sections VII, X and XI of this report.

As Ohio EPA is aware, new rules governing reporting from compost facilities have been implemented. In the past Ohio EPA has expressed their concerns regarding tonnages provided by the Boardman Twp. Composting Facility. The District believes that 2004 will contain the most accurate data to date. However, this may reflect negatively on the District's overall diversion weights. In past accounts there has been as much as 16,500 tons of yard waste credited to the Boardman Twp site. That number will now be in the area of 1,122 tons of material for 2004, a tremendous drop in our diversion rate. The District intends on conducting its own independent audit of the facility to determine the reporting anomaly.

IV. OUT-OF-STATE SOLID WASTE FACILITIES USED BY THE SOLID WASTE MANAGEMENT DISTRICT

Each year, Ohio EPA contacts the environmental agencies in neighboring states for data on waste exported to those states from Ohio. The Agency collects this information and presents it in the *Out-of-State Waste Report*. A copy of the out-of-state waste data that is relevant to your SWMD will be sent to you along with the review comments that Ohio EPA generates on this Annual District Report. If your SWMD has contracts or other agreements with haulers, transfer stations or out-of-state landfills and collects and maintains data on waste sent out of state, please complete Table IV.1.

Does the SWMD have any contracts or other special agreements with out-of-state waste facilities or haulers that provide data on waste taken out of state? (check one below)

☐ Yes → Complete Table IV.1

☒ No → Continue with section V

Source(s) of the out-of-state waste data

Table VI.1 Solid Waste Management District Waste Recycled (all units should be in tons unless otherwise specified; all double counting should be eliminated from the values in this table)

Categories	Residential/ Commercial Tons Recycled	Industrial Tons Recycled	Total Tons Recycled
Appliances	133		133
Lead-Acid Batteries	6.5		6.5
Dry Cell Batteries	7		7
Food[1]	289		289
Glass	1,740		1,740
Household Hazardous Waste[2]	36.5		36.5
Ferrous Metals	571	33,742	34,313
Non-Ferrous Metals	720	9,276	9,996
Non-Exempt Foundry Sand[3]			
Corrugated Cardboard	9,112	88	9,200
All other paper	5,527	428	5,925
PETE Plastic			
HDPE Plastic			
Mixed/Other Plastic	330		330
Rubber (not including tires)			
Scrap Tires			
Passenger (check one) ☐ Tons ☐ Number			
Truck (check one) ☐ Tons ☐ Number			
Other / Mixed ☒ Tons ☐ Number	67		67
Textiles	972		972
Used Oil[4]	2		2
Wood	3,436	1	3,437
Yard Waste	5,076		5,076
Commingled Recyclables[5]	137		137
Electronics (all residential)	127		127
Other(s) (specify)[6]		8,000	8,000
Educational Furniture (Reuse)	21		21
Toner Cartridges	3		3
Commercial Electronics\Dump & Run\Styrofoam\re:CREATE, etc	255		255
Under Layment	6		6
Grand Totals	28,574	51,535	80,109

1. Used cooking fat should not be included in this row.
2. Only household hazardous wastes which are recycled should be included in this row. If this does not match the amounts in table XI.1, please note the reason for the difference in Section XI.
3. Foundry sand that meets the definition of a solid waste in accordance with Ohio EPA Policy DSW 0400.007.
4. Only used oil from household hazardous waste collections, oil change service stations serving residents, and those changing oil in their own vehicles should be included in this row. No industrial used oil should be listed here.
5. Only use this row if data on individual materials are not available. Only single stream recyclables collected from curbside and drop-off programs should be included in this row. Do not include material listed elsewhere in table in this total.
6. All materials listed as "other" MUST be specified so the SWMD may receive proper credit for these materials.

