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MONTGOMERY TOWNSHIP, PA SUSTAINABILITY AUDIT

A report prepared by the Center for Sustainable Communities, Temple University



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A report prepared by:

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on behalf of the

Montgomery Township Environmental Advisory Committee

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EXECUTIVE SUMMARY

Temple University's Center for Sustainable Communities (CSC) completed a **Sustainability Audit of Montgomery Township, Pennsylvania** in the spring of 2009 that analyzed greenhouse gas emissions and the use of water, wastewater, and solid waste disposal services by the Township government and the community's residents and businesses. The audit—initiated by the Board of Supervisors upon the recommendation of the Township's Environmental Advisory Committee (EAC)—sets a baseline against which to measure future efforts to reduce greenhouse gas emissions and the environmental impacts of the township's use of public services and it makes recommendations for specific steps the municipal government can take.

The findings of the Sustainability Audit, and recommendations resulting from those findings, are organized in four sections of the report: Greenhouse Gas Emissions, Water, Wastewater, and Solid Waste.

Greenhouse Gas emissions attributable to Montgomery Township residents, businesses, and municipal government operations equaled 392,281 metric tons of CO₂ equivalents (MTCO₂E) in 2005, the base year used for this Sustainability Audit. Of these emissions, 23% was attributable to residential home energy use, 21% to commercial businesses, 12% to industry, and 40% to transportation (for combined residential, commercial and industrial purposes). The municipal government was responsible for 1.1% of the township's greenhouse gas emissions, primarily from electricity used for wastewater treatment and streetlights and traffic signals, and motor fuels for the Township's vehicle fleet. On a per capita basis, 16.3 MTCO₂E were generated in 2005, a figure comparable to per capita emissions for the entire nine-county Greater Philadelphia region.

Water use in Montgomery Township is provided by the North Wales and North Penn Water Authorities and a small number of private wells. Water consumption, at 60 gallons per person per day, is slightly lower than the regional and state averages and significantly lower than the national average. Effective water authority policies have encouraged water conservation in the township and kept usage relatively low.

Wastewater disposal in the township is managed by the Montgomery Township Municipal Sewer Authority (MTMSA) using its own Eureka wastewater treatment facility and facilities in neighboring communities. Almost 3 million gallons of wastewater are generated per day in the Township, about 45% higher than water use which suggests that infiltration and inflow (I/I) is occurring. While this indicates ongoing MTMSA maintenance efforts need to be continued, I/I does not appear to be a significant problem in the Township at present.

Solid waste disposal in Montgomery Township is provided by multiple haulers of both trash and recycling materials. The availability of reliable data is poor and makes it difficult to accurately estimate per capita solid waste generation and recycling rates. The Montgomery County Planning Commission estimates that 43% of the township's solid waste is recycled, though that figure could be 33% or lower, depending upon the method used to estimate solid waste tonnage.

Montgomery Township's municipal government, residents, business owners, and public service managers use some effective conservation practices that reduce the Township's environmental impacts. But per capita greenhouse gas emissions and the use of water, wastewater, and solid waste disposal services are, at best, only slightly lower than in neighboring communities and in the region as a whole, indicating that there are opportunities for Township, community and business leaders to initiate and promote policies to encourage reductions in consumption and solid waste and wastewater disposal.

Recommendations in the report are focused on those actions that the municipal government can take. Though its greenhouse gas emissions are only 1.1% of the Township’s total, the municipal government’s efforts can provide leadership and a model for the rest of the community. These recommendations include the passage of a resolution committing the Township to significant greenhouse gas reductions in the next fifteen years, the appointment of a Sustainability Coordinator, the development of energy conservation policies for municipal operations, the purchase of wind energy credits, and the promotion of these efforts to residents and businesses. Adopting and meeting recommended targets for greenhouse gas reductions would result in a 15-20% reduction in emissions from municipal government operations, and 15% reduction in community emissions by 2025.

The report also provides recommendations for the water, wastewater, and solid waste sectors, all aiming at more conservative levels of consumption of these public services.

Next steps for the EAC and Township leaders are to set greenhouse gas reduction and resource conservation targets and to study the potential costs and benefits of each recommendation, in terms of financial commitments required and the expected benefits that could be realized from reducing greenhouse gas emissions and energy costs. A Sustainability Coordinator—working in collaboration with the EAC, the Board of Supervisors, municipal government employees, and residents and business owners—can then help develop a Township Local Action Plan using recommendations from this report to meet the targets.

INTRODUCTION

This report presents the results of a Sustainability Audit that Temple University's Center for Sustainable Communities (CSC) conducted on behalf of Montgomery Township, Pennsylvania in the spring of 2009. The audit was initiated by a request from Montgomery Township's Board of Supervisors, on behalf of the Township's Environmental Advisory Committee (EAC), whose members wanted to accomplish two key goals. First they saw a need to establish a baseline assessment of energy and resource use by residents, commercial businesses, industries, and the municipal government so that changes could be tracked in future years. Second, the EAC wanted the CSC to develop a set of recommendations for actions the municipal government could take to reduce energy and resource use, and encourage township residents and businesses to do the same.

This audit includes four components: 1) a greenhouse gas emissions inventory for the municipal government's facilities and operations and for the community's use of energy for residential, commercial, industrial, transportation and other purposes, and assessments of 2) water, 3) wastewater, and 4) solid waste disposal systems in Montgomery Township. Recommendations for improving sustainability are included in each of these sections.

ABOUT MONTGOMERY TOWNSHIP

Montgomery Township is a small municipality of 10.6 square miles located in Montgomery County (Figure 1), one of nine Pennsylvania and New Jersey counties within the Philadelphia, Pennsylvania metropolitan region. In the 1980s, the largely rural community began suburbanizing with the construction of new homes and businesses, attaining within a couple of decades its present population of about 24,000 residents.

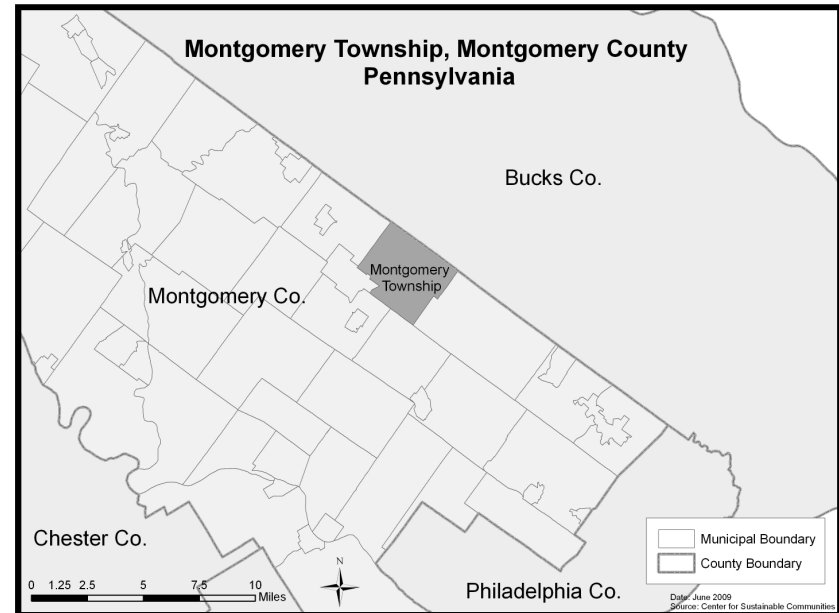


Figure 1 – Montgomery Township, Pennsylvania

The government has a Township Manager - Board of Supervisors structure without a mayor. The Township's expenditures for public safety, highways and streets, parks and recreation, employee compensation and other commitments were \$8.8 million in 2005, with the Municipal Sewer Authority spending about \$4 million on operating and non-operating expenditures.

The Montgomery Township Municipal Sewer Authority (MTMSA) was created by the municipal government in 1963, and is administered from the Montgomery Township Government offices within the Stump Road building. While it is perceived of by Township residents and businesses as part of the municipal government, it is in fact a financially independent entity that is not under direct operational control of the Board of Supervisors or Township Manager.

ENVIRONMENTAL AND ENERGY CHALLENGES FACED BY LOCAL MUNICIPALITIES

Municipalities around the country face environmental and energy challenges that are expected to become more serious in the coming decades. These challenges are varied, and many are simple to understand, yet complex to solve.

Montgomery Township, like many other communities in the Delaware Valley region, has established an Environmental Advisory Committee (EAC) to provide advice and leadership on environmental issues affecting the Township. Authorized through PA Act 177 in 1996 and based on earlier legislation of Act 148 (1973), local municipalities may appoint 3-7 community residents to serve on an EAC. EACs advise the local planning commission, park and recreation board, and elected officials on the protection, conservation, management, promotion, and use of natural resources (Environmental Advisory Council Network, 2009).

The impacts of changing global and regional climates due to the emissions of greenhouse gases from the use of fossil fuels for energy will pose significant environmental challenges for Montgomery Township in the coming years and decades. These changes could have serious impacts on the economy of the state and the quality of life for all of its residents. Some of the significant changes expected in Pennsylvania include increases in the number of summer days over 90 degrees leading to deteriorating air quality, declines in cows' milk production, decreases in yields of many crops, a shortening or cessation of snowmobiling and skiing seasons, and deteriorating conditions for prized hardwood trees (Union of Concerned Scientists, 2008).

Probable rises in the cost of energy for transportation and for residential, commercial, and industrial purposes will also require thoughtful attention. Reducing greenhouse gas emissions—by the municipal government and by residents and businesses located

within the Township—can be achieved through greater efficiency in the use of all energy sources, including the most widely used: electricity, natural gas, motor fuels (gasoline and diesel), and fuel oil.

There are many reasons to use resources more sustainably and to reduce or mitigate the negative impacts of economic activities on the natural environment. More efficient use of resources reduces pollution emissions into the air and water, and contributes fewer greenhouse gases to the atmosphere. Just as importantly, more sustainable use of resources can result in significant financial savings on energy, water, and waste-related costs, and contribute to greater stability and predictability in energy markets.

PROJECT APPROACH

This Sustainability Audit has been undertaken as a collaborative effort involving the technical skills of the Center for Sustainable Communities and the knowledge and experience of Montgomery Township staff-members and volunteers. CSC staff interviewed Montgomery Township employees by telephone and in-person and collected data from Township and other sources in order to conduct the analyses that are documented in this report.

The report is divided into four sections: a greenhouse gas emissions inventory, and assessments of the provision and use of water, wastewater and solid waste disposal systems by residents, commercial and industrial businesses, and the township government.¹ In each section, the report documents current use patterns and recommendations for reducing energy and resource consumption in the future.

Analysis for the greenhouse gas emissions inventory was accomplished through the use of the *Clean Air and Climate Protection* (CACP) software package distributed by ICLEI – Local Governments for Sustainability, an international membership organization of more than 1,000 local communities working to address climate change and environmental sustainability. Montgomery Township became a member of ICLEI at the start of this project and has full access to the information, analytical, and training resources of the organization. Using the CACP software, and in consultation with ICLEI and the Delaware Valley Regional Planning Commission (DVRPC), data on the use of electricity, natural gas, and other fuels, and other sources of greenhouse gas emissions were converted into a standard unit of emissions measurement – metric tons of carbon dioxide equivalent (MTCO₂E).

¹ Note that there is some overlap in the analyses because Wastewater and Solid Waste are included as part of the Greenhouse Gas Inventory for their greenhouse gas, but are examined separately as well, taking into account other aspects of sustainability.

Greenhouse gas emissions can be broken into two primary categories: stationary and mobile. Stationary emissions are those associated with energy use at a specific location, while mobile emissions are related to motor fuels for cars, light duty trucks, heavy duty trucks, and other vehicles. Residents, businesses, and the municipal government contribute to greenhouse gas emissions from both stationary sources (fuel consumption for the homes and buildings in which they live and work) and mobile sources (fuel consumption for the cars and trucks they use for travel).

The year 2005 was used as a baseline for this analysis to be consistent with the recently completed Delaware Valley Regional Planning Commission's March 2009 *Regional Greenhouse Gas Emissions Inventory* (DVRPC 2009). DVRPC's effort provided much of the data for the community greenhouse gas inventory, while the results of this Sustainability Audit provide additional detail and depth, particularly in terms of greenhouse gas emissions attributable to municipal government operations.

The water, wastewater, and solid waste audits were conducted by CSC staff using data and information provided by Montgomery Township staff and other sources of expert information. The quantitative analysis was conducted using standard office computer software packages such as Microsoft Excel.

GREENHOUSE GAS EMISSIONS INVENTORY

Our modern economy is based upon the consumption of energy. In construction, communication, transportation, building operations, agriculture, industry, and commerce, the availability of abundant and inexpensive energy is essential. Most of the energy consumed in American communities comes from non-renewable fossil fuels: petroleum (refined into gasoline, diesel, jet fuel, kerosene, heating oil, and other fuels), coal, and natural gas. As fossil fuels are combusted to provide energy, many gases are emitted, including carbon dioxide (CO₂), nitrous oxides (NO_x), and methane (CH₄). These and others are commonly referred to as “greenhouse gases” for their heat-retaining qualities that contribute to global climate change. While some uncertainty remains in the scientific community as to the severity and timing of the impacts of climate change, there is no uncertainty that human activities—including the combustion of fossil fuels, agriculture, the decomposition of solid and liquid wastes, land use changes as forests are converted to other uses, and more—are contributing to climate change that will have serious impacts on the natural environment and national and local economies.

To understand and address the contribution of Montgomery Township’s municipal government, residents, and businesses to greenhouse gas emissions, conducting an inventory is a first important step. Such an inventory identifies the amounts, types and sources of greenhouse gases emitted within the municipality. With data collected from Montgomery Township, the Delaware Valley Regional Planning Commission (DVRPC), the Montgomery Township Municipal Sewer Authority, and other sources—the Center for Sustainable Communities created an inventory of energy consumption and greenhouse gases emitted by using the *Clean Air and Climate Protection* (CACP) software package developed by ICLEI—Local Governments for Sustainability.

The results of the inventory are presented here, with municipal government greenhouse gas emissions detailed first and community emissions detailed second. The municipal government has a fair amount of control over its consumption of energy. The documentation of the sources, purposes, and types of its energy use provides the information the municipal government needs to identify the best ways to reduce energy consumption and, consequently, both its energy costs and its contributions to climate-changing greenhouse gas emissions. The municipal government does not have direct control over the greenhouse gas emissions that residents and businesses are responsible for, but the documentation of those emissions in this report sets a baseline by which all community members can identify and assess efforts to reduce emissions.

