Ohio’s

**PM** \(2.5\)

Recommended Designations

Prepared by:
The Ohio Environmental Protection Agency
Division of Air Pollution Control

December 2007
Acknowledgement

The Ohio EPA, Division of Air Pollution Control would like to express appreciation for the extensive efforts, guidance and expertise provided by the Ohio Department of Development, Office of Strategic Research staff, especially Ed Simmons. The level of detailed county-specific information provided in this document would not have been possible without Mr. Simmons' efforts and timely assistance. Appreciation is also extended to Greg Stella at Alpinegeophysics, Inc. and to Mark Janssen at Midwest RPO for their assistance with the emissions data included in this submittal.
List of Appendices

A. Air Quality System (AQS) data sheets  
B. Ohio EPA, DAPC PM$_{2.5}$ summary sheets  
C. SLAMS 2006 PM$_{2.5}$ certification  
D. Speciation data  
E. Meteorology data, wind roses  
F. Physiographic, elevation and land cover maps  
G. Jurisdiction boundary maps  
H. County profiles and statewide informational maps  
I. Public notice, public hearing, and response to comments documentation
<table>
<thead>
<tr>
<th>Designation Area</th>
<th>Current PM$_{2.5}$ Nonattainment Designation Counties</th>
<th>Ohio EPA Recommended Nonattainment Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Canton-Massillon, OH</td>
<td>Stark</td>
<td>Stark</td>
</tr>
<tr>
<td>(3) Cleveland-Akron-Lorain, OH</td>
<td>Cuyahoga, Lake, Lorain, Medina, Portage, Summit, Ashtabula (P)</td>
<td>Cuyahoga, Lake, Lorain, Medina, Portage, Summit</td>
</tr>
<tr>
<td>(4) Columbus, OH</td>
<td>Delaware, Fairfield, Franklin, Licking, Coshocton (P)</td>
<td>Delaware, Fairfield, Franklin, Licking</td>
</tr>
<tr>
<td>(5) Dayton-Springfield, OH</td>
<td>Clark, Greene, Montgomery</td>
<td>Greene, Montgomery</td>
</tr>
<tr>
<td>(6) Huntington-Ashland, WV-KY-OH</td>
<td>Lawrence, Scioto, Adams (P), Gallia (P)</td>
<td></td>
</tr>
<tr>
<td>(7) Parkersburg-Marietta, WV-OH</td>
<td>Washington</td>
<td>Washington</td>
</tr>
<tr>
<td>(8) Steubenville-Weirton, OH-WV</td>
<td>Jefferson</td>
<td>Jefferson</td>
</tr>
<tr>
<td>(9) Toledo, OH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10) Wheeling, WV-OH</td>
<td>Belmont</td>
<td></td>
</tr>
<tr>
<td>(11) Youngstown-Warren-Sharon, OH-PA</td>
<td></td>
<td>Mahoning, Trumbull</td>
</tr>
</tbody>
</table>
An Explanation of Ohio EPA’s Nine-Factor Analysis

U.S. EPA guidance (June 2007) states that each area evaluated for attainment should be assessed on a case-by-case basis. A nonattainment area must include not only the area that is violating the standard but also nearby areas that contribute to the violation. Boundary recommendations should be based on an evaluation of the nine factors used in the prior PM$_{2.5}$ designations process, as well as any other relevant factors or circumstances specific to a particular area.

The nine designation factors used to determine nearby areas of influence for 24-hour NAAQS violations are:

- Air quality
- Emissions
- Population and urbanization
- Traffic & commuting
- Growth
- Current emission controls
- Political and other boundaries
- Topography
- Meteorology

Ohio EPA has included all of the nine factors for each area however two are combined, population/urbanization and growth. Meteorology information is not included with each respective area’s discussion but is provided as one document in Appendix E.

Factor 1: Air quality data

The air quality analysis looks at the 24-hour 98th percentile and annual average values for each county based on data for 2004 to 2006. The 24-hour revised standard is 35 μg/m$^3$ and the annual standard is 15.0 μg/m$^3$. Counties without monitors are not listed. Data is retrieved from the U.S. EPA’s Air Quality System (AQS) at [http://www.epa.gov/ttn/airs/airsaqs/](http://www.epa.gov/ttn/airs/airsaqs/) and is presented in micrograms per cubic meter (μg/m$^3$) in all tables. The three-year averages for monitors that are violating the standard are highlighted with red. Monitoring sites that have less than 75 percent capture in at least one quarter are highlighted with yellow. AQS data retrieval sheets and Ohio EPA summary sheets for 2004, 2005, 2006 and 2007 (not complete) are provided in Appendix A and B respectively. The state and local air monitoring stations (SLAMS) data certification report for calendar year 2006 is provided in Appendix C.