Division of Solid and Infectious Waste Management
Solid Waste Management District – Annual District Report

RECEIVED
JUN 0 5 2006
OHIO EPA
DIV. OF SOLID & INFECTIOUS WASTE MGMT

Calendar Year 2005 Annual District Report

Prepared in accordance with OAC 3745-27-90 (F)

I. Reference Information

1. Name of Primary District Contact Jim Petuch, Director	2. Name of Solid Waste Management District (SWMD) Mahoning County Solid Waste Management District
3. Address of SWMD 2801 Market St. Suite 207	City: Youngstown State: OH Zip: 44507 -
4. Telephone: (330) 740 - 2060 Ext. 7155	6. Does SWMD have a Web site ☒ Yes ☐ No If yes, list address below: www.greenteam.cc
5. E-mail Address jpetuch@mahoningcountyoh.gov	
7. Name of person responsible for filling out this report. Louie Vega, MIS	8. Business relationship of # 7 (left) to SWMD Employee
9. Telephone of # 7 (above) (330) 740 - 2060 Ext. 7159	(Date Stamp [illegible])
10. Address of # 7 2801 Market St. Suite 207 Youngstown, Ohio 44507	

II. Name and address of current Policy Committee Chair (District) -or- Board of Trustees Chair (Authority)

1. Name: Commissioner Anthony Traficanti		Phone: (330) 740 - 2130
2. Address 1: 21 W. Boardman St		FAX: (330) 740 - 2006
3. Address 2:		E-mail: atraficanti@mahoningcountyoh.gov
4. City: Youngstown	5. State: OH	6. Zip: 44503 -

Please do not write below this line

Data			File
☐ SIIMAN	☐ TVI1	☐ IMPS	Program ______
☐ ODNR	☐ HHW	☐ LT	County ______
			Fac/Entity ______
			Subcategory ______

III. DISTRICT INFORMATION

1. Population of District (2005):	2. Source of Population Information:
252,660	Ohio Department of Development

3. Special Circumstances that affected District activities or waste generation in 2005:

Ohio EPA acknowledges that many events outside of a Solid Waste Management District's (SWMD) control can have an impact on its activities. [illegible] please describe any special circumstances that occurred in the SWMD during 2005 that impacted waste generation, reduction, recycling and/or disposal data. Examples might include a natural disaster, a major industry [illegible], a large [illegible] recycling infrastructure, a landfill closing, etc. The District may also use this space to provide any other comments it wish to share concerning the preparation of this report or Ohio EPA's review of this report. Additional spaces for comments have been provided in sections VII, X and XI of this report.

2005 was a banner year for recycling initiatives in Mahoning County. Several events contributed to a 35% increase over reported amounts in the 2004 ADR. Among the triggers was a 58% increase in commercial cardboard recycling from our two largest haulers. A new scrap metals ordinance yielded over 4,000 residential/commercial tons for the last quarter of 2005. Additionally, this years ADR contains a complete record of activity for Mahoning County's registered compost facilities. The District was also able to tap into markets that were previously unknown.. Examples include previously unrecorded food banks and cooperation with the United States Postal Service on recycling of junk mail. Mahoning County was able to verify 68% of tires headed for Liberty Tire are indeed being recycled instead of monofilled as previously assumed.

Many of the District run programs and strategies demonstrated tremendous growth as well. Our school fiber program increased over 200% and our drop-off program saw incredible increases as well.

IV. OUT-OF-STATE SOLID WASTE FACILITIES USED BY THE SOLID WASTE MANAGEMENT DISTRICT

Each year, Ohio EPA contacts the environmental agencies in neighboring states for data on waste exported to those states from Ohio. The Agency collects this information and presents it in the *Out-of-State Waste Report*. A copy of the out-of-state waste data that is relevant to your SWMD will be sent to you along with the review comments that Ohio EPA generates on this Annual District Report. If your SWMD has contracts or other agreements with haulers, transfer stations or out-of-state landfills and collects and maintains data on waste sent out of state, please complete Table IV.1.