MUNICIPAL GOVERNMENT GREENHOUSE GAS EMISSIONS

Montgomery Township municipal government facilities and operations were responsible for 4,360 metric tons of carbon dioxide equivalent emissions in 2005.² These emissions come from the township’s police, fire, public works, code enforcement, and administrative functions, as well as the sewer authority’s functions. All data in this section represent a subset of the community inventory which follows.

The Township owns a municipal building on Stump Road which houses administrative and police services. There are also two fire stations, a public works facility, park buildings, and the sewer authority’s wastewater treatment plant and seven pump stations.

² Because there are several important greenhouse gases that are accounted for in an inventory of this type, a conversion is made to carbon dioxide equivalents and the results are reported in metric tons (one metric ton of 1,000 kilograms is equal to 2,205 U.S. pounds, or 1.1 U.S. tons). Metric tons of CO₂ equivalents are often abbreviated as MTCO₂E.

The Township had 85 full-time, 12 part-time, and 24 summer employees in 2005. Additionally, the Sewer Authority has 12 full-time employees. The Township government and sewer authority own 21 cars, 30 light trucks (including vans and SUVs), 19 heavy trucks, and approximately 48 pieces of construction and agricultural equipment of varying sizes. There are six parks within the Township, and only a few off-road trails, but more trails are planned for the area.

Montgomery Township has no airports, ports, power generation facilities, water treatment facilities or pumps, or libraries. The public schools are not operated by the Township government.

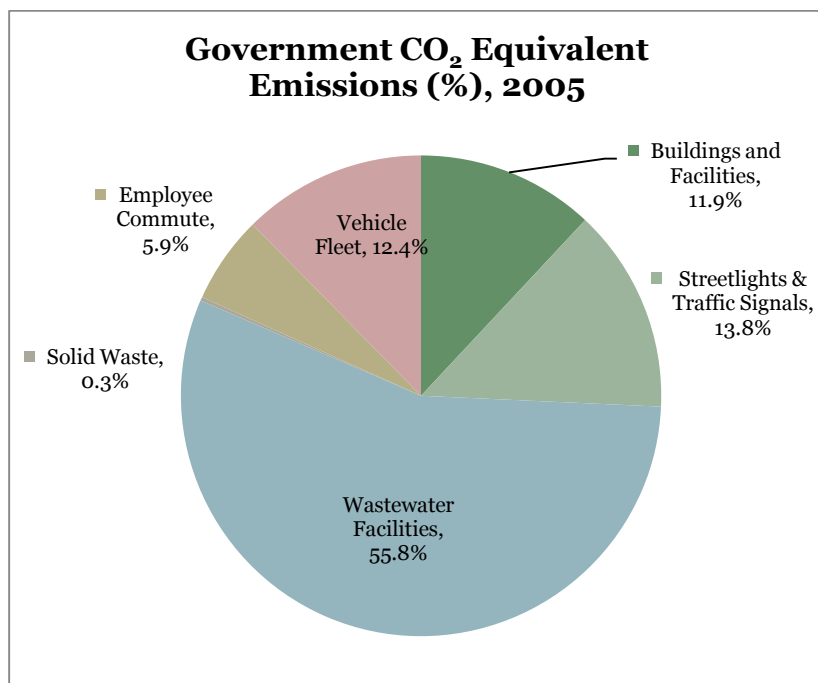


Figure 2 – Government CO₂ Equivalent Emissions (%), 2005

The Montgomery Township Municipal Sewer Authority’s operations were responsible for 55.8% of the total Township emissions, or 2,431 MTCO₂E. The government’s vehicle fleet, buildings and facilities, and streetlights and traffic signals have roughly equal shares of the emissions, 12.4% for the vehicle fleet, 11.9% for buildings and facilities, and 13.8% for streetlights and traffic signals (Figure 2). Employee commuting is responsible for 5.9% of township greenhouse gas emissions, and solid waste disposal is responsible for the remaining 0.3% of emissions.

The primary source of Wastewater Facilities emissions is the electricity used to pump and process wastewater (91.8%); emissions from the wastewater (5.0%) and from natural gas use (3.2%) are responsible for important, but much smaller shares. Emissions from streetlights and traffic signals are entirely from electricity and those from municipal buildings and facilities (the Stump Road municipal offices, the Domorah Road public works facility, the fire stations, and the municipal park buildings) are from both electricity (69.9%) and natural gas (29.0%) consumption, and from burning waste motor oil for heat at the public works building (1.1%). Emissions due to municipal vehicle fleet operations are principally from gasoline (55.3%) and diesel (38.6%), but also reflect reimbursable business travel (including air travel) in vehicles not owned by the township (1.5%), and refrigerants used for vehicle air conditioning (4.6%). Employee Commute emissions reflect fuel used by employees to travel to and from work, estimated using the results of a survey conducted in February and March, 2009. Emissions from the Solid Waste sector reflect the decomposition in landfills of waste collected from parks, Public Works, and the Stump Road Municipal buildings.

In the municipal government vehicle fleet, police vehicles consumed the most fuel and emitted the most greenhouse gases, followed by public works vehicles (Figure 3).

Greenhouse gas emissions sources from the Montgomery Township Municipal Government are identified in Figure 4. PECO uses coal,

nuclear, oil, natural gas, and other fuels and energy sources to supply electricity to the region. Montgomery Township’s electricity use—for municipal buildings and facilities, streetlights and traffic signals, and the sewer authority’s operations—is responsible for nearly three quarters of total greenhouse gas emissions. Gasoline and diesel fuels for the municipality’s vehicle fleets make up more than a sixth of total greenhouse gas emissions. And natural gas used for heating water and buildings represents slightly more than 5%, with emissions associated with solid waste disposal and jet fuel for long-distance business travel making up very small percentages.

Significant reductions in the municipal government’s greenhouse gas emissions are possible primarily through reductions in the use of electricity and vehicle fuels.

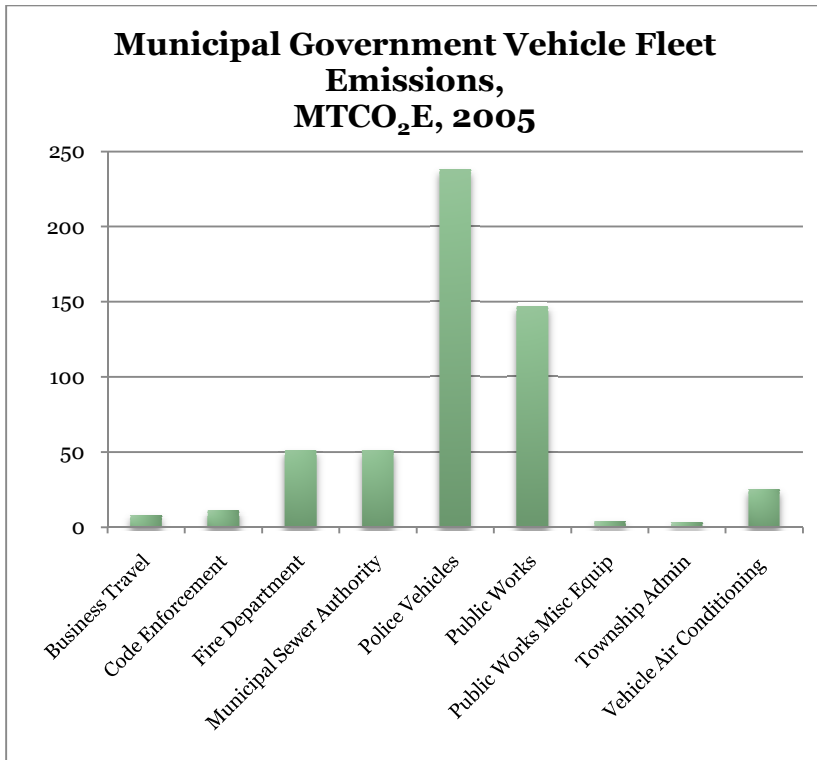


Figure 3 – Municipal Government Vehicle Fleet Emissions, MTCO₂E, 2005

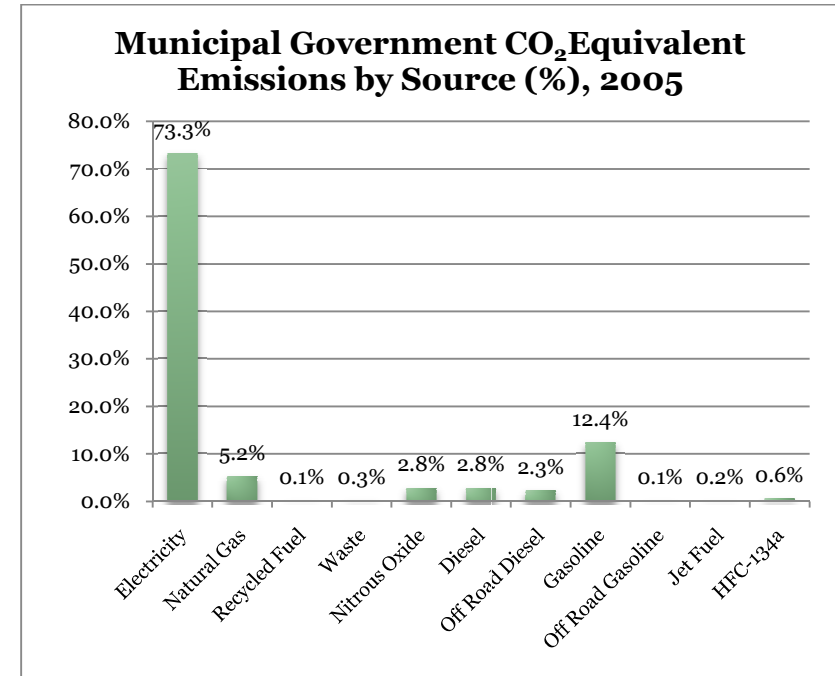


Figure 4 – Municipal Government CO₂ Equivalent Emissions by Source (%), 2005

Purchasing more energy-efficient building heating and cooling systems and office equipment, using less electricity through maximum heating and minimum cooling temperatures, turning off computers, lights, and other appliances when not in use, and purchasing wind energy credits are the main alternatives for reducing electricity-related greenhouse gas emissions. Purchasing more fuel-efficient vehicles and reducing mileage driven are the principal alternatives for reducing motor fuel-related greenhouse gas emissions.

SCOPES

The Local Government Operations Protocol (LGOP)³ was designed to provide a consistent set of methods and practices for municipal greenhouse gas inventories. LGOP recommends that local communities assess greenhouse gas emissions in three categories designated “Scopes,” in order to help understand the level of control that municipal governments have over the greenhouse gas emissions.

Scope One	MTCO ₂ E	%
Police Vehicles	238	5.5
Building Natural Gas	151	3.5
Public Works Vehicles	148	3.4
Fire Department Vehicles	51	1.2
Vehicle Air Conditioning	25	0.6
Code Enforcement Vehicles	11	0.3
Public Works Motor Oil	6	0.1
Public Works Misc Equip	4	0.1
Township Administration Vehicles	3	0.1
Total Scope One	637	14.8

Table 1 – Montgomery Township, PA Scope One Emissions, 2005

Scope one emissions are those that a municipal government has the most direct control over, such as the quantities of natural gas used in

³ The Local Government Operations Protocol was developed by the California Air Resources Board, California Climate Action Registry, ICLEI – Local Governments for Sustainability, and the Climate Registry.

municipal buildings and the gallons of gasoline and diesel used in municipal vehicles. In these cases, the Township controls both the quantity and the type of fuels used. In Montgomery Township, Scope one emissions are attributable to natural gas and heating oils used in Township buildings, motor fuels used for the operation of police, public works, fire department and other vehicles, and the operation of air conditioning units in buildings and vehicles. Combined, these Scope one emissions equal 14.8% of all government emissions in Montgomery Township (Table 1).

Scope Two	MTCO ₂ E	%
Streetlights	502	11.5
Building Electricity	364	8.4
Traffic Lights	98	2.2
Total Scope Two	964	22.1

Table 2 – Montgomery Township, PA Scope Two Emissions, 2005

Scope two emissions are those that a municipal government controls in terms of the quantities of energy used, but not the sources. Montgomery Township determines the amount of electricity it uses in municipal operations, for example, but does not control the sources of fuel used in generating the electricity that PECO provides. Electricity used for Township buildings, streetlights, and traffic signals account for 22.1% of all government emissions in Montgomery Township (Table 2).

Scope three emissions come from sources that the municipal government does not have direct control over, but for which it has indirect responsibility. In Montgomery Township, Scope three emissions come primarily from the motor fuel used by employees to commute to work and the Sewer Authority’s electricity consumption

for wastewater treatment. Scope three sources account for 63.3% of total government emissions (Table 3).

Scope Three	MTCO ₂ E	%
MTMSA buildings & pumping	2,311	53
Full Time Year-Round Employee Commute	207	4.7
Wastewater Emissions	121	2.8
MTMSA Vehicles	51	1.2
Part Time Year Round Employee Commute	36	0.8
Summer Employee Commute	15	0.3
Government Generated Waste	11	0.3
Business Travel	8	0.2
Total Scope Three	2,760	63.3

Table 3 –Montgomery Township, PA Scope Three Emissions, 2005

COST

The municipal government spent over \$675,000 in 2005 on energy for four categories of operations: \$121,254 on electricity and natural gas for municipal buildings and facilities, \$109,706 for the electricity to power streetlights and traffic signals, \$336,676 on electricity and natural gas for wastewater processing, and \$108,940 on gasoline and diesel for the municipality’s vehicle fleet (Figure 5).

Municipal Government Energy Costs (\$), 2005

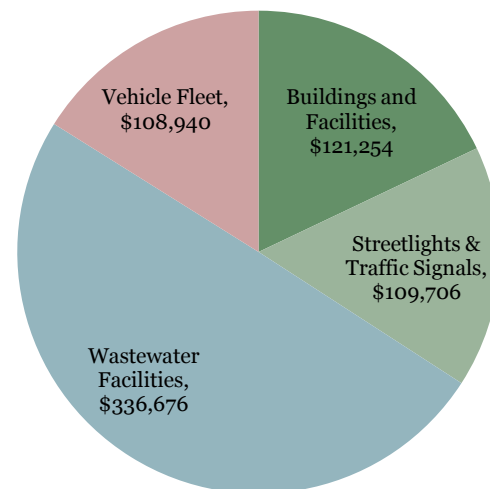


Figure 5 – Municipal Government Energy Costs (\$), 2005

The 4,360 metric tons of CO₂ equivalent greenhouse gas emissions attributable to Montgomery Township municipal government buildings and operations are significant, but they represent just 1.1% of total Montgomery Township greenhouse gas emissions, which are detailed in the following section.