Ohio EPA operates a large network of Federal Reference Method (FRM) PM$_{2.5}$ monitors, primarily located in the expected high PM$_{2.5}$ concentration areas with additional attention to more highly populated areas as well. Included in the FRM network is a subset of monitor sites which also monitor PM$_{2.5}$ species (sulfate,
nitrate, organic carbon, elemental carbon and ‘crustal’ or ‘other’). The majority of the speciation monitors are co-located with the highest reading FRM monitors. In some cases, though, the speciation monitor is located in a more rural or less industrialized area. It is the comparison of the speciation monitoring from the two types of sites (higher reading nonattainment sites and those currently reading attainment) which provides insight into the species and source types that contribute to the urban/industrial ‘excess’. Data included in factor 2 are also provided by the Web site below.

http://vista.cira.colostate.edu/views/Web/Data/DataWizard.aspx

This Web site provides access to a wide variety of data resources, including metadata from several networks of monitoring sites, an integrated aerosol database, graphical summaries of data analyses and extensive catalogs of air quality information. Detailed information and graphs on speciation is provided in Appendix D.

Factor 2: Emissions data

The analysis for factor 2 looks at emissions of sulfur dioxide (SO$_2$), nitrogen dioxide (NO$_x$) and particulate matter (PM$_{2.5}$). Emissions data are derived from:

Mid-West RPO http://www.ladco.org/tech/emis/index.html, (2005 and 2009 SO$_2$, NO$_x$ and PM$_{2.5}$ emissions, except 2005 on-road)

Alpine Geophysics http://www.alpinegeophysics.com/, and (2009 WV and KY on-road)


The data are for 2005 (base year) and 2009 (attainment demonstration year). The counties in bold font are currently designated as nonattainment.

Tables presented under factor 2 show 2005 and 2009 SO$_2$, NO$_x$ and PM$_{2.5}$ emissions for each county. Also included in this factor are tables showing the major employers for each county.

Emissions data indicate the potential for a county to contribute to observed violations, often making the emissions data one of the most important factors in assessing a county to be designated as nonattainment for PM$_{2.5}$.

Factor 3: Population and projected growth

Tables presented under factor 3 show the past, present and projected population for each county. Population data and expected growth indicate the likelihood of population-based emissions that may contribute to violations. The counties in
are currently designated as nonattainment. The population data are provided by the Ohio Department of Development, Office of Strategic Research [http://www.odod.state.oh.us/research/](http://www.odod.state.oh.us/research/). Appendix H provides population data for all 88 counties in Ohio.

**Factor 4: Traffic and commuting patterns**

The traffic and commuting analysis looks at the number of commuters in each county who drive to another county, the number of total commuters in each county who commute to other counties, as well as the estimated daily vehicle miles traveled (kDVMt) for each county in thousands of miles. Commuting information is provided by the Ohio Department of Development, Office of Strategic Research [http://www.odod.state.oh.us/research/](http://www.odod.state.oh.us/research/) and the kDVMt data estimates are provided by the Ohio Department of Transportation, Office of Technical Services. Appendix H provides traffic and commuting data for all 88 counties in Ohio.

A county with a significant amount of traffic commuting to an area with a violating monitor is generally an integral part of the area, and would be an appropriate part of the domain of some mobile source strategies, thus may warrant inclusion in the nonattainment area. In this document, counties that have a high level of commuting into a county with a violating monitor is identified a “contributing county”. Ohio EPA also took the level of emissions, population and growth into consideration for determining whether a county is “contributing”.

**Factor 5: Meteorology**

The meteorology review looks at wind data gathered at stations in and near Ohio by the National Weather Service (NWS). Figures presented for factor 5 indicate the annual average winds by for each NWS site. These data may also suggest that emissions in some directions relative to the violation may be more prone to contribute than emissions in other directions. A discussion of relevant meteorological factors is discussed in Appendix E rather than for the individual areas.

**Factor 6: Topography and land use/land cover**

The topography and land use/land cover analysis looks at physical features and land use or cover that might have an effect on the airshed, and therefore, the distribution of particulate matter over an area. Ohio does not have significant topographic features that significantly influence the regional transport of pollutants within the multi-county study areas. Tables presented under factor 6 show the land use/land cover for each county in percentage of urban (residential, commercial, industrial, transportation, grasses), cropland, pasture, forest and wetlands (all types). Maps for this section are provided in Appendix F. The sources for the information provided in this section are:
Factor 7:  Jurisdictional boundaries

The analysis of jurisdictional boundaries looks at the planning and organizational structure of an area to determine if the implementation of controls in a potential nonattainment area can be carried out in the cohesive manner. Although MSA boundaries were not considered for these recommendations, a map showing the MSA’s in Ohio and an MPO map is provided in Appendix G. For information on the metropolitan planning organizations referenced in this document, please see: http://www.odotnet.net/Planning/ACCESS%20OHIO/Final/AppendixB.pdf.