Does the SWMD have any contracts or other special agreements with out-of-state waste facilities or haulers that provide data on waste taken out of state? (check one below)

☐ Yes → Complete Table IV.1

☒ No → Continue with section V

Source(s) of the out-of-state waste data

Table VI.1 Solid Waste Management District Waste Recycled (all units should be in tons unless otherwise specified; all double-counting should be eliminated from the values in this table)

Categories	Residential/Commercial Tons Recycled	Industrial Tons Recycled	Total Tons Recycled
Appliances	3,911		3,911
Lead-Acid Batteries	21		21
Dry Cell Batteries	8		8
Food[1]	1,058		1,058
Glass	1,650		1,650
Household Hazardous Waste[2]	30		30
Ferrous Metals	922	33,742	34,664
Non-Ferrous Metals	799	9,276	10,075
Non-Exempt Foundry Sand[3]			
Corrugated Cardboard	11,010	88	11,098
All other paper	7,432	428	7,860
Plastics	305		305
Rubber (not including tires)			
Scrap Tires (please check one)			
☒ Tons ☐ Number / PTE's[6]	980		980
Textiles	902		902
Used Oil[4]	5		5
Wood	3,242	1	3,243
Yard Waste	7,789		7,789
Commingled Recyclables[5]			
Electronics (all residential)	781		781
Other(s) (specify)[7]			
Furniture	27		27
Carpet Underlayment	7		7
Commingled Recyclable (Litter Clean-ups, Overflow)	269		269
Grand Totals:	41,148	43,535	84,683

1. Used cooking fat should not be included in this row.
2. Only household hazardous wastes which are recycled should be included in this row. If this does not match the amounts in table XI.1, please note the reason for the difference in Section XI.
3. Foundry sand that meets the definition of a solid waste in accordance with Ohio EPA Policy DSW 0400.007.
4. Only used oil from household hazardous waste collections, oil change service stations serving residents, and those changing oil in their own vehicles should be included in this row. No industrial used oil should be listed here.
5. Only use this row if data on individual materials are not available. Only single stream recyclables collected from curbside and drop-off programs should be included in this row. Do not include material listed elsewhere in table in this total.
6. Assume 20 lbs. per Passenger Tire Equivalent (PTE).
7. All materials listed as "other" MUST be specified so the SWMD may receive proper credit for these materials.

NOTE: When reviewing data submitted with the ADR, Ohio EPA evaluates the data for consistency with data from previous years a for quantities that seem particularly unusual for a given material. Ohio EPA strongly encourages SWMDs to do the same prior to submitting the ADR. This is particularly important if this will be the data used for the reference year for a solid waste management p update. The data reported in this section may be subject to increased scrutiny when used as reference year data in a plan update. Districts are encouraged to provide supporting data and documentation whenever possible for the recycling numbers reported in this section, and are encouraged to contact Ohio EPA with any questions.

Division of Solid and Infectious Waste Management
Solid Waste Management District – Annual District Report

Calendar Year 2006 Annual District Report

Prepared in accordance with OAC 3745-27-90 (F)

I. Reference Information

1a. Name of Primary District Contact	1b. Title of the person listed in 1a.
Jim Petuch	Director

2. Name of Solid Waste Management District or Authority
Mahoning County Solid Waste Management District

3. Address of District	City	State	Zip
2801 Market St. Suite 207	Youngstown	OH	44507 -

4. Telephone: (330) 740 - 2060 Ext. 6732 FAX: (330) 740 - 2066	6. Does District have a Web site ☒ Yes ☐ No If yes, list address below:
5. E-mail Address jpetuch@mahoningcountyoh.gov	www.greenteam.cc
7. Name of person responsible for filling out this report. Louie Vega, MIS	8. Business relationship of # 7 (left) to District Employee
9. Telephone of # 7 (above) (330) 740 - 2060 Ext. 6734	(Date Stamp – Please Do not write in this section)
10. Address of # 7 2801 Market St. Suite 207 Youngstown, OH 44507	

II. Name and address of current Policy Committee Chair (District) -or- Board of Trustees Chair (Authority)

Name: Commissioner Anthony Traficanti	Date he/she assumed role: 01 / 2005 (mm / yyyy)	Phone: (330) 740 - 2130 x
Address 1: 21 W. Boardman St.		FAX: (330) 740 - 2006
Address 2: Suite 200		E-mail: atraficanti@mahoningcountyoh.gov
City: Youngstown	State: OH	Zip: 44503 -