COMMUNITY GREENHOUSE GAS EMISSIONS

This report provides a comprehensive inventory of those greenhouse gas emissions that we can accurately measure at the community level. The primary sources of these emissions are electricity, natural gas, and transportation fuels.

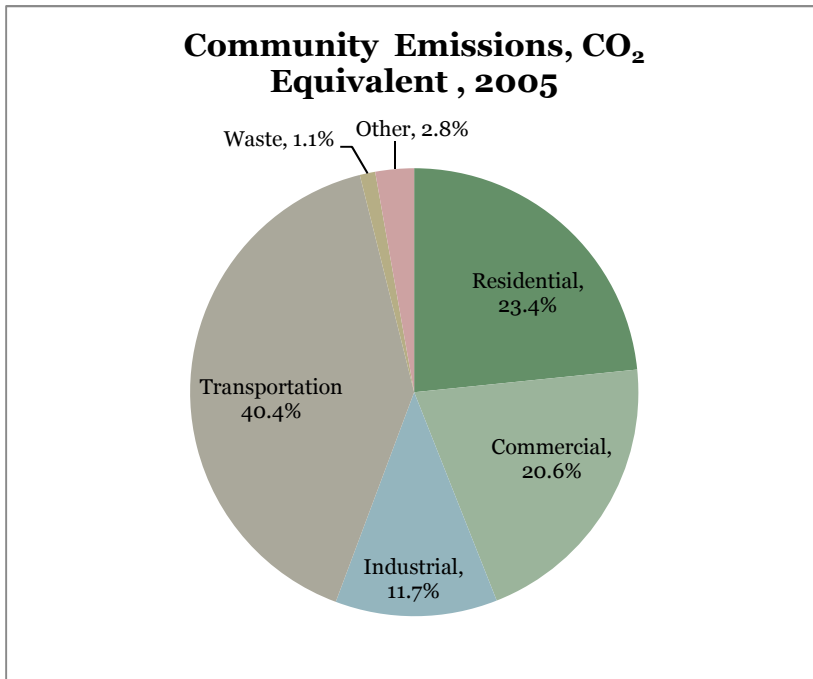


Figure 6 – Community Emissions, CO₂ Equivalent, 2005

Montgomery Township residents, commercial businesses, industries and municipal government operations were responsible for 392,281 metric tons of CO₂ equivalent emissions in 2005. Residents’ energy use in their homes was responsible for nearly a quarter of total community greenhouse gas emissions, and energy use in commercial establishments contributed about a fifth. Industry’s energy use accounted for about an eighth of greenhouse gas emissions, and transportation (by residents, commercial and industrial businesses, and municipal government vehicles) accounted for about two fifths. Waste disposal and other sources made up just 3.9% of total emissions (Figure 6).

As shown in Figure 7, electricity and gasoline are the primary sources of these emissions, making up 75.9% of community emissions.

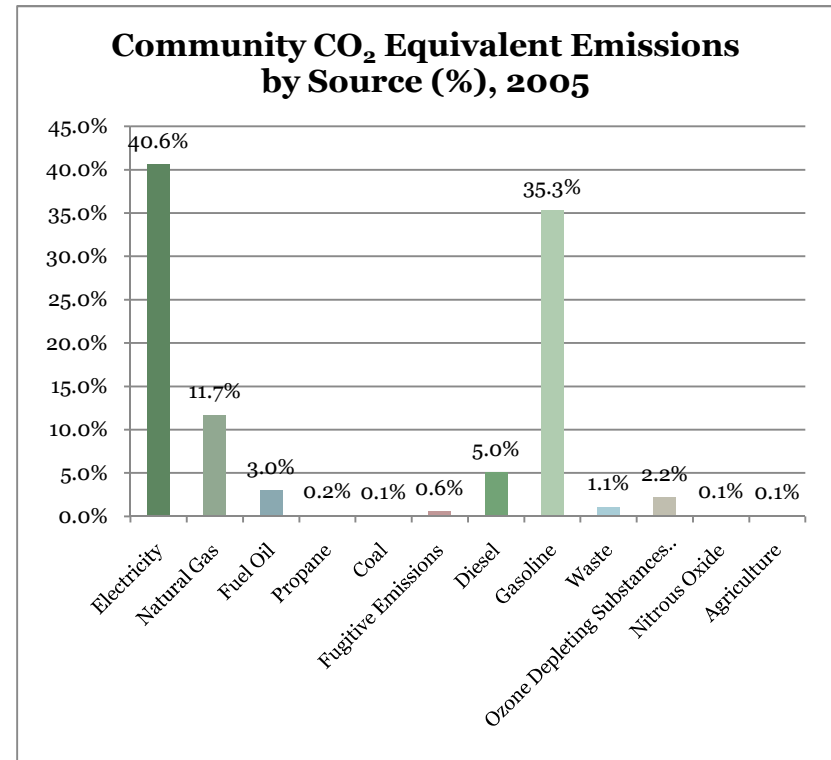


Figure 7 – Community CO₂ Equivalent Emissions by Source (%), 2005

RESIDENTIAL

Montgomery Township’s residential stationary emissions come from households’ use of electricity and natural gas for heating, cooling, and powering appliances in homes, with much smaller amounts attributable to fuel oil, propane, and coal used for heating (Figure 8). The 91,702 MTCO₂E emissions from residential stationary sources in 2005 represented almost one quarter of all greenhouse gas emissions in Montgomery Township. Residents were also responsible for a

substantial portion of transportation-related greenhouse gas emission. These are accounted for separately; see the transportation section below.

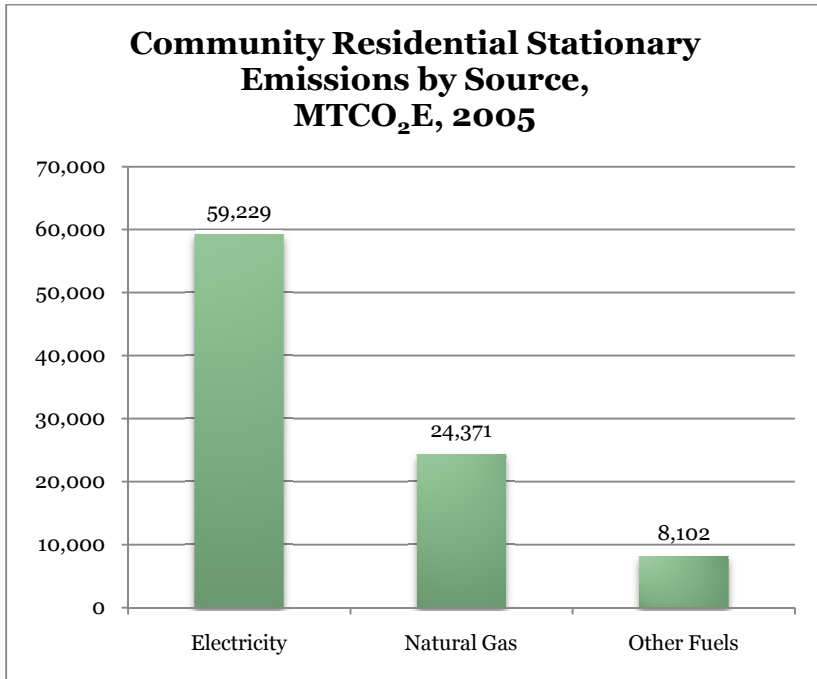


Figure 8 - Community Residential Stationary Emissions by Source, MTCO₂E, 2005

COMMERCIAL AND INDUSTRIAL

The sources of Commercial and Industrial greenhouse gas emissions in Montgomery Township are electricity, natural gas, fuel oil, propane, coal, industrial processes, wastewater, and agricultural soils (note that in Figure 9, fuel oil, liquid petroleum gas, propane, and coal are combined into “other fuels”).

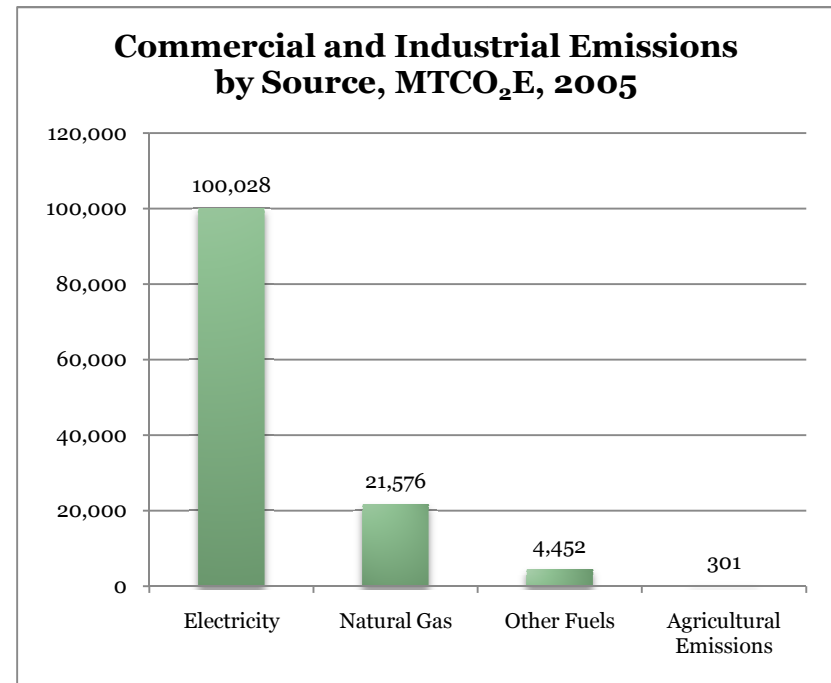


Figure 9 - Commercial and Industrial Emissions by Source, MTCO₂E, 2005

Many of the major commercial and industrial establishments that generate these emissions are located on State Route 309, the major commercial arterial in the Township. There are several large shopping centers in the municipality, including the Montgomery Mall, Airport Square, and Montgomery Commons. Commercial businesses include several strip shopping centers, “big box” retail, warehouses, office buildings, restaurants and grocery stores. In addition, there are several office parks and light industrial parks located in the Township.

TRANSPORTATION

Greenhouse gas emissions in Montgomery Township caused by cars, trucks, buses, and other motor vehicles totaled 158,424 metrics tons of CO₂ equivalents, or about 6.6 MTCO₂E per resident. These emissions were calculated using annual municipal-level data from the Delaware Valley Regional Planning Commission (DVRPC) on vehicles miles traveled (VMT) by cars, light trucks (vans, pickup trucks and sports utility vehicles), heavy trucks, and taxis that started or ended trips in the township.⁴ In 2005 this figure for Montgomery Township was 243,303,000 VMT. Because this figure is provided for the entire township, there is no way to calculate how much of the transportation emissions are from residential versus commercial or industrial.

The amount of per resident emissions is quite a bit higher than the regional average of 3.9 MTCO₂E in part because the physical design of the community discourages travel by walking, bicycling, or public transit—the widths and designs of Township roads and the low density of commercial and residential neighborhoods make it easier to travel by car—and in part because of the high levels of vehicle traffic from outside of the community that the Montgomery Mall and other commercial destinations in the township attract.

WASTE

Trash disposal in 2005 by Montgomery Township residents and businesses is estimated to be the source of 4,337 metric tons of CO₂ equivalent emissions (1.1% of all emissions in the Township) due to the decomposition of solid waste in landfills. Paper products in the waste stream—most of which could be recycled, rather than

⁴ See DVRPC's March 2009 *Regional Greenhouse Gas Emissions Inventory* for more detail.

landfilled or incinerated—are responsible for the emissions of the largest quantity of greenhouse gases – over 2,500 MTCO₂E (60.7% of total waste, see Figure 10).

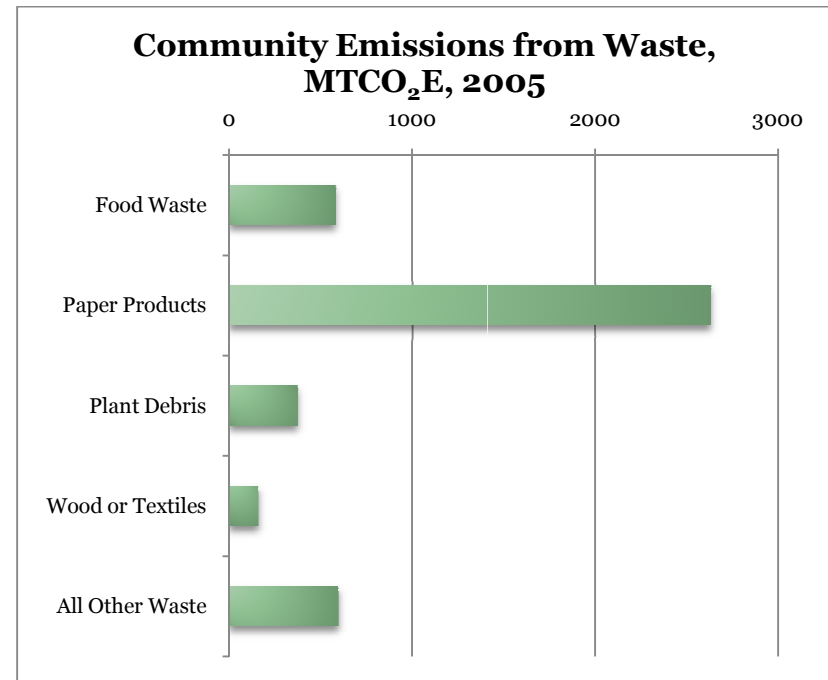


Figure 10 - Community Emissions from Waste, MTCO₂E, 2005

OTHER SOURCES OF GREENHOUSE GAS EMISSIONS

DVRPC calculated 2005 emissions from Fugitive Methane and substitutes for Ozone Depleting Substances (ODS) attributable to each municipality in the region. Montgomery Township's share was 10,975 MTCO₂E, or 2.8% of total community emissions. Fugitive

Methane comes from the transmission of natural gas, and ODS substitutes are refrigerants used in place of Freon and other ozone depleting substances. While these new materials are better for the ozone layer, many of them are significant sources of greenhouse gas emissions.

There are other such similar sources that are not included in this analysis. For example, in addition to the emissions from coal and other fuels burned for electricity, which are accounted for in this report, there are emissions of methane and other gases associated with coal mining that are not included. Similarly oil refining and electricity transmission have associated emissions. These types of emissions are collectively referred to as “fugitive emissions.” Households and business owners are indirectly responsible for these fugitive emissions in that they result from the demand for electricity and other fuel and power sources. These emissions are difficult to allocate at the municipal level, so are generally calculated using national or state per capita averages. Consequently, Montgomery Township’s municipal government and community members cannot implement recommendations to reduce fugitive emissions that can be reflected in future greenhouse gas emissions inventories; those reductions would only be reflected at the national and state level.