Factor 8:  Level of control of emission sources

The level of control analysis looks at what controls are currently implemented in each area. Emission reductions which have recently occurred or are expected to occur in the near future affects both the current PM$_{2.5}$ design values, the potential future design values and, ultimately, attainment of the standards. In Ohio, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- on-road motor vehicle control program
- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)
- NO$_x$ Reasonably Available Control Technology (RACT) [Cleveland/Akron nonattainment only]
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities (e.g., Mittal Steel)

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal). In Ohio, all of the major utilities located along the Ohio River Valley (Miami Fort, Zimmer (previously controlled), Killen, Stuart, Gavin, Keiger Creek, Burger, Cardinal and Sammis) and the largest units within the interior of Ohio (Muskingum River and Conesville) will be controlling both SO$_2$ and NO$_x$. The units along Lake Erie have not committed to sulfur dioxide controls, but are partially controlled for NO$_x$. There are similar Electric
Generating Unit control programs in all of the states bordering Ohio as well. These control programs will reduce \( \text{PM}_{2.5} \) concentrations statewide, and in many cases, sufficiently to attain both the annual and the revised 24-hour \( \text{PM}_{2.5} \) standards by the initial attainment date of April 15, 2010.

Given these controls, there is justification for not including certain ‘power plant’ partial counties (townships) in the current recommendations for the revised \( \text{PM}_{2.5} \) standard. The counties with power plants which will be controlled under CAIR include Adams, Gallia and Coshocton. These partial counties, which are currently designated nonattainment for the initial \( \text{PM}_{2.5} \) standards, should not be included as nonattainment under the revised standards.

Mobile source control measures (on-road and off-road) provide emission reductions proportional to the vehicle miles traveled and levels of construction and other major industrial activities. As such, areas nearest the highest reading urban/industrial ambient monitors will benefit from these controls. These areas, though, will continue to have the highest emission levels for these source categories.

In some cases, enforcement activities may provide partial relief of the hot spot monitored concentrations. The potential reductions are not yet quantified, nor the ambient impact estimated. There are no instances where we can currently identify where reductions in emissions from enforcement activities would result in an area becoming insignificant as a source area for \( \text{PM}_{2.5} \) or its precursors.

Another area where Ohio is placing significant effort is in clean diesel programs. These programs can accelerate the turnover of the dirtiest portions of the diesel fleet by several years by controlling emissions from units that otherwise would not be replaced for several years. The benefits of these programs can be magnified when specific fleets are targeted which are located and operate primarily in the highest monitored areas. These programs will not result in an area becoming insignificant for emissions contributing to high \( \text{PM}_{2.5} \) concentrations, but they are valuable nonetheless.
Factor Analysis for Current and Recommended PM$_{2.5}$ Nonattainment Counties in Ohio

**Canton-Massillon, OH**

**Current** county nonattainment: Stark County

- Current nonattainment counties
- Current partial nonattainment

**Recommended** county nonattainment: Stark County

Source: Office of Strategic Research, Ohio Department of Development
Discussion

There is one county in this existing PM$_{2.5}$ nonattainment area, Stark County. Ohio EPA recommends retaining Stark County as nonattainment for the Canton-Massillon area. After considering the nine factors, Ohio EPA does not recommend adding any contributing counties to this one-county nonattainment area. Stark County contains two monitors, one of which is violating both the annual and the 24-hour revised standard. There are six counties that are adjacent to Stark County; Wayne, Holmes, Tuscarawas, Carroll, Columbiana and Mahoning counties. Columbiana and Mahoning counties are discussed in the Youngstown-Warren section.

The three-year average of the 98$^{th}$ percentile and the three-year annual average concentration at site 39-151-0017 is not attaining the 24-hour revised standard and the monitor also violates the annual standard. Emissions in Stark County and the adjacent counties are not significant. Wayne County 2005 SO$_2$ emissions are notable but are forecasted to decrease by 2009.