Please do not write below this line

Data			File
☐ RECYC	☐ IMPS	☐ REV	Program _____
☐ HHW	☐ ODNR	☐ Filed	County _____
☐ NOV	☐ NOD		Fac/Entity _____
			Subcategory _____

III. DISTRICT INFORMATION

1. Population of District (2006):	2. Source(s) of Population Information:
251,280	Ohio Department of Development

3. Special Circumstances that affected District activities or waste generation in 2006:

2006 provided record numbers in recycling and reuse activities within Mahoning County. A number of key events triggered a 72% increase over 2005. The most significant is attributed to the Scrap Metal Recycling Program. A City of Youngstown supported ordinance, requires all scrap metal dealers to report to the Director of the Solid Waste Management District monthly. These reports delineate all residential/commercial and industrial sector scrap metal recycling generated within Mahoning County. In light of this the District has not conducted an industrial survey and instead relied solely on direct numbers from the metals brokers for this annual report.

There were abundant successes among other District strategies as well. The non-subscription curbside service reported its first increase in volume after a thirteen (13) year decline. The Drop-Off Recycling Program increased by an additional eleven (11) sites and garnered an impressive 26% increase over the previous year. Lastly, the Commercial Office Paper Recovery Program added an additional 120 businesses bringing our total participation to 280 locations.

IV. OUT-OF-STATE SOLID WASTE FACILITIES USED BY THE SOLID WASTE MANAGEMENT DISTRICT*

Does the District have any contracts or other special agreements with out-of-state waste facilities or haulers that provide data on waste taken out of state? or Does the District keep it's own data on waste sent out of state? (check one below).

☒ Yes → Complete Table IV.1

☐ No → Continue with section V

NOTE: If you maintain a list of out-of-state facilities that have accepted waste from the District but you do not know the amount, you may list the name(s) of the facility(ies) and an unknown amount of waste.

Source(s) of the out-of-state waste data:

Seneca Landfill, Inc / Voluntarily provides Director with quarterly waste receipt reports

Table VI.1 Solid Waste Management District Waste Recycled (Tons)

NOTE: Please read the 2006 ADR Instruction Manual carefully before filling out this table. Any materials not listed in one of the 20 pre-designated categories below must be specified so the district may receive proper credit for these materials.

Recyclable Categories*	Residential/Commercial Tons Recycled	Industrial Tons Recycled	Total Tons Recycled
1. Appliances / "White Goods"	231.00		231.00
2. Lead-Acid Batteries	89.00		89.00
3. Dry Cell Batteries	9.00		9.00
4. Food	1,167.00		1,167.00
5. Glass	1,793.00		1,793.00
6. Household Hazardous Waste	4.00		4.00
7. Ferrous Metals	28,689.00	120,511.00	149,200.00
8. Non-Ferrous Metals	1,174.00	1,104.00	2,278.00
9. Corrugated Cardboard	11,565.00		11,565.00
10. All other paper	8,051.00		8,051.00
11. Plastics	507.00		507.00
12. Scrap Tires (tons)	3,746.00		3,746.00
13. Textiles	319.00		319.00
14. Used Motor Oil	14.00		14.00
15. Wood	2,545.00		2,545.00
16. Yard Waste	9,881.00		9,881.00
17. Commingled Recyclables	620.00		620.00
18. Electronics (all residential)	153.00		153.00
19. Ash (recycled ash only)			
20. Non-Exempt Foundry Sand			
21. Styrofoam	13.00		13.00
22. Re-Use Initiatives	120.00		120.00
23. Misc.	85.00		85.00
24. Aluminum Scrap		930.00	930.00
25.			
26.			
27.			
28.			
29.			
30.			
31. Recycling Subtotals	**70,775.00**	**122,545.00**	**193,320.00**
Source / Volume Reduction and Incineration			
32. Source Reduction (2006)			
33. Incineration			
34. Source Reduction Subtotals			
35. Grand Totals	**70,775.00**	**122,545.00**	**193,320.00**

* Please read the instruction booklet carefully for definitions and restrictions on reportable categories so that the district may receive the proper recycling credit for all creditable materials.