Also not included in this report are a large category of emissions known as “product life-cycle emissions,” including those from the production of foods consumed by township residents, and from marine transportation used to ship consumer products to Southeast Pennsylvania. These emissions can be significant, but are difficult to calculate on the local level. Individual choices can help reduce these emissions—for example, by purchasing products made close to home and sold with less packaging and by eating less meat—but these actions cannot be accurately measured at the local level.

Air travel by township residents for business and tourism, is also not included in this report, and cannot be measured precisely at the municipal level. As comprehensive as this inventory is, therefore, it

cannot represent a full accounting of Montgomery Township’s carbon “footprint.” Some sources of greenhouse gas emissions are simply too difficult to measure at this level.

REDUCING GREENHOUSE GAS EMISSIONS IN MONTGOMERY TOWNSHIP

The municipal government of Montgomery Township can be the community leader in reducing energy consumption and greenhouse gas emissions. For municipal government emissions, the Board of Supervisors can take action to be more efficient with its use of energy for building and vehicle fleet operations, reducing energy consumption, saving tax dollars and helping to attain national emissions reductions goals. By taking these actions and communicating clearly and consistently with residents and business owners, the municipal government will encourage and support households’ and businesses’ efforts to reduce their greenhouse gas emissions.

Conducting a baseline inventory and setting targets are important for understanding the scope and sources of emissions and for providing a motivation to work towards reductions. Our recommendation is that targets be established that are feasible, but ambitious. The percentages in Table 4 are for reductions below the 2005 level detailed in this report. These goals are ambitious; even a 0% reduction over 2005 levels may be a challenge to achieve by 2015 due to projected population growth and expected increases in consumption in the township. The government can lead by example, showing its commitment to greenhouse gas emissions reductions and inspiring the community to make the same commitment.

	Government Scope One and Two	Government Scope Three	Community
Short Term by 2015	10%	5%	5%
Medium Term – by 2020	15%	10%	10%
Long Term – by 2025	20%	15%	15%

Table 4 – Greenhouse Gas Emissions Reductions Targets

These goals are challenging, but achievable. New energy saving technologies and more fuel efficient cars and trucks coming to market in the coming years will help the community and the municipal government reduce greenhouse gas emissions and energy costs. But additional efforts, including the implementation of energy efficiency measures, increased reuse and recycling of office and consumer goods, and reductions in vehicle miles traveled will all be necessary as well if these targets are to be met.

To attain targeted greenhouse gas emissions reductions, we recommend that the following policies and programs be considered by the EAC and the Township Board of Supervisors for implementation. Each recommendation is designated as an opportunity for the short term (for implementation before 2015), the medium term (between 2016 and 2020), or the long term (between 2021 and 2025).

When reviewing these recommendations, we suggest that Township and community leaders consider the following factors: time frame for implementation, ease of implementation, level of potential impact, promotional value in communicating with the community and the media, cost of implementation, and return on investment. These

factors will vary for each recommendation and should be assessed in collaboration with Montgomery Township’s partners at ICLEI, DVRPC, Montgomery County, and other agencies. These recommendations are summarized in Table 6.

MUNICIPAL GOVERNMENT GREENHOUSE GAS EMISSIONS REDUCTIONS

Ongoing Sustainability Coordination, Monitoring and Evaluation

The municipal government’s elected officials and employees have an important role to play in providing leadership and coordination of sustainability efforts in the Township. This first set of recommendations provides a strong foundation for all the other recommendations in the report.

1. Pass a resolution committing the municipal government to the greenhouse gas emissions reduction targets detailed above in Table 4.

Short term

2. Designate a staff member to serve as the Township’s Sustainability Coordinator and to assume the following responsibilities.
 - a. Serve as Township liaison with ICLEI – Local Governments for Sustainability. ICLEI provides many services to member communities, from technical assistance with Climate Action Plans to practical advice on applying for grants under the

American Recovery and Reinvestment Act of 2009 (ARRA).

- b. Develop a Climate Action Plan for Montgomery Township using ICLEI methods and tools.
- c. Establish data collection guidelines for all municipal offices.
- d. Design and implement a system for ongoing monitoring of township greenhouse gas emissions, annual updating of the government section of the Township's emissions inventory, and updating of the community section of the inventory in coordination with DVRPC's regional greenhouse gas emissions inventory.
- e. Collaborate with DVRPC's Climate Change Initiative staff on regional climate action planning and future greenhouse gas emissions inventories.
- f. Collaborate with other local energy efficiency organizations such as the Energy Coordinating Agency, Green and Save, and Greater Philadelphia Clean Cities.
- g. Network with other municipalities working to reduce greenhouse gas emissions.
- h. Remain informed of grant and funding opportunities for energy efficiency and greenhouse gas emissions reduction projects from the federal, state, and county governments, and from other funding sources.
- i. Attend meetings of the Environmental Advisory Committee and report to and advise EAC members

of Township sustainability efforts, opportunities, and progress.

Short term

- 3. Create a township government web page and printed brochures that publicize energy efficiency and sustainability initiatives and programs and provide detailed information, advice, and encouragement to township residents and businesses.

Short term

- 4. Distribute press releases to local newspapers and media sources highlighting the efforts and progress towards achieving targeted greenhouse gas emissions reductions.

Short term

Vehicle Fleet (12.4% of government emissions)

The Township's vehicle fleet is a large source of those emissions over which the Township has significant control, with police vehicles accounting for about half.

- 5. Implement a vehicle purchasing policy that gives priority to the most fuel efficient vehicles available in consideration of the intended use of the vehicle.

Short term

6. Consider the purchase of hybrid vehicles for the police department.⁵

Medium term

7. Institute a “no idling” policy for all municipal vehicles. In some cases, this simple change can lead to fuel economy savings of several percent.⁶

Short term

8. Develop an “eco-driving” training program for all employees who drive Township vehicles to emphasize energy-saving vehicle operations and maintenance practices that can significantly improve fuel efficiency.⁷

Short term

9. Consider the purchase and use of alternative fuel vehicles (bio-diesel and compressed natural gas (CNG) vehicles). Dozens of CNG refueling stations are located within the Delaware Valley region and a former state grant program to assist communities in establishing new facilities may be renewed in the future.⁸

Medium term

10. Institute a policy of purchasing carbon offsets for every air ticket purchased for out of town business travel.⁹

Short term

Buildings and Facilities (11.9% of government emissions)

Of the emissions of greenhouse gases attributable to buildings and facilities, electricity accounts for about 70% and should be the primary focus of efforts to reduce energy use.

11. Purchase wind energy credits for a portion of municipal electricity use. The percentage of municipal government electricity use to be offset in this way should be established after completion of a Montgomery Township Climate Action Plan. The Township’s participation in this program should be promoted throughout the community.

Short term

⁵ Westwood, New Jersey’s police department has been a leader in using hybrid vehicles in police work. The municipality began with a single hybrid vehicle in its police fleet in 2007 and has experienced significant cost savings and environmental benefits without compromising functionality. The community now owns three hybrid vehicles, and estimates savings of \$29,000 per year in fuel costs per vehicle. See <http://icma.org/pm/9006/public/feature1.cfm?author=Robert%20S.%20Hoffmann&title=Hybrid%20Police%20Patrol%20Vehicles%20Praised>.

⁶ See “Three Secrets to Driving Down Your Fleet Emissions” (June 9, 2009) by Karen Healey at <http://greenbiz.com/blog/2009/06/08/three-secrets-reduce-fleet-emissions>.

⁷ See <http://www.ecodrivingusa.com/>, <http://www.ecodrive.org/Home.219.0.html>, <http://www.fueleconomy.gov/feg/driveHabits.shtml>, and <http://www.ecodrivingusa.com/#/state-and-local-action/>.

⁸ See <http://www.afdc.energy.gov/afdc/locator/stations/> for the locations of alternative fueling facilities in the region. The State of Pennsylvania’s Department of Environmental Protection has funded an Alternative Fuels Incentive Grant program (<http://www.depweb.state.pa.us/enintech/cwp/view.asp?a=1412&q=502176>) in the past which may be renewed sometime in the future.

⁹ The American Council for an Energy-Efficient Economy sponsored a study of Voluntary Offsets For Air-Travel Carbon Emissions. See details of their findings at http://www.aceee.org/consumerguide/TCI_o6Report.pdf.

12. Develop and implement a Government Energy Conservation Policy, including guidelines for turning off lights and printing documents, limits on heating and air conditioning temperatures, and setting purchasing policies for office supplies, computers and computer peripherals, and other office machines.¹⁰

Short term

13. Conduct an education campaign for staff. Distribute information and hold brief training sessions for municipal government employees on energy conserving practices for offices and other Township facilities.

Short term

14. Conduct an Energy Audit of all municipal buildings to identify actions for improving the energy efficiency of building heating, ventilation, cooling, insulation and electrical systems.¹¹

Short term

Streetlights and Traffic Signals (13.8% of government emissions)

Montgomery Township has already taken significant steps to reduce energy use and greenhouse gas emissions related to streetlights and traffic signals. Township streetlights use high-pressure sodium lamps, a relatively efficient lighting source, and Township traffic

¹⁰ For an example, see http://www.temple.edu/sustainability/full_energy.pdf

¹¹ Energy audits for households, businesses, and public agencies in the Delaware Valley region can be supplied by professional firms. Two of the many firms that can provide this service are Practical Energy Solutions (<http://www.practicalenergy.net>) and Warren Energy Engineering (<http://www.warren-energy.com/services.html>); the Township should evaluate the capabilities of these and other firms before contracting for this service.

signals have been converted to LED lights which save significant amounts of energy compared to older traffic signal bulbs.

15. Keep up to date with energy saving opportunities for streetlights and traffic signals and coordinate with public works staff members to select appropriate improvements in future years.¹²

Ongoing

Wastewater Facilities (55.8% of government emissions)

Greenhouse gas emissions from wastewater processing are primarily from electricity purchased by the Montgomery Township Municipal Sewer Authority to pump and process wastewater. The most straightforward way to reduce greenhouse gas emissions caused by wastewater processing is to encourage residents and businesses to reduce their consumption and disposal of water. While Montgomery Township residents and businesses are already relatively efficient in their use of water and wastewater services (see the Water and Wastewater sections of this report), there are opportunities to improve efficiency with the following recommendations.

16. Encourage water conservation and the collection and use of rainwater in rain barrels for outdoor water uses.

Short term

17. Promote the installation by Township residents and businesses of greywater systems to recycle household wastewater from the sink, shower, washing machines and

¹² The Rocky Mountain Institute publishes Community Energy Opportunity Finder information sheets (see http://www.energyfinder.org/images/other/CEOF_CityLighting.pdf) which provide detailed information on energy saving opportunities with streetlights and traffic signals.

dishwashers which typically make up about half to three-quarters of household water use.¹³ Greywater systems save money, reduce pollution, conserve water, and can be used for outdoor watering (plants consume the nutrients in greywater and soil organisms break down any residual grease and particles) or recycled for indoor use in flushing toilets.

Short term

18. Purchase wind energy credits for a portion of MTMSA electricity use. The percentage of municipal government electricity use to be offset in this way should be established after completion of a Montgomery Township Climate Action Plan. The Township's participation in this program should be promoted throughout the community.

Short term

19. Study the possibility of using solar power to replace part of the electricity use at MTMSA's Eureka wastewater treatment facility. Several wastewater treatment plants in the country have implemented solar electric generating systems, including systems in Morristown, NJ,¹⁴ San Diego, CA, and Boulder, CO.

Medium term

¹³ Two useful sources of information on greywater systems are Grey Water Central (<http://www.oasisdesign.net/greywater/>) and the Greywater Guerrillas Web site (<http://www.greywaterguerrillas.com/greywater.html>).

¹⁴ The town of Morristown, NJ opened a 578-kW solar installation on May 28, 2009, enough to provide 40% of the facility's electricity needs, which will save the town an estimated \$90,000 annually. The municipality received a \$1,464,734 grant from the New Jersey Clean Energy Program (similar grant programs exist in Pennsylvania) and the project qualifies them for more than 600 Solar Renewable Energy Certificates per year that will offset the cost of the system by \$384,000 in the first year. The system is expected to pay for itself in ten years. See "Solar modules help power NJ wastewater treatment plant" (May 28, 2009) in WaterWorld, http://www.waterworld.com/index/display/article-display/363425/s-articles/s-waterworld/s-water-utility_management/s-solar-modules-help-power-nj-wastewater-treatment-plant.html (retrieved June 18, 2009).

Employee Commute (5.9% of government emissions)

The Township government is only indirectly responsible for emissions from employees' commuting to work, but these recommendations can help reduce total government greenhouse gas emissions.

20. Provide incentives for employees to carpool: designate carpool parking spots, provide help to employees in coordinating carpools, permit flexibility in work start and end times for carpoolers, and provide reimbursable rides home for carpooling employees in cases of family emergencies.

Short term

21. Communicate with SEPTA planners to develop improved accessibility of municipal facilities by transit routes.

Medium term

22. Provide secure, sheltered bicycle parking (outdoors or indoors) and showering facilities for employees at the Stump Road and Domorah Road municipal buildings. Approximately 17% of employee commutes are four miles or shorter and could easily be done by bicycle in good weather.

Short term

Carbon Sequestration

Tree planting programs are an important way to offset greenhouse gas emissions and to help cool homes and streets at the same time (through the process of photosynthesis, trees remove CO₂ from the atmosphere and store carbon in their wood, bark and leaves).

23. Montgomery Township should continue and strengthen the Shade Tree Commission's programs to plant of trees in the community. In 2005 these programs reduced the Township's overall greenhouse gas emissions by 0.93 metric tons of CO₂ equivalent emissions.¹⁵ These trees will continue to remove carbon from the atmosphere as they grow, so the amount of emissions offset will increase each year. The shade tree planting efforts should be continued and strengthened.

Ongoing

COMMUNITY GREENHOUSE GAS EMISSIONS REDUCTIONS

The municipal government of Montgomery Township does not have direct responsibility for the greenhouse gas emissions attributable to residents and businesses in the community, but decisions that the Board of Supervisors makes have indirect impacts on the amounts and types of energy consumed in the community. Montgomery Township's municipal government has the ability to take a leadership role in reducing greenhouse gas emissions and helping community members save money through lower energy use by considering the following recommendations and implementing those that have the support of community members.