Factor 1: Air quality data

= Exceeds standard

AQS: 24-Hour Average – 98$^{th}$ Percentile (µg/m$^3$)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-151-0017</td>
<td>Stark</td>
<td>36.3</td>
<td>51.0</td>
<td>33.1</td>
<td>40</td>
</tr>
<tr>
<td>39-151-0020</td>
<td></td>
<td>32.8</td>
<td>39.3</td>
<td>26.1</td>
<td>33</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture

AQS: Annual Average (µg/m$^3$)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-151-0017</td>
<td>Stark</td>
<td>15.5</td>
<td>17.8</td>
<td>14.6</td>
<td>16.0</td>
</tr>
<tr>
<td>39-151-0020</td>
<td></td>
<td>14.1</td>
<td>16.4</td>
<td>11.9</td>
<td>14.1</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
Stark County PM\textsubscript{2.5} Monitor Locations and Site ID Numbers

Factor 2: Emissions Data (tons per day)

<table>
<thead>
<tr>
<th>County</th>
<th>SO\textsubscript{2}</th>
<th>NO\textsubscript{x}</th>
<th>PM\textsubscript{2.5}</th>
</tr>
</thead>
<tbody>
<tr>
<td>STARK</td>
<td>3.31</td>
<td>36.74</td>
<td>3.19</td>
</tr>
<tr>
<td>Wayne</td>
<td>68.67</td>
<td>24.35</td>
<td>2.01</td>
</tr>
<tr>
<td>Holmes</td>
<td>0.26</td>
<td>4.72</td>
<td>0.72</td>
</tr>
<tr>
<td>Tuscarawas</td>
<td>8.99</td>
<td>14.81</td>
<td>0.93</td>
</tr>
<tr>
<td>Carroll</td>
<td>0.23</td>
<td>3.62</td>
<td>0.36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>County</th>
<th>SO\textsubscript{2}</th>
<th>NO\textsubscript{x}</th>
<th>PM\textsubscript{2.5}</th>
</tr>
</thead>
<tbody>
<tr>
<td>STARK</td>
<td>2.31</td>
<td>33.27</td>
<td>3.05</td>
</tr>
<tr>
<td>Wayne</td>
<td>52.17</td>
<td>21.19</td>
<td>3.78</td>
</tr>
<tr>
<td>Holmes</td>
<td>0.11</td>
<td>4.47</td>
<td>0.69</td>
</tr>
<tr>
<td>Tuscarawas</td>
<td>14.88</td>
<td>13.90</td>
<td>1.46</td>
</tr>
<tr>
<td>Carroll</td>
<td>0.16</td>
<td>3.95</td>
<td>0.35</td>
</tr>
</tbody>
</table>
Major Employers  
Source: Ohio Department of Development, 2007

Most of the major employers in Stark County and the surrounding counties are in the categories of manufacturing, service and government as shown below.

**Stark County**

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aultman Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Canton City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Fisher Food Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>General Electric Co</td>
<td>Finance</td>
</tr>
<tr>
<td>Mercy Medical Center</td>
<td>Service</td>
</tr>
<tr>
<td>Precision Castparts Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Republic Engineered Products</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Timken Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Wal-Mart Stores Inc</td>
<td>Trade</td>
</tr>
</tbody>
</table>

**Wayne**

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Wooster</td>
<td>Service</td>
</tr>
<tr>
<td>Frito-Lay Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>JM Smucker Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>LuK Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
<tr>
<td>Will-Burt Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Wooster Brush Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Wooster City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Wooster Community Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Worthington Ind/Gerstenslager Co</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

**Holmes County**

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case Foods Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Collins &amp; Aikman Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>East Holmes Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Owens-Illinois Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Pomerene Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Sperry &amp; Rice Mfg Co LLC</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Wayne-Dalton Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Weaver Leather Goods Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>West Holmes Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Robin Industries</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

**Tuscarawas County**

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alamo Group/Gradall Industries</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Allied Machine &amp; Engineering</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Dover City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>New Philadelphia City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Sanwa Shutter Corp/Genie Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Smurfit-Stone Container Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Union Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Wal-Mart Stores Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Zimmer Holdings Inc</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>
Carroll County
American Axle & Manufacturing Holding  Manufacturing
Ashi Tec Corp/Metaldyne Corp  Service
Atwood Lake Resort  Service
Carroll Health Care Center Inc  Service
Carrollton Exempted Village Bd of Ed Government
GBS Corporation  Manufacturing
Summitville Tiles Inc  Manufacturing

Factor 3: Population and Projected Growth
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in Stark County are Canton, Massillon, and Alliance; in Wayne County, Wooster, Rittman and Orrville; in Holmes County, Millersburg; in Tuscarawas County, New Philadelphia, Dover, Uhrichsville and Sugarcreek; in Carroll County, Carrollton.

As indicated in the following table and graphs, Stark County has the highest population in this area and it is projected to steadily decrease. The population in the surrounding counties is projected to gradually increase.

<table>
<thead>
<tr>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stark</td>
<td>380,421</td>
<td>380,275</td>
<td>380,575</td>
<td>376,470</td>
<td>372,490</td>
<td>368,900</td>
</tr>
<tr>
<td>Wayne</td>
<td>113,086</td>
<td>113,496</td>
<td>113,950</td>
<td>119,850</td>
<td>128,670</td>
<td>136,690</td>
</tr>
<tr>
<td>Holmes</td>
<td>41,165</td>
<td>41,424</td>
<td>41,574</td>
<td>43,440</td>
<td>47,010</td>
<td>49,690</td>
</tr>
<tr>
<td>Tuscarawas</td>
<td>91,956</td>
<td>91,791</td>
<td>91,766</td>
<td>93,160</td>
<td>96,080</td>
<td>98,220</td>
</tr>
<tr>
<td>Carroll</td>
<td>29,448</td>
<td>29,252</td>
<td>29,189</td>
<td>31,820</td>
<td>34,170</td>
<td>35,720</td>
</tr>
</tbody>
</table>

Stark County

![Graph showing population trends from 1950 to 2030](image_url)
Factor 4: Traffic and commuting patterns

While the kDVMT in Stark County have had upward trend, the surrounding counties have experienced a downward trend in kDVMT between 2004 and 2006, as shown in the graphs below.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)
Source: Ohio Department of Transportation, Office of Technical Services

![Stark County: Total County kDVMT 1990-2006](image)

2004 = 8191.93  2005 = 8136.66  2006 = 8405.65

![Wayne County: Total County kDVMT 1990-2006](image)

2004 = 3065.97  2005 = 3111.7  2006 = 3003.18
Holmes County: Total County kDVMT 1990-2006

Tuscarawas County: Total County kDVMT 1990-2006

Commuting Patterns
Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Over 5,000 workers from Tuscarawas County and Carroll County commute to Stark County. The majority of Stark County workers commuting outside the county, travel to Summit County. The largest portion of Wayne County workers commuting outside the county, travel to Medina and Summit counties. Most of the commuting workers from Holmes County drive to Wayne County.

<table>
<thead>
<tr>
<th>Stark</th>
<th>Percent of workers that work outside the county</th>
<th>20.7%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average commute time in minutes</td>
<td>21.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Stark County</th>
<th>177,234</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>21,094</td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>3,026</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>2,443</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>2,256</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>1,679</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>1,158</td>
</tr>
<tr>
<td>Carroll Co. OH</td>
<td>956</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>770</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>640</td>
</tr>
<tr>
<td>Holmes Co. OH</td>
<td>480</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Stark County</th>
<th>171,642</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>7,665</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>5,707</td>
</tr>
<tr>
<td>Carroll Co. OH</td>
<td>5,125</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>3,306</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>2,548</td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>1,672</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>1,578</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>565</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>445</td>
</tr>
<tr>
<td>Harrison Co. OH</td>
<td>292</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.
### Wayne

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Wayne County</th>
<th>Number of workers 16+ years of age working in Wayne County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute Out To</strong></td>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>4,667</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>3,948</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>1,672</td>
</tr>
<tr>
<td>Holmes Co. OH</td>
<td>1,247</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>1,193</td>
</tr>
<tr>
<td>Ashland Co. OH</td>
<td>565</td>
</tr>
<tr>
<td>Richland Co. OH</td>
<td>297</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>145</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>125</td>
</tr>
</tbody>
</table>

**Percent is of workers living in county.** **Percent is of workers working in county.**

### Holmes

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Holmes County</th>
<th>Number of workers 16+ years of age working in Holmes County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute Out To</strong></td>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>2,411</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>538</td>
</tr>
<tr>
<td>Ashland Co. OH</td>
<td>352</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>200</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>104</td>
</tr>
<tr>
<td>Carroll Co. OH</td>
<td>76</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>72</td>
</tr>
<tr>
<td>Knox Co. OH</td>
<td>70</td>
</tr>
<tr>
<td>Coshocton Co. OH</td>
<td>68</td>
</tr>
</tbody>
</table>

**Percent is of workers living in county.** **Percent is of workers working in county.**

### Tuscarawas

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Tuscarawas County</th>
<th>Number of workers 16+ years of age working in Tuscarawas County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute Out To</strong></td>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>5,707</td>
</tr>
<tr>
<td>Holmes Co. OH</td>
<td>1,983</td>
</tr>
<tr>
<td>Coshocton Co. OH</td>
<td>709</td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>688</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>606</td>
</tr>
<tr>
<td>Carroll Co. OH</td>
<td>289</td>
</tr>
<tr>
<td>Harrison Co. OH</td>
<td>182</td>
</tr>
<tr>
<td>Guernsey Co. OH</td>
<td>153</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>128</td>
</tr>
</tbody>
</table>