Education and Communication

The municipal government of Montgomery Township can inspire, encourage, educate, and challenge residents, business owners, and its own employees to practice energy efficiency, both to save money on energy costs and reduce greenhouse gas emissions.

¹⁵ This number was calculated using the US Department of Energy's *Method for Calculating Carbon Sequestration by Trees in Urban and Suburban Settings* published in 1998.

24. Use the Township government web page and printed brochures to provide residential and small business energy and vehicle efficiency information. Many models of effective public education materials provided by or for municipalities are available.¹⁶

Short term

25. Distribute press releases to local newspapers and media sources highlighting the municipal governments' and the community's efforts to achieve the targeted greenhouse gas emissions reductions.

Short term

26. Consider and, if appropriate, develop a community challenge similar to the Minnesota Energy Challenge (<http://www.mnenergychallenge.org/>) or the Burlington, Vermont 10% Challenge Campaign (<http://www.10percentchallenge.org>), perhaps in partnership with neighboring municipalities. Encourage residents to sign up and document their emissions reductions on a website such as <http://www.celsias.com/>.

Short term

27. Consider partnering with the Global Emissions Exchange to offer financial incentives to residents and businesses for emission reductions (<http://www.the-gex.com>).

Short term

¹⁶ See, for example, http://cityofdavis.org/pgs/Sustainability/pdfs/Sustainability-Doing_Your_Part_v1.pdf, <http://www.fypower.org/res/>, http://cityofdavis.org/pgs/lowcarbodiets/activity_chart.cfm, <http://www.beclimatesmart.com/whatCanIDo/easySteps.php>, and <http://www.google.org/powermeter/tips.html>.

Energy Efficient Transportation

Montgomery Township transportation-related greenhouse gas emissions are about twice as high as the region’s on a per-capita basis. Some of the factors that contribute to this are land use and zoning patterns that have resulted in low residential population density, a strict separation of land uses into residential, commercial, and industrial areas, a low level of public transit service, and inconsistent and, in places inadequate, provision of sidewalks, pedestrian crossing lights, and bicycle lanes. The existing design of the community makes it difficult to travel by any mode of transportation other than private cars and light duty vehicles (vans, SUVs, and pick-up trucks). Montgomery Township’s leaders and elected officials should:

- 28. Provide information on “eco-driving” practices on the Township government’s web page (see footnote 7 above).

Short term

- 29. Encourage the North Penn School District to expand its *Safe Routes to School* program that helps children safely get to and from school on foot or by bicycle.

Short term

- 30. Improve walking and cycling conditions on the Township’s roads.

- a. Develop a municipal pedestrian and bicycle plan.

Short term

- b. Implement the municipal pedestrian and bicycle plan.

Medium term

- 31. Encourage land use planning with higher population densities and a greater mix of housing, commercial, and public spaces in nodes of transit-friendly locations along major arterial roads.

- a. Assess municipal zoning regulations to identify ways in which current practices affect travel patterns of residents, shoppers, and local businesses.

Short term

- b. Revise zoning regulations as necessary.

***Medium term /
Long term***

COMPARING MONTGOMERY TOWNSHIP TO NEIGHBORING COMMUNITIES

Overall, regional per capita emissions of 16.5 MTCO₂E (DVRPC 2009) were slightly higher than Montgomery Township’s per capita emissions of 16.3 MTCO₂E. We can compare Montgomery Township’s emissions to those in several other municipalities in the Delaware Valley region that have recently completed greenhouse gas inventories using ICLEI’s software and methodology: Haverford Township (2005), Upper Dublin Township (2007), and Lower Makefield Township (2005).

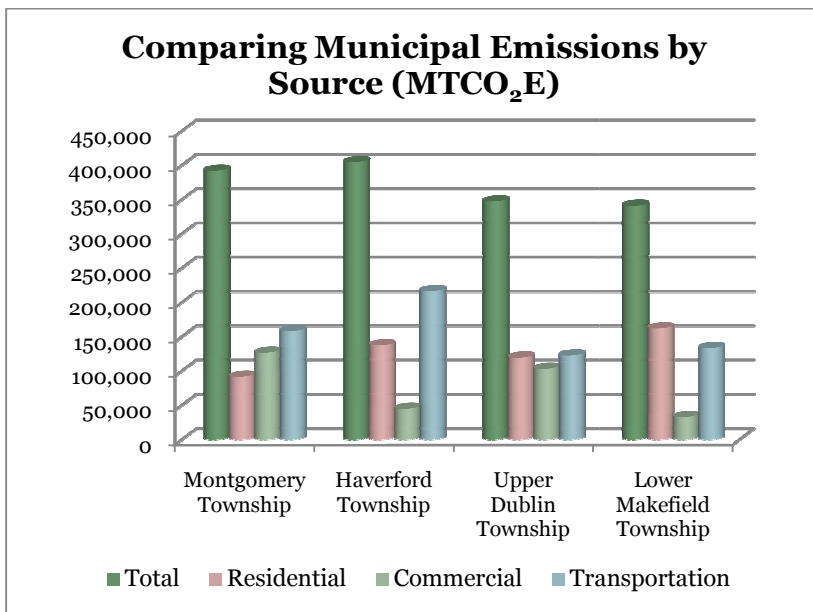


Figure 11 – Comparing Municipal Emissions by Source (MTCO₂E)

Note: Commercial and industrial are combined in “commercial” for all municipalities.

While total greenhouse gas emissions in CO₂ equivalents are fairly similar for the four communities (Figure 11), the proportions of emissions by sources (Figure 12) and per capita emissions (Figure 13)

reveal some differences with Montgomery Township that are important to highlight.

CO₂ Emission Equivalents

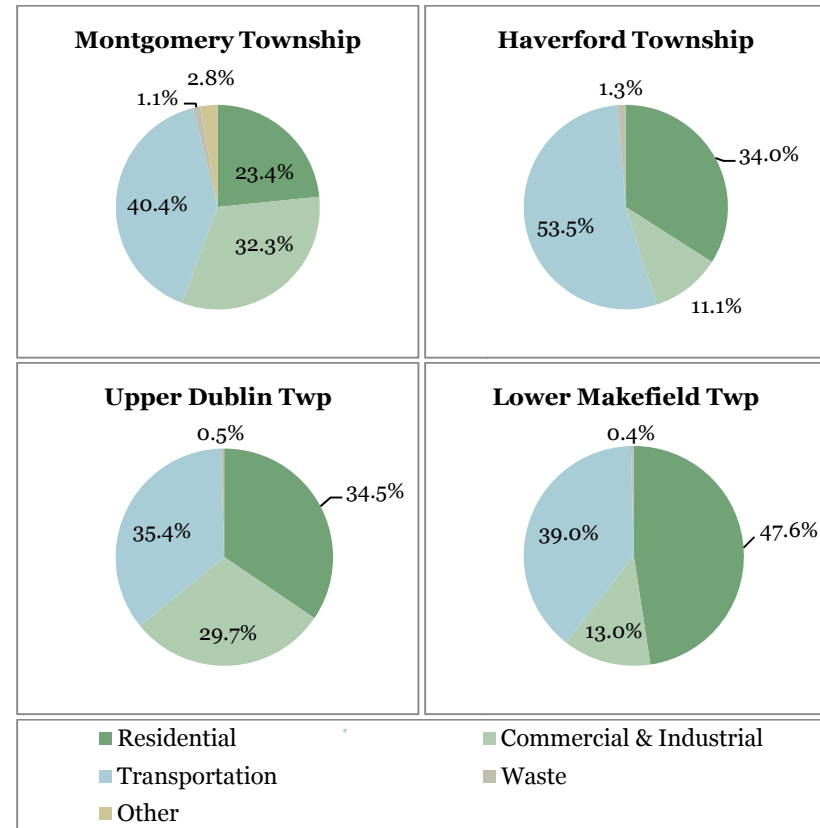


Figure 12 –CO₂ Emission Equivalents for four Delaware Valley Region Communities

Montgomery Township has a larger commercial share (32.3%) than any of the other communities, a reflection of the many retail establishments and other commercial and industrial enterprises in the community. Upper Dublin Township also has a large percentage of emissions (29.7%) from the commercial and industrial sectors

because of the presence of the Fort Washington Office Park and other establishments within the community.

In the transportation sector too, Montgomery Township has a very large share of greenhouse gas emissions (40.4%) and the largest per capita emissions (almost 6.6 MTCO₂E per person) of any of the four communities (Figure 13).

example, it includes some emissions from agriculture and ozone depleting substances substitutes.

STATE AND INTERNATIONAL INDICATORS

The U.S. EPA calculates that CO₂ equivalent emissions from the state of Pennsylvania were 277,000,000 metric tons in 2005 (U.S. Environmental Protection Agency, 2008). With 12,351,881 residents of Pennsylvania in 2005 (U.S. Census Bureau, 2007), per capita emissions were 22.4 MTCO₂E, compared to 16.3 in Montgomery Township. Global carbon emissions in 2000 were about 4.5 MTCO₂E per person (Baer, et al., 2000).

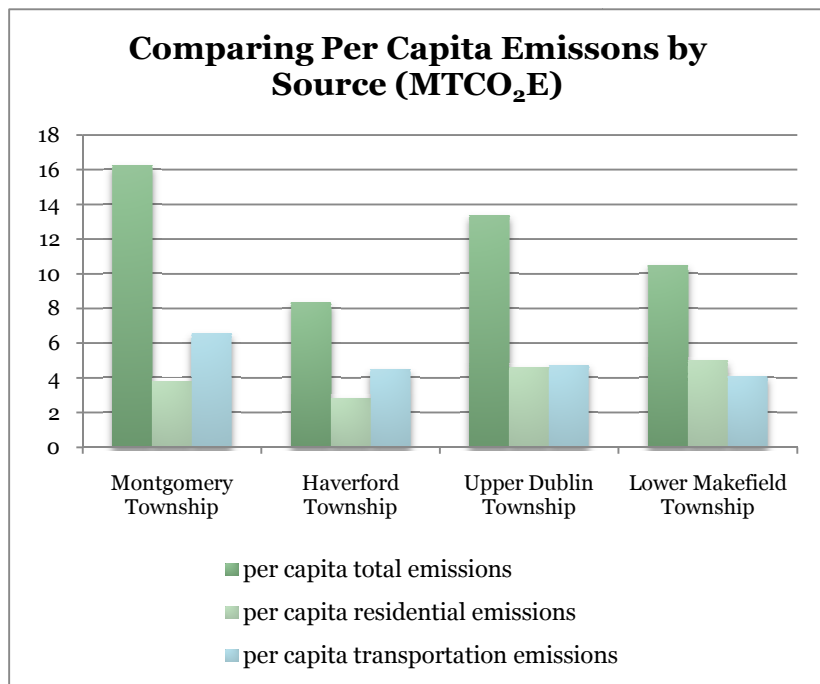


Figure 13 – Comparing Per Capita Emissions by Source (MTCO₂E)

Although similar software and methodologies were used for these inventories, it should be noted that the Montgomery Township inventory was conducted using the Clean Air and Climate Protection Software Version 2.0 released in 2009, while the other communities used an earlier version of the software. In addition this inventory is slightly more comprehensive than the others in some aspects, for

WATER

Water is supplied to Montgomery Township’s residential, commercial, and industrial customers by the North Wales Water Authority (NWWA), the North Penn Water Authority (NPWA), and a small number of private wells which provide water to less than two percent of township households. NWWA and NPWA are independent utilities funded through usage charges and not directly affiliated with any municipality.

Water use information for Montgomery Township was obtained from NWWA and NPWA for the 2004 – 2008 time period. Of households using public water supply, the vast majority (99.84%) are served by the North Wales Water Authority which obtains water from the Delaware River and a few wells. The Delaware River water is treated at the Forest Park Treatment Plant in Chalfont, Pennsylvania and distributed to the seven municipalities in the NWWA service area, including Montgomery Township.

Montgomery Township does not experience significant ground water depletion problems normally associated with suburban developments in the region that are dependent upon groundwater tapped with wells. Large scale groundwater development often depletes water locally, lowering water tables, interfering with smaller domestic wells and diminishing the flow of local streams as was the case in Montgomery Township until the late 1980s, when the North Wales and North Penn water authorities began importing Delaware River water, treating it at the Forest Park Treatment Plant, and distributing this water to communities in central Bucks and Montgomery counties.

OVERALL WATER USE BREAKDOWN AND COMPARISON

Total annual water use for Montgomery Township in 2008 was about 672 million gallons. The breakdown of water use by sector is presented in Figure 14. While commercial water use is substantial, the largest sector is residential, comprising 76% of total 2008 usage. Industrial use of water in Montgomery Township was relatively low at 4.3% of 2008 usage, reflecting the relatively small number of industrial enterprises.