**Percent is of workers living in county.** **Percent is of workers working in county.**
### Carroll

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>Percent of workers that work outside the county</th>
<th>57.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average commute time in minutes</td>
<td></td>
<td>27.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Carroll County</th>
<th>7,947</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Commute Out To</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stark Co. OH</td>
<td>5,125</td>
<td>39.8%</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>840</td>
<td>6.5%</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>297</td>
<td>2.3%</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>271</td>
<td>2.1%</td>
</tr>
<tr>
<td>Jefferson Co. OH</td>
<td>178</td>
<td>1.4%</td>
</tr>
<tr>
<td>Harrison Co. OH</td>
<td>160</td>
<td>1.2%</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>73</td>
<td>0.6%</td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>73</td>
<td>0.6%</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>47</td>
<td>0.4%</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>37</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commute In From</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stark Co. OH</td>
<td>956</td>
<td>12.0%</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>453</td>
<td>5.7%</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>289</td>
<td>3.6%</td>
</tr>
<tr>
<td>Jefferson Co. OH</td>
<td>265</td>
<td>3.3%</td>
</tr>
<tr>
<td>Harrison Co. OH</td>
<td>188</td>
<td>2.4%</td>
</tr>
<tr>
<td>Holmes Co. OH</td>
<td>76</td>
<td>1.0%</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>44</td>
<td>0.6%</td>
</tr>
<tr>
<td>Mercer Co. PA</td>
<td>16</td>
<td>0.2%</td>
</tr>
<tr>
<td>Clark Co. OH</td>
<td>13</td>
<td>0.2%</td>
</tr>
<tr>
<td>Geauga Co. OH</td>
<td>12</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

| Percent is of workers living in county. | Percent is of workers working in county. |

### Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Canton-Massillon area.

### Factor 6: Topography/Land use/Land cover

Stark County is in the Appalachian Plateau Physiographic Province (see Appendix F). The northern two-thirds of the county are located in the glacial part of the Appalachian Plateau, and the rest of the county is in the unglaciated part. Elevations range from a little less than 900 feet above sea level to about 1,350 feet above sea level. The topography of the unglaciated portion of the county is hilly and steep and variations in relief average about 200 feet within one-half mile. The glaciated part of the county is undulating and rolling, with an average relief varying less than 100 feet within a mile.

Wayne County is a county of contrasts. Although the entire area has been glaciated, the landforms are very diverse including flat wetlands, steep slopes and hilly areas. The elevation ranges from about 850 feet to 1260 feet above sea level.

Holmes County lies in the Appalachian Plateau Province, both the glaciated and unglaciated sections. The northern glaciated landscape is gently rolling while the southern unglaciated portion retains its rough, bedrock relief. The highest elevation is 1,410 feet and the lowest is 790 feet above sea level.
Tuscarawas County is in the unglaciated part of the Allegheny Plateau region except for the northwest corner. Most areas in the southern and eastern parts of the county have deep valleys and narrow ridgetops while the western part of the county, the hills are not as steep. The elevation ranges from 795 feet to 1,340 feet above sea level.

Carroll County is on the unglaciated, dissected Allegheny Plateau. The highest point in the county is near the northern border at 1,375 feet and the lowest point 900 feet.

As shown in the following pie charts, the land use/land cover in Stark County and all the surrounding counties except for Wayne County is predominately classified as forest. Wayne County is nearly 60 percent cropland. As expected, in comparison to the surrounding counties, Stark County has the largest percentage of urbanized area at 23 percent.
Tuscarawas County Land Use/Land Cover

- Urban (Res/Comm/Ind/Trans/Grasses): 5%
- Cropland: 20%
- Pasture: 10%
- Forest: 64%
- Wetlands All Types: 1%

Carroll County Land Use/Land Cover

- Urban (Res/Comm/Ind/Trans/Grasses): 1%
- Cropland: 19%
- Pasture: 11%
- Forest: 51%
- Wetlands All Types: 1%

Holmes County Land Use/Land Cover

- Urban (Res/Comm/Ind/Trans/Grasses): 1%
- Cropland: 29%
- Pasture: 18%
- Forest: 20%
- Wetlands All Types: 10%

Legend:
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types
Factor 7: Jurisdictional boundaries

The Canton-Massillon, OH Metropolitan Statistical Area includes Stark and Carroll counties and the principal cities of Canton and Massillon.

The Stark County Transportation Study (SCATS) is the planning agency designated as the Metropolitan Planning Organization (MPO) for Stark County. The SCATS region is composed of Stark County.

The surrounding counties; Wayne, Holmes, Tuscarawas and Carroll are not part of an MPO. Columbiana and Mahoning counties also border Stark County however they are discussed in the Youngstown-Warren section.

Factor 8: Level of control of emission sources

In Stark County, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal) resulting in air quality improvements in Stark County.
Cincinnati-Hamilton, OH-KY-IN

Current county nonattainment: Butler, Clermont, Hamilton and Warren

Recommended county nonattainment: Butler, Clermont, Hamilton and Warren

Source: Office of Strategic Research, Ohio Department of Development
**Discussion**

There are four Ohio counties in this existing PM$_{2.5}$ nonattainment area: Butler, Clermont, Hamilton, and Warren counties. Ohio EPA recommends retaining these four counties as nonattainment for the Cincinnati-Hamilton area. There are violating monitors in Butler and Hamilton counties. Hamilton County also has high 2005 SO$_2$ emissions and significant NO$_x$ emissions. Clermont County also has high 2005 SO$_2$ emissions. Warren County has insignificant emissions but has high a commuting pattern into Hamilton County and therefore is considered a contributing county in this area. Currently, there is not sufficient data to determine if the monitor in Clermont County is violating the standards. Toward the latter part of 2007, more data will be available in order to make this determination. The surrounding counties of Brown, Highland and Clinton counties are excluded due to very low emissions and population. Preble County is also an adjacent county but it is discussed in the Dayton-Springfield area section.

The three-year average of the 98th percentile and the three-year annual average concentration at sites in Butler and Hamilton counties are not attaining the revised 24-hour or the annual standards.

**Factor 1: Air quality**

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-017-0003</td>
<td>Butler</td>
<td>37.2</td>
<td>47.6</td>
<td>30.2</td>
<td>38</td>
</tr>
<tr>
<td>39-017-0016</td>
<td></td>
<td>32.2</td>
<td>43.4</td>
<td>35.2</td>
<td>37</td>
</tr>
<tr>
<td>39-017-0017</td>
<td></td>
<td>34.3</td>
<td>44.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-017-1004</td>
<td></td>
<td>31.6</td>
<td>45.4</td>
<td>32.7</td>
<td>37</td>
</tr>
<tr>
<td>39-025-0022</td>
<td>Clermont</td>
<td></td>
<td>38.3</td>
<td>31.6</td>
<td></td>
</tr>
<tr>
<td>39-061-0006</td>
<td>Hamilton</td>
<td></td>
<td>45.0</td>
<td>33.3</td>
<td></td>
</tr>
<tr>
<td>39-061-0014</td>
<td></td>
<td>42.0</td>
<td>38.5</td>
<td>35.2</td>
<td>39</td>
</tr>
<tr>
<td>39-061-0040</td>
<td></td>
<td>30.5</td>
<td>45.8</td>
<td>32.8</td>
<td>36</td>
</tr>
<tr>
<td>39-061-0041</td>
<td></td>
<td>32.2</td>
<td>37.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-061-0042</td>
<td></td>
<td>31.9</td>
<td>44.4</td>
<td>34.5</td>
<td>37</td>
</tr>
<tr>
<td>39-061-0043</td>
<td></td>
<td>31.4</td>
<td>39.9</td>
<td>34.9</td>
<td>35</td>
</tr>
<tr>
<td>39-061-7001</td>
<td></td>
<td>34.6</td>
<td>47.1</td>
<td>34.0</td>
<td>39</td>
</tr>
<tr>
<td>39-061-8001</td>
<td></td>
<td>33.9</td>
<td>51.4</td>
<td>36.1</td>
<td>40</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
## AQS: Annual Average (μg/m³)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-017-0003</td>
<td>Butler</td>
<td>14.1</td>
<td>19.0</td>
<td>14.1</td>
<td>15.7</td>
</tr>
<tr>
<td>39-017-0016</td>
<td></td>
<td>14.7</td>
<td>17.9</td>
<td>14.0</td>
<td>15.5</td>
</tr>
<tr>
<td>39-017-0017</td>
<td></td>
<td>14.2</td>
<td>17.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-017-1004</td>
<td></td>
<td>13.6</td>
<td>16.9</td>
<td>13.4</td>
<td>14.6</td>
</tr>
<tr>
<td>39-025-0022</td>
<td>Clermont</td>
<td>15.7</td>
<td>12.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-061-0006</td>
<td>Hamilton</td>
<td>16.6</td>
<td>13.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-061-0014</td>
<td></td>
<td>15.9</td>
<td>19.8</td>
<td>15.5</td>
<td>17.1</td>
</tr>
<tr>
<td>39-061-0040</td>
<td></td>
<td>14.6</td>
<td>17.5</td>
<td>13.6</td>
<td>15.2</td>
</tr>
<tr>
<td>39-061-0041</td>
<td></td>
<td>14.6</td>
<td>15.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-061-0042</td>
<td></td>
<td>16.0</td>
<td>19.1</td>
<td>14.9</td>
<td>16.7</td>
</tr>
<tr>
<td>39-061-0043</td>
<td></td>
<td>14.9</td>
<td>16.9</td>
<td>14.5</td>
<td>15.4</td>
</tr>
<tr>
<td>39-061-7001</td>
<td></td>
<td>15.3</td>
<td>18.4</td>
<td>14.4</td>
<td>16.0</td>
</tr>
<tr>
<td>39-061-8001</td>
<td></td>
<td>16.4</td>
<td>20.0</td>
<td>15.9</td>
<td>17.4</td>
</tr>
</tbody>
</table>