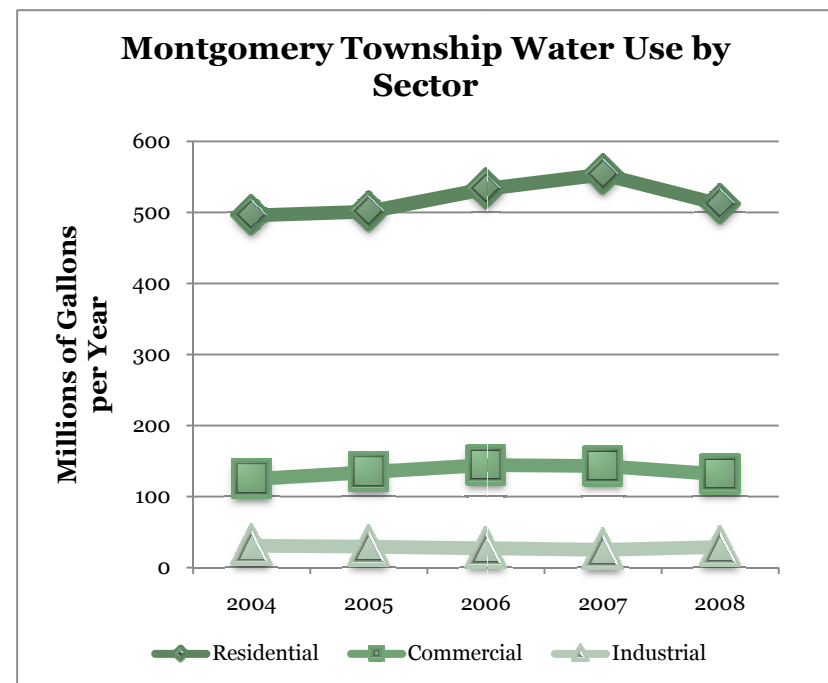


Figure 14 - Montgomery Township Water Use by Sector

Source: NWWA and NPWA data

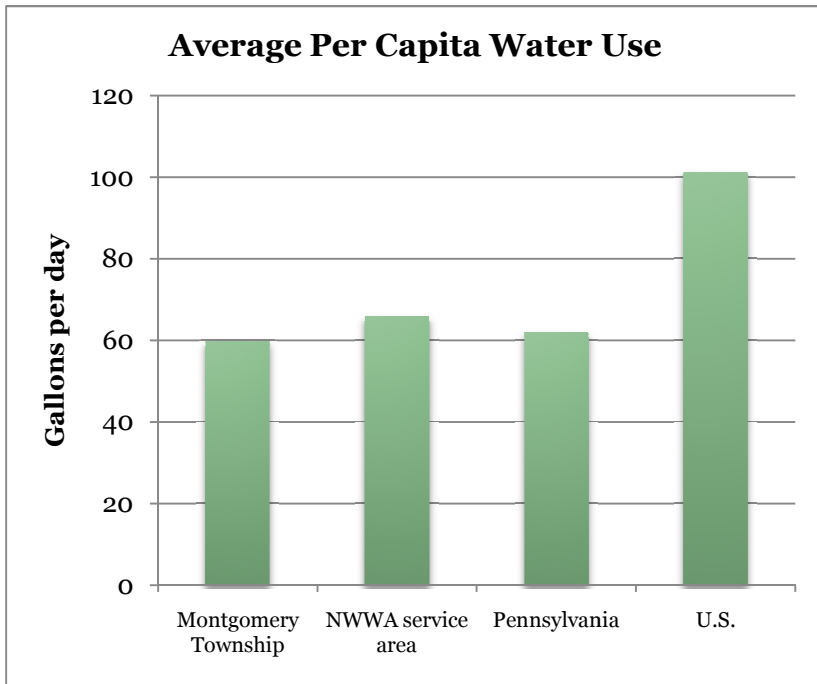


Figure 15 – Average Per Capita Water Use
 Sources: Township average, NWWA (Tom Bradbury) and NPWA data; state average, Pennsylvania DEP, 2006 and Sharpe & Swistock, 2008.; U.S. average, American Water Works Association, 2009 and Sharpe & Swistock, 2008.

Residential per capita water use¹⁷ in the township is about 60 gallons per day, slightly lower than comparable NWWA service area and Pennsylvania usage and significantly lower than the national average (Figure 15). Many factors contribute to the relatively low water use rates in the township, including NWWA’s use of an innovative “excess use surcharge” rate structure which has been effective in encouraging water conserving behavior by NWWA customers. The

¹⁷ Per capita water use can be calculated using only metered residential use, as is done here, or by dividing all water use by population. The latter method takes into account water used for irrigation, commercial and industrial purposes, cooling power generators, and other functions.

excess use surcharge program is explained in more detail in the next section.

SEASONAL AND WEATHER-RELATED WATER USE

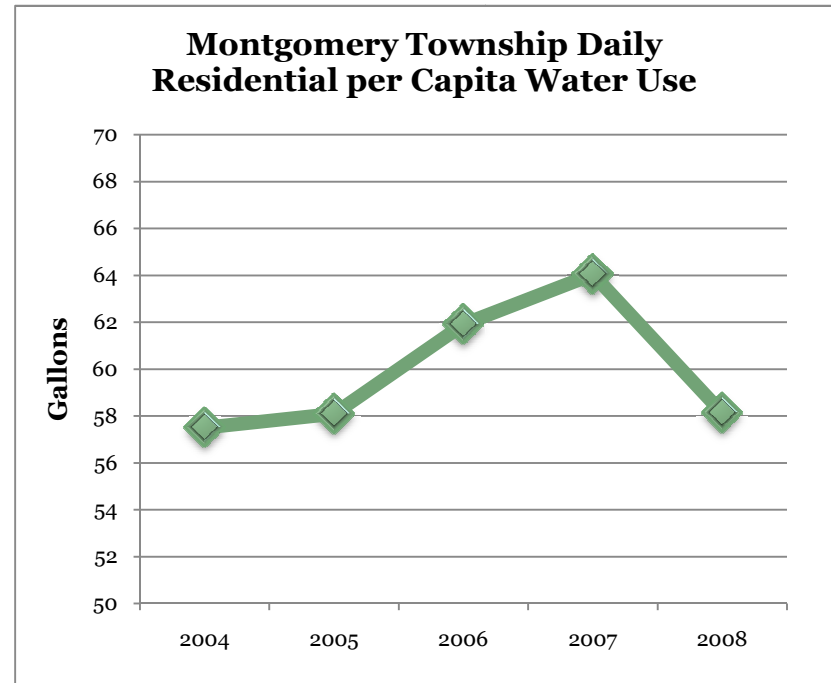


Figure 16 - Montgomery Township Daily Residential per Capita Water Use
 Source: NWWA and NPWA data

Figure 16 highlights average annual per capita water use for the residential sector during the five-year period 2004 to 2008.¹⁸ It

¹⁸ Please note that residential water use refers only to *metered use* and does not take into account water needed for food production, bottled drinking water consumption, power plant cooling, and other factors. The choices residents and businesses make

ranges from 57.5 gallons per capita per day (gpd) in 2004 to 64 gpd in 2007. This variation can be explained in part due to weather. Homeowners and businesses increase their lawn watering during dry summer months.

of precipitation data for the six hottest months of each year, 2004-2008, for Philadelphia indicates that 2007 was the driest of the five years (Franklin Institute, 2009).

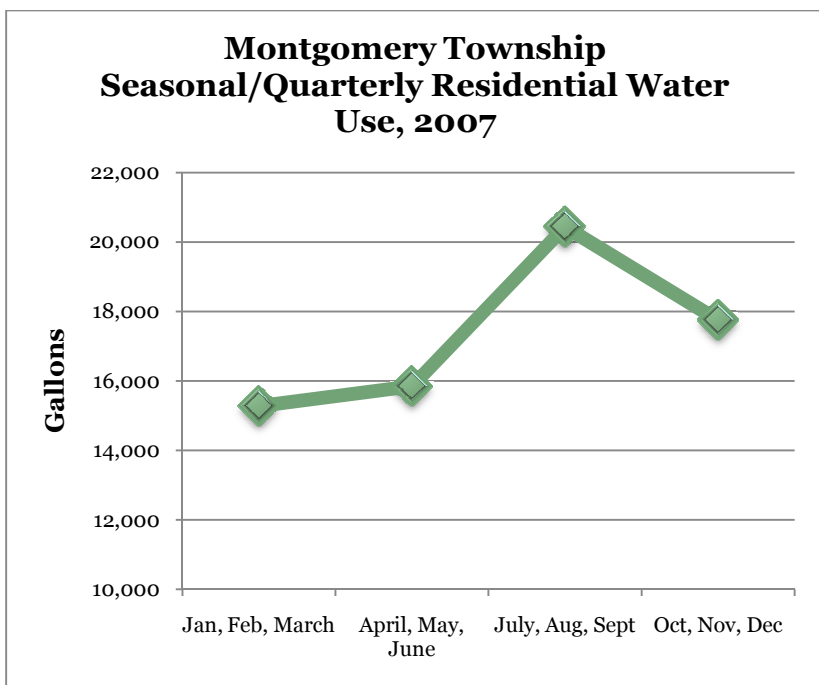


Figure 17 - Montgomery Township Seasonal/Quarterly Residential Water Use, 2007

Source: NWWA and NPWA data

Figure 17 shows the seasonal pattern of residential water consumption for a representative year (2007) wherein summer months have the highest level of water use. Figure 18 indicates that municipal government water use follows a similar pattern. A review

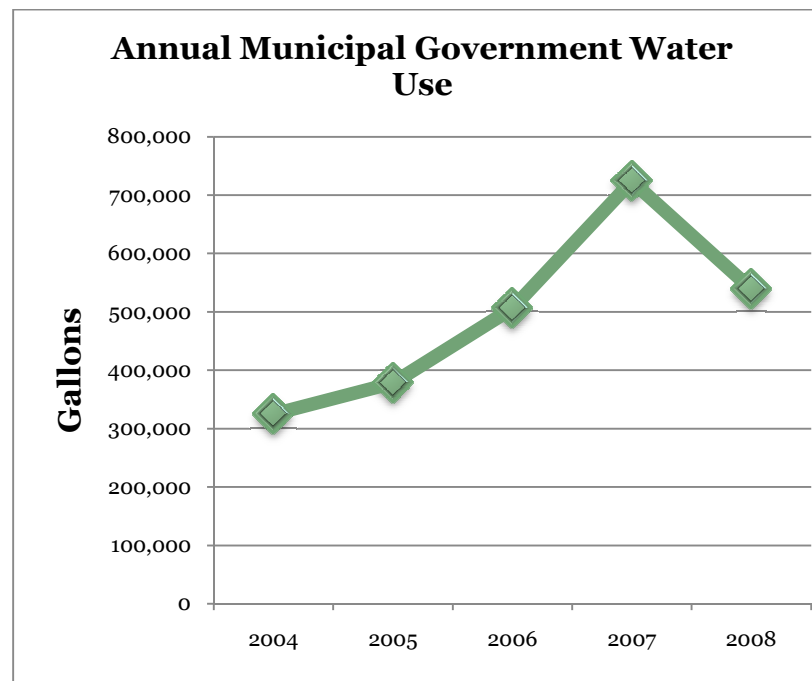


Figure 18 - Annual Municipal Government Water Use

Source: NWWA and NPWA data

North Wales Water Authority implements an “excess use surcharge,” designed to promote conservation. “It is activated during the peak outdoor water usage months of April through October. It is calculated by averaging the number of gallons from the two winter quarter bills for homes and businesses, then adding 40% or 12,000 gallons, whichever is greater. Once customers have exceeded this summer allowance, a conservation charge of \$1.60 per 1,000 gallons is added to their bills for every 1,000 gallons over the allowance” (North Wales Water Authority, 2009).

about what kinds of food to eat, how much electricity to use, how many and what types of consumer goods to purchase all indirectly require the use of water which is not reflected in the residential water use statistics mentioned in this section.

In most suburban communities, water usage can increase 30-40% during the summer months. This surcharge directly impacts this usage. Featherstone (1996) reported that conservation rates are particularly effective in reducing discretionary water use in the summer months, particularly in the mid-Atlantic region of the country. Researchers have consistently documented that an increase in summer price of water decreases summer water use in this region.

Montgomery Township's low level of residential water use is due to two factors, relatively humid climatic conditions, which limit the amount of outdoor water use required to keep gardens and lawns green, and the innovative billing practices described above. Still, water use in Montgomery Township could be further reduced with appropriate conservation policies and would result in cost savings and lower greenhouse gas emissions through reduced electricity use.

EXISTING MEASURES

The North Wales Water Authority regularly distributes information about water conservation to its customers and makes presentations at community events. Items distributed include:

- A ruler and brochures that illustrate how much water is wasted from common water leaks that customers are often unaware of,
- Dye tablets for identifying toilet leaks, with information about how and why to use them,
- A brochure about when and how to water lawns to minimize water use,
- An illustrated guide to water conservation, and

- An illustrated brochure with 55 facts about water conservation.

Representatives from North Wales Water Authority are often present at school, community, and social events in the service area to promote conservation. NWWA is invested in community education, and believes it provides significant benefits to the community and the authority.

The North Penn Water Authority also provides dye tablets and conservation information to its customers and encourages water conservation.

RECOMMENDATIONS

North Wales Water Authority is already doing many things to encourage water conservation in Montgomery Township. NWWA should continue to focus on:

32. Encouraging homeowners and businesses to install water conserving fixtures and fittings in their homes and establishments. Such fixtures and fittings have generally been required since the mid 1990s as a result of the federal Energy Policy Act of 1992, but many older, water guzzling products still remain. The North Wales Water Authority can distribute information about purchasing these products from third party vendors.

Ongoing

33. Distributing dye tablets to homeowners for home testing. This can be a big help as toilets leak are a significant source of excess water use.

Ongoing

34. Encouraging residents and businesses replace toilet flappers when dye tests show they are leaking. This is a simple task that can save substantial amounts of water.

Ongoing

The township government can take its own water saving measures:

35. Provide leadership to residents and businesses in the community by planning, implementing, and publicizing water conserving actions and upgrades.

Ongoing

36. Monitor annual municipal water use and set a target to reduce water use by 10% by 2015.

Short term

37. Annually conduct dye tests in toilets in municipal buildings and replace toilet flappers, as necessary.

Ongoing

38. Purchase and install waterless urinals.

Short term

39. Assess outdoor watering practices at municipal parks and facilities and, if not already the case, implement water use minimizing practices.

Short term

WASTEWATER

Wastewater treatment in Montgomery Township is managed by the Montgomery Township Municipal Sewer Authority (MTMSA). The collection, conveyance, and treatment of wastewater from residences, businesses, industrial sites, and public buildings are provided through a combination of facilities owned and operated by the MTMSA and several neighboring municipalities or authorities, as well as one privately owned facility.

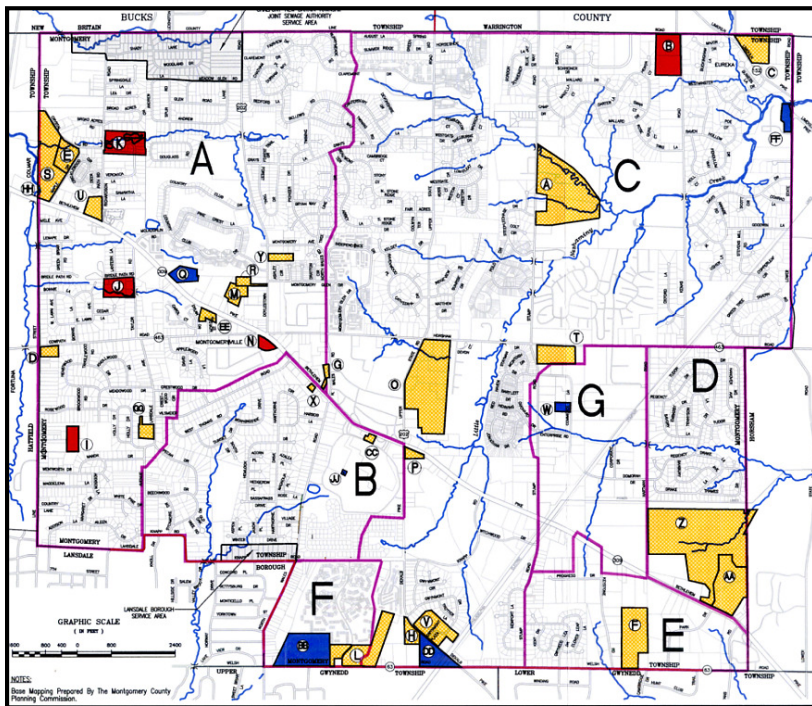


Figure 19 – MTMSA Sewer Basins

Source: CKS Engineers, Inc., 2007

The MTMSA was established by the Montgomery Township Board of Supervisors to develop and operate a modern wastewater system and

to be financially and operationally independent from the municipal government. The MTMSA has defined six sewerage basins that have been divided into seven districts (See

Figure 19). The seven drainage districts are identified alphabetically from “A” through “G” and each one lies either within the Wissahickon watershed or within the Neshaminy watershed (see Figure 20). In addition to these sewerage districts, there are two relatively small portions of the Township that are served via connections owned and operated by the Chalfont-New Britain Township Joint Sewer Authority and Lansdale Borough.

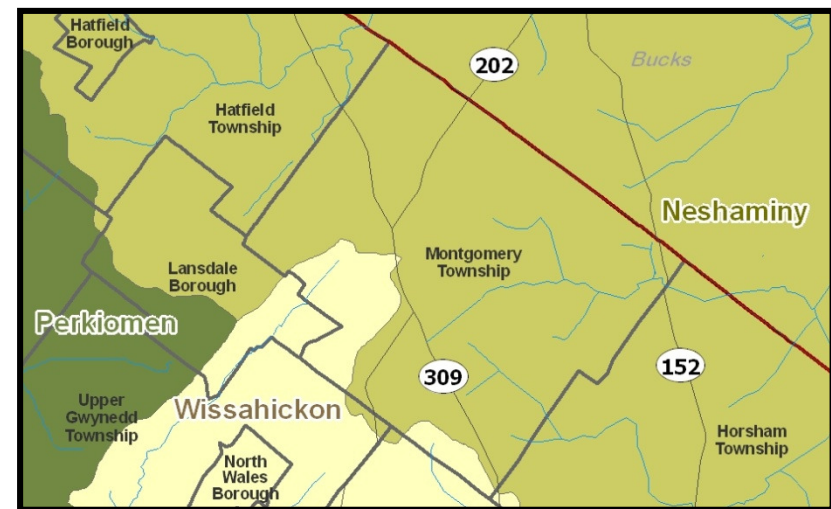


Figure 20 – Local Watersheds

Source: Temple University Center for Sustainable Communities

Wastewater flows that are generated within Montgomery Township are treated either at the Eureka treatment facility (owned and operated by the MTMSA), by facilities in neighboring communities, or by a privately owned facility. The average annual amount of wastewater generated in the seven districts, including the one private facility, was 2.86 million gallons per day (MGD) in 2007. This

includes wastewater from a mix of properties zoned residential, commercial, and light industrial.

In 2008, MTMSA commissioned a study of potential green and alternative energy options that could be implemented at the Eureka wastewater plant. The MTMSA board has directed its staff to continue evaluating feasible options, including conducting an energy conservation audit at the plant and evaluating possible reduction and curtailment of electrical usage during peak load conditions in PECO's grid.

The Eureka Wastewater Treatment Plant is located on Lower State Road and discharges to the Little Neshaminy Creek. It treats wastewater flows generated in Drainage Districts C, D, and a portion of G. The facility has an average daily flow capacity of 2.4 MGD with a peak capacity of 3.5 MGD. The maximum three-month average flow in 2007 was 1.10 MGD, well below both allocated and peak treatment capacities. The MTMSA has estimated that average annual capacity could increase to 1.54 MGD in 2012. This volume is well below the current capacity.

Wastewater that is generated in Drainage Districts A and B is treated at a facility operated by the Hatfield Township Municipal Authority (HTMA). This facility is located in the Eastern corner of Hatfield Township, on Advance Lane and discharges to the West Branch of Neshaminy Creek. The wastewater flows are monitored by a flow meter located at the HTMA facility. The MTMSA's allocated average annual capacity at the HTMA facility is 2.14 MGD. In 2007, the annual average flow to the plant was 1.46 MGD.

Wastewater that is generated in Drainage District E and a small portion of District G is conveyed to the Lower Gwynedd Township Municipal Authority (LGTMA) and subsequently to the Borough of Ambler for treatment and discharge to the Wissahickon Creek. The wastewater flows are monitored by two flow meters owned by the

MTMSA. The MTMSA's allocated average annual capacity is 0.083 MGD. In 2007, the average annual flow to the plant was 0.075 MGD.

Wastewater that is generated in Drainage District F is treated at a treatment facility owned by Upper Gwynedd Township. This facility is located off Township Line Road in the southeast corner of Upper Gwynedd Township and discharges to the Wissahickon Creek. The wastewater flows are monitored by an MTMSA flow meter. MTMSA's allocated average annual capacity is 0.25 MGD; in 2007, the average annual flow rate to the plant was 0.11 MGD.

A private company, the Montgomery Sewer Company, Inc. operates one facility - the Orchard Wastewater Treatment Plant, which has 396 connections as of April 22, 2009, and a design capacity of 0.15 MGD. Current flow has been estimated at 0.08 MGD.

INFILTRATION AND INFLOW

Wastewater flows can be impacted by infiltration and inflow (I/I), which is leakage into the sewer system from storm water or high ground water tables. Sewer pipes crack and need to be replaced on a regular basis. Manhole covers often leak, requiring repair. Some sewerage systems experience significant I/I problems—causing wastewater plants to discharge large volumes of untreated wastewater during storm events, resulting in severe stream pollution—but this does not appear to be a problem in Montgomery Township at this time.

The Chapter 94 Municipal Wasteload Management 2007 Annual Report (CKS Engineers, Inc., 2008) addressed the issue of I/I into the MTMSA's sewerage system and noted the impacts of increased rainfall on wastewater flows. During months of excessive rainfall, the flow at the various discharge points generally increased. When comparing water use with wastewater flows, the latter are about 45%

higher. Our discussions with the MTMSA manager indicate that there are no self-supplied water users discharging to the sewerage system, and with the exception of 50,000 gpd from holding tanks and septic systems delivered by local haulers, there are no transfers of wastewater from outside communities to the Eureka facility. Therefore, the higher wastewater flows can be attributed to I/I. Given that some water use is not discharged to the sewerage system (for example, lawn watering which evaporates or runs into the storm sewer pipes and into township creeks), I/I is probably more significant.

The report notes that corrective action took place in 2006 in several sections of the system and was to continue through 2008. Additional corrective measures beyond 2009 merit attention by the MTMSA. The inclusion of funds for I/I management in the Authority's long-term capital plan indicates that these measures are a priority.

WASTEWATER BILLING

As wastewater flows are only metered at treatment facilities or large transmission mains, residential, commercial, industrial and municipal water use is used by the MTMSA as a proxy for wastewater flows. This is the fairest method of charging customers given that most water use enters the sewer system and is processed as wastewater. This is the typical protocol for authorities and communities as wastewater flows are rarely metered for billing purposes. Some communities charge customers a fixed rate based on factors such as dwelling type or number of fixtures, but this is less desirable from a water management perspective than are charges based upon water use.

The MTMSA bills residents on a quarterly basis. All residents are charged a base rate of \$75.84 per quarter and a variable rate of \$2.46 per 1,000 gallons. A typical family of four using 60 gallons per day

would be charged about \$129 for a quarter. The base fee is set to recover the costs associated with building and maintaining the sewer system, while the variable fee represents the costs to treat sewage that vary with the quantity treated. The MTMSA reports that its average residential bill is \$112 per quarter.

RECOMMENDATIONS

40. Maintaining high levels of wastewater treatment is critical for Montgomery Township because the municipality is located at the headwaters of several streams in the Wissahickon and Neshaminy watersheds. As noted in the water use section, the North Wales Water Authority imports most of the water it distributes from the Delaware River. After being used by homeowners and businesses, this water is discharged to the area's headwaters streams as treated wastewater. Advanced waste treatment processes are critical to maintaining viable ecological conditions in these small headwater streams.

Ongoing

41. Continue programs to regularly inspect, maintain, and replace old sewer mains and repair leaky manhole covers that contribute to continuing I/I problems.

Ongoing

42. In coordination with the North Wales Water Authority, we recommend that the MTMSA distribute information to its customers explaining the benefits of water conservation and offering literature about the purchase of water conserving plumbing fixtures and fittings. Water conservation targeted at interior water use leads to a direct reduction of wastewater, thereby enabling sewage treatment plants to

process wastes from more homes and eliminating the need for constructing new plants or expanding existing plants. It also allows the plants to treat more stormwater before it is discharged to water bodies. When wastewater treatment facilities are operating at or near their peak design capacity, additional stormwater flow usually bypasses plants and is discharged directly into water bodies without treatment. See the water section of this sustainability audit for specific recommendations for reducing water use in the township.

Medium Term

SOLID WASTE

The solid waste¹⁹ generated by Montgomery Township residents, businesses, and the municipal government is dumped in landfills or incinerated, creating environmental impacts that only begin with the consumption of diesel fuel to power the many trucks that collect it. Landfills occupy large areas of land and require long-term monitoring and maintenance and the wastes in them decompose, releasing greenhouse gases and liquids that in some cases pollute aquifers and streams. Incineration facilities burn solid waste, often to power electrical generators, and in doing so release greenhouse gases, fine particulate matter, and other materials.

Whether landfilled or incinerated, the community needs to know the quantities of solid waste and recycling materials generated before it can understand how to mitigate the environmental impacts. Unfortunately, in Montgomery Township, as in many Pennsylvania municipalities, it is not possible at the present time to obtain reliable, accurate data on the amounts of solid waste generated and collected. The waste collection system is so complex that “no one organization has the total waste generation data by municipality. There are too many haulers taking the solid waste and recycling to too many locations” (Hough, 2009). Our assessment of solid waste disposal in the township, therefore, is based upon the descriptions and estimations described in this section of the report.

¹⁹ The EPA defines solid waste as “any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or an air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities...” (U.S. Environmental Protection Agency, 2003). The term *Municipal Solid Waste* refers to “the sum of residential and commercial wastes, excluding construction and demolition debris, manufacturing wastes, and used motor oil (Platt & Lease, 1999). In practice, Municipal Solid Waste may refer only to landfill- or incinerator-destined waste picked up curbside (without including recycling materials) or it may refer to all residential and commercial trash and recycling.

WASTE AND RECYCLING COLLECTION IN MONTGOMERY TOWNSHIP

Montgomery Township’s residents and businesses are required to contract independently with waste haulers for the disposal of trash and recycling. All waste is hauled to transfer stations outside of the township boundaries then transported to landfills, incineration facilities, and recycleries. Five haulers collect the bulk of the residential waste from within the township—Waste Management, Republic Services (also called Allied Waste), Ches-Mont Disposal, G&C Waste, and J.P. Mascaro & Sons—with the result that trucks from multiple companies collect solid waste on the same Township streets.

In addition to these five haulers, there are thirteen other hauling companies that recycle residential and commercial waste produced within the township. These companies pick up metals, paper, food waste, and other products primarily from businesses that produce large quantities of these materials. Ten retail stores (Acme Supermarket, Wawa, and others) also independently “backhaul” some of their recyclables, baling cardboard boxes and other recyclables and taking them to a recycling facility or a central warehouse for sale directly to recycling markets.

Residents make individual agreements with private haulers for curbside trash and recycling service, but the quantities collected from Montgomery Township are not monitored. Private haulers may collect trash from several municipalities in the same truck before taking it to a landfill or transfer station. Haulers have their trash weighed at the disposal site, since they are charged by the ton, but they may have waste from several municipalities in their trucks when they reach the disposal facility, and drivers do not necessarily know or disclose the proportion of truck capacity collected in each municipality.

Since 1990, the Pennsylvania Department of Environmental Protection, under the authority of Act 101, has required all municipalities with a population of 10,000 residents or more to implement a curbside recycling program. In response Montgomery Township and ten other municipalities in eastern Montgomery County established the Northern Montgomery County Recycling Commission (NMCRC). This Commission contacts all haulers, recycling companies, and backhauling stores in Montgomery Township to gather recycling data, then uses these data to comply with state and county reporting requirements, and to apply for state grants.

COMPOSITION OF THE WASTE STREAM

Data on waste composition are not available at the municipal or county levels in Southeastern Pennsylvania. However, using data from two sources, it is possible to estimate the composition of waste generated in Montgomery Township. The U.S. Environmental Protection Agency (U.S. Environmental Protection Agency, 2003) provides information on national waste stream composition, and a Pennsylvania Department of Environmental Protection (DEP) study (R.W. Beck, Inc., 2003) provides information for the state and for each of the DEP’s six regions, including Southeastern Pennsylvania (Philadelphia, Montgomery, Bucks, Delaware, and Chester Counties).

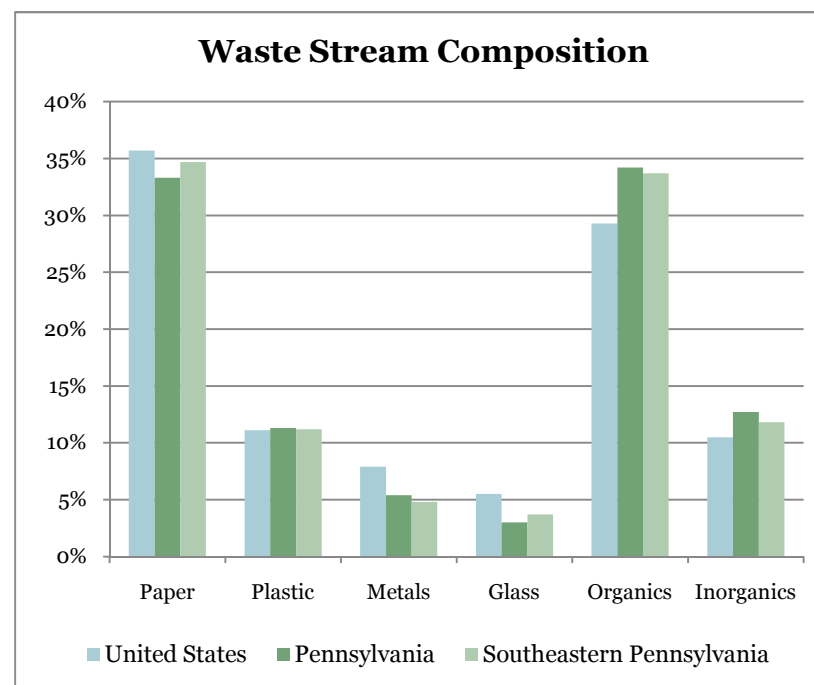


Figure 21 – Waste Stream Composition

Sources: U.S. Environmental Protection Agency (2003) and R.W. Beck, Inc. (2003)

Southeastern Pennsylvania’s waste stream composition is fairly similar to the composition of the State and the Nation (Figure 21). There is a slightly smaller share of metals and glass in the Pennsylvanian waste stream than in the nation, and a slightly higher share of organics and inorganics. But the differences are relatively small and we can make the assumption that the composition of Montgomery Township’s solid waste is similar to the breakdown illustrated above for Southeastern Pennsylvania.

ESTIMATING MONTGOMERY TOWNSHIP SOLID WASTE

In order to understand the economic and environmental costs of solid waste disposal by Montgomery Township's residents, businesses and municipal government and to assess the amounts and percentages of recycled materials, reliable estimates of the quantity of solid wastes collected and disposed of are necessary. With the limited amount of reliable data available to us, we can use the three estimation methods described in this section.

The Pennsylvania DEP directs all municipalities and groups of municipalities, including the Northern Montgomery County Recycling Commission, to estimate the total annual waste (trash and recycling) generated by using a simple formula in which the population is multiplied by 0.8 tons of waste per person (Pennsylvania Department of Environmental Protection, 2008). Using the 2005 estimated population of Montgomery Township—24,114 people, according to the U.S. Census Bureau (2007)—the total solid waste generated in 2005 was 19,291 tons.²⁰

A second method is to use the household average solid waste disposal figures calculated by the Waste System Authority of Eastern Montgomery County (WSAEMC), which operates the Montanay waste-to-energy incineration facility in Plymouth Township. Trash disposal rates (not including recyclables) in 2008 for twenty-two Montgomery County municipalities (but not including Montgomery Township) were 1.5 tons per single-family house and 0.6 tons per apartment (Gannett Fleming, Inc., 2008). Using the proportion of homes and apartments identified in the 2000 census (U.S. Census Bureau, 2000) applied to the 8,650 occupied housing units in the most recent American Community Survey (U.S. Census Bureau, 2005-2007) Montgomery Township generated an estimated 12,631 tons of trash in 2005. Adding to that figure the 6,223 tons of paper,

bottles, and cans Montgomery Township residents generated that year (see below) results in an estimated total of 18,854 tons of solid waste.

Finally, a third method is to use waste collection data available from Waste Management, Inc., the Montgomery Township hauler that provided the most complete data. In 2008, these 2,284 residential household customers generated 3,851 tons of waste (not including recyclables), an average of 1.7 tons per household. Applying the U.S. Census Bureau's estimated household size of 2.69 people for Montgomery Township (U.S. Census Bureau, 2005-2007) yields an average of 0.63 tons of solid waste per capita in 2008. Applying this figure to the 24,600 residents estimated to live in Montgomery Township in 2008 (Montgomery Township, 2008) allows us to estimate 15,420 tons of residential waste. It is not possible to estimate total commercial waste from Waste Management's data, however, because the company's share of the commercial market for solid waste collection in the township is unknown.

²⁰ The State Grant requires use of the most recent decennial census for population. However, since we are using a base year of 2005 we have used the Census Bureau's 2005 population estimate for this calculation.

Solid Waste Data Availability for Montgomery Township

	ChestMont Disposal	G&C Waste	J.P. Mascaro & Sons	Republic Services (Allied Waste)	Waste Management
Tons of total township waste	unknown	2008	unknown	2008	2006, 2007, 2008
Tons of total township trash	unknown	2008	unknown	2008	2005, 2006, 2007, 2008
Tons of total township recycling	2004, 2006, 2007, 2008	2008	2005, 2006, 2007, 2008	2008	2006, 2007, 2008
Number of residential customers	unknown	unknown	unknown	unknown	2007, 2008
Tons of residential trash	unknown	unknown	unknown	2008	2007, 2008
Tons of residential recycling	2004, 2006, 2007, 2008	unknown	2005, 2006, 2007, 2008	2008	2006, 2007, 2008
Number of commercial customers	unknown	unknown	unknown	unknown	unknown
Square yards of commercial trash	unknown	unknown	unknown	unknown	2007, 2008
Square yards of commercial recycling	unknown	unknown	unknown	unknown	2006, 2007, 2008
Tons of commercial trash	unknown	unknown	unknown	2008	2007, 2008
Tons of commercial recycling	2004, 2006, 2007, 2008	unknown	2005, 2006, 2007, 2008	2008	2006, 2007, 2008
Disposal technology (incineration or landfill)	estimated	known	unknown	unknown	known
Government trash	n/a	n/a	n/a	2008	n/a
Government recycling	n/a	n/a	n/a	2008	n/a

Table 5 - Solid Waste Data Availability for Montgomery Township

Sources: Solid waste hauler data provided to Temple University Center for Sustainable Communities, Spring 2009

Table 5 shows the availability of solid waste data for the five principal waste haulers in Montgomery Township. Even in cases where data are available, the figures may only be estimates because the haulers often calculate the weight generated in each municipality by the number of stops a truck makes along its route. Commercial hauling companies typically calculate weight by the capacity (in cubic yards) of containers collected in each jurisdiction on the truck route.

RECYCLING IN MONTGOMERY TOWNSHIP

The Northern Montgomery County Recycling Commission obtained data for 6,223 tons of residential and commercial recycling materials collected in Montgomery Township in 2005. Using this figure, the Montgomery County Planning Commission estimated an overall recycling rate of 42.6% for the township in 2005 (Montgomery County Planning Commission, 2006). That recycling rate would be approximately 33% or less, however, if the estimates for solid waste generation described in the preceding section are used. Estimates of the recycling rate in Montgomery Township are, therefore, uncertain and do not permit Montgomery Township's municipal government to set specific targets for recycling rates until a consistent and reliable source of solid waste data is identified.

RECOMMENDATIONS

Because of the difficulty of identifying the proportion of solid waste that is recycled, it is not possible to recommend a specific target for future percentages of waste stream diversion to recycling facilities. Nevertheless, there is clearly an opportunity to increase the total amount of recycled materials, and the following recommendations provide possible strategies for Montgomery Township to use.

43. The municipal government should commit to the concept of reducing materials consumption, reusing materials to the extent possible, and recycling as much of its solid waste as possible and should publicize its efforts and progress on the community website and in other community publications. Policies to reduce consumption of office supplies and to increase the quantities of paper, cardboard, cans, and bottles recycling in municipal offices and facilities should be implemented to demonstrate the municipal government's commitment to leading community recycling and solid waste reduction efforts.

Ongoing

44. The Environmental Advisory Committee should provide high-quality information to residents and businesses on waste minimization and recycling. There are many sources of online information; Links could be provided from the Township's website, or put in the Township's newsletter.²¹

Short term

45. Promote commercial recycling: Montgomery Township is the largest source of commercial recycling in the NMCRC's region. Continue to promote that as a source of revenue – in the form of DEP Recycling Performance Grants – for the township.

Short term

²¹ Some examples of recycling information web sites are: the Northern Montgomery County Recycling Commission's website (<http://www.northmontcorecycle.org/>), the U.S. EPA's Recycled Content Tool – Shows Greenhouse Gas Emissions savings from purchasing products with partially or fully recycled content (http://www.epa.gov/climatechange/wywd/waste/calculators/ReCon_Online.html); the Cycle Videos from RecycleBank – a series of short educational videos explain the recycling process (<http://www.recyclebank.com/recycling#/intro/>), and the National Recycling Commission's "Conversionator" – entertaining graphics illustrate the impacts of recycling choices (<http://www.nrc-recycle.org/theconversionator/shell.html>).

46. Recognize recyclers: The Northern Montgomery County Recycling Commission (NMCRC) has an awards program for companies, organizations, and individuals who are leaders in recycling. An award is presented annually to a representative in each of the eleven member communities. Let the community know about past recipients of these awards to inspire them to work towards the recycling cause. Consider distributing “We Recycle” stickers for businesses to display on their doors, or “I recycle right” buttons for residents to wear.

Short term

47. Montgomery Township should work with RecycleBank (see <http://www.recyclebank.com>), a for-profit recycling company that provides cash rewards to residents based on the quantity of recyclables they put out at curbside. Neighboring Lower Gwynedd Township recently increased recycling by 76% after partnering with RecycleBank (Hough, 2009).

Short term

48. The Township may also consider as a future measure, converting to a pay as you throw (PAYT) solid waste disposal system, where residents are charged for trash based on the number of bags or pounds of trash they put out. These systems are fair and equitable, as users pay only for the waste that they discard, and provide a strong incentive to recycle as much waste as possible.

**Medium /
Long term**

49. To gain a more complete picture of solid waste and recycling in the community, Montgomery Township needs more accurate waste disposal data. With more reliable

information, more precise recycling rates could be determined and more meaningful recycling goals set. The following are options for achieving this goal:

a. The township government should request that haulers report the weight of trash collected within the township. While the township cannot require haulers to comply with this request, municipal representatives should explain the importance of the information to the community and monitor haulers’ responsiveness to the request.

Short term

b. Request more detailed data collection by landfills, transfer stations, and incineration facilities, which are currently required by the DEP to report the origin of waste by county (or state if the waste is from outside of Pennsylvania), but not by municipality. Again, while the township cannot require facilities to comply with this request, municipal representatives should clearly explain the importance of the information to the community and monitor facilities’ responsiveness to the request.

Short term

c. Consider joining the Waste System Authority of Eastern Montgomery County (WSAEMC), which was created by court order to provide solid waste disposal services to twenty-two member municipalities. WSAEMC operates a waste-to-energy incineration facility and carefully tracks waste disposal from these municipalities. There may be challenges to joining WSAEMC, including cost to Montgomery Township and membership eligibility.

Medium term

- d. Implement a single hauler system in the township. Because a single hauler trash collection system in Montgomery Township would require fewer trucks to drive down each residential road to collect trash and recyclables than is the case under the current multi-hauler system, it would be more efficient, require much less motor fuel, thereby emitting fewer greenhouse gases, reducing wear and tear on Township roads, and likely save residents money. In addition, it would make performance monitoring easier because solid waste would not need to be commingled with waste from other communities, allowing for more accurate and thorough waste generation data collection.

Long term

- e. Implement a municipal collection system in the township. While technically feasible, municipal collection requires a large investment in capital equipment. It would also add a significant labor force for collection, maintenance, and administration. Municipalities that have municipal collection have better data about residential solid waste, but do not gain any additional data from the commercial sector.

Long term

Summary of Recommendations for Municipal Government Greenhouse Gas Emissions Reductions

	Recommendation	Time Frame	Scope
<i>Sustainability Coordination, Monitoring and Evaluation</i>	1. Pass a greenhouse gas emissions reduction targets resolution	Short	
	2. Appoint a Township Sustainability Coordinator	Short	
	3. Initiate a sustainability campaign to provide information to the public	Short	
	4. Publicize township efforts to reduce greenhouse gas emissions	Short	
<i>Vehicle Fleet</i>	5. Create a fuel efficient vehicle purchasing policy	Short	1
	6. Purchase hybrid vehicles for police department	Medium	1
	7. Create a “No idling” policy for all municipal vehicles	Short	1
	8. Provide an “Eco-driving” training program for employees who drive Township vehicles	Short	1
	9. Purchase alternative fuel vehicles	Medium	1
	10. Purchase carbon offsets for air tickets purchased for out of town business travel	Short	3
<i>Buildings and Facilities</i>	11. Purchase wind energy credits	Short	2
	12. Pass a Township Government Energy Conservation Policy	Short	1 & 2
	13. Initiate an energy conservation education campaign for staff	Short	1 & 2
	14. Conduct an energy audit of all municipal buildings, including exploring solar options	Short	1 & 2
<i>Streetlights and Traffic Signals</i>	15. Keep up to date with energy saving opportunities for streetlights and traffic signals	<i>Ongoing</i>	2
<i>Wastewater Facilities</i>	16. Encourage water conservation and use of rain barrels for outdoor water use	Short	3
	17. Promote on-site greywater systems to recycle household wastewater	Short	3
	18. Purchase wind energy credits for a portion of MTMSA electricity use	Short	3
	19. Study installation of solar panels at MTMSA Eureka wastewater treatment facility	Medium	3
<i>Employee Commute</i>	20. Provide incentives for employees to carpool	Short	3
	21. Work with SEPTA to develop improved accessibility of municipal facilities by transit	Medium	3
	22. Provide secure, sheltered bicycle parking at municipal facilities	Short	3
<i>Carbon Sequestration</i>	23. Continue and expand tree planting programs in the community	<i>Ongoing</i>	3

Summary of Recommendations for Community Greenhouse Gas Emissions Reductions

	Recommendation	Time Frame
<i>Education and Communication</i>	24. Provide public education materials	Short
	25. Publicize township and community efforts to reduce greenhouse gas emissions	Short

	Recommendation	Time Frame
Education and Communication	26. Issue a community emissions reduction challenge	Short
	27. Participate in the Global Emissions Exchange	Short
Energy Efficient Transportation	28. Post information on “eco-driving” practices on the Township government’s website	Short
	29. Encourage and expand the Safe Routes to School program	Short
	30. Improve walking and bicycling conditions in the Township	Short to Medium
	31. Encourage land use planning with higher population densities and a greater mix of housing, commercial, and public spaces in nodes of transit-friendly locations along major arterial roads.	Medium to Long
Summary of Water, Wastewater, and Solid Waste Recommendations		
Water – North Wales Water Authority	32. Promote installation of water conserving fixtures and fittings in homes and businesses	Ongoing
	33. Distribute dye tablets to homeowners for home testing	Ongoing
	34. Encourage residents and businesses to replace toilet flappers	Ongoing
Water –Municipal Government	35. Provide leadership to residents and businesses in the community	Ongoing
	36. Monitor annual municipal water use and set a target to reduce water use by 10%	Short
	37. Test toilets in municipal buildings annually	Ongoing
	38. Purchase and install waterless urinals	Short
	39. Assess outdoor watering practices at municipal parks and facilities	Short
Wastewater	40. Maintain high levels of wastewater treatment in Montgomery Township	Ongoing
	41. Continue regular maintenance and repair	Ongoing
	42. Encourage MTMSA to distribute information on water conservation	Medium
Solid Waste Disposal	43. Lead by example in recycling and solid waste disposal	Ongoing
	44. Provide information to residents and businesses on the benefits of recycling	Short
	45. Continue to promote commercial recycling	Short
	46. Recognize recyclers	Short
	47. Partner with RecycleBank to provide cash rewards to residents	Short
	48. Consider pay as you throw trash disposal	Medium to Long
	49. Obtain better solid waste disposal data	Ongoing

Table 6 – Summary of Recommendations

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