**Sites with less than 75% capture**

### Kentucky

![Exceeds standard]

**AQS: 24-Hour Average – 98th Percentile (μg/m³)**

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-037-0003</td>
<td>Campbell</td>
<td>27.5</td>
<td>38.0</td>
<td>25.2</td>
<td>30</td>
</tr>
<tr>
<td>21-117-0007</td>
<td>Kenton</td>
<td>29.4</td>
<td>42.1</td>
<td>32.6</td>
<td>35</td>
</tr>
</tbody>
</table>

**Sites with less than 75% capture**

### Indiana

**There are no monitors in applicable areas of Indiana**
Cincinnati-Hamilton Area PM$_{2.5}$ Monitor Locations and Site ID Numbers
## Factor 2: Emissions data (tons per day)

### 2005

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAMILTON</td>
<td>254.17</td>
<td>93.16</td>
<td>5.09</td>
</tr>
<tr>
<td>BUTLER</td>
<td>27.47</td>
<td>45.30</td>
<td>4.09</td>
</tr>
<tr>
<td>WARREN</td>
<td>1.30</td>
<td>20.20</td>
<td>1.36</td>
</tr>
<tr>
<td>CLERMONT</td>
<td>267.41</td>
<td>59.67</td>
<td>2.96</td>
</tr>
<tr>
<td>Brown</td>
<td>0.38</td>
<td>5.23</td>
<td>0.44</td>
</tr>
<tr>
<td>Clinton</td>
<td>0.44</td>
<td>6.75</td>
<td>0.38</td>
</tr>
</tbody>
</table>

### 2009

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAMILTON</td>
<td>90.74</td>
<td>87.53</td>
<td>7.44</td>
</tr>
<tr>
<td>BUTLER</td>
<td>17.79</td>
<td>38.36</td>
<td>3.85</td>
</tr>
<tr>
<td>WARREN</td>
<td>0.59</td>
<td>21.91</td>
<td>1.27</td>
</tr>
<tr>
<td>CLERMONT</td>
<td>144.09</td>
<td>58.77</td>
<td>9.94</td>
</tr>
<tr>
<td>Brown</td>
<td>0.22</td>
<td>5.31</td>
<td>0.41</td>
</tr>
<tr>
<td>Clinton</td>
<td>0.18</td>
<td>7.33</td>
<td>0.33</td>
</tr>
</tbody>
</table>

### Indiana

#### 2005

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEARBORN</td>
<td>214.14</td>
<td>36.91</td>
<td>0.61</td>
</tr>
<tr>
<td>Franklin</td>
<td>0.23</td>
<td>3.17</td>
<td>0.13</td>
</tr>
<tr>
<td>Ohio</td>
<td>0.06</td>
<td>0.91</td>
<td>0.03</td>
</tr>
<tr>
<td>Switzerland</td>
<td>0.13</td>
<td>1.84</td>
<td>0.07</td>
</tr>
<tr>
<td>Union</td>
<td>0.13</td>
<td>1.33</td>
<td>0.08</td>
</tr>
</tbody>
</table>

#### 2009

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEARBORN</td>
<td>69.79</td>
<td>36.14</td>
<td>8.60</td>
</tr>
<tr>
<td>Franklin</td>
<td>0.12</td>
<td>2.91</td>
<td>12.47</td>
</tr>
<tr>
<td>Ohio</td>
<td>0.05</td>
<td>0.73</td>
<td>0.81</td>
</tr>
<tr>
<td>Switzerland</td>
<td>0.07</td>
<td>1.74</td>
<td>0.55</td>
</tr>
<tr>
<td>Union</td>
<td>0.08</td>
<td>0.59</td>
<td>1.08</td>
</tr>
</tbody>
</table>
Kentucky

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boone</td>
<td>14.05</td>
<td>18.59</td>
<td>2.27</td>
</tr>
<tr>
<td>Campbell</td>
<td>1.64</td>
<td>6.52</td>
<td>0.89</td>
</tr>
<tr>
<td>Kenton</td>
<td>3.50</td>
<td>11.25</td>
<td>1.30</td>
</tr>
<tr>
<td>Gallatin</td>
<td>0.83</td>
<td>3.37</td>
<td>0.69</td>
</tr>
<tr>
<td>Grant</td>
<td>0.14</td>
<td>2.78</td>
<td>0.41</td>
</tr>
<tr>
<td>Ohio</td>
<td>26.78</td>
<td>3.7</td>
<td>0.88</td>
</tr>
<tr>
<td>Pendleton</td>
<td>1.59</td>
<td>8.86</td>
<td>0.60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boone</td>
<td>10.50</td>
<td>29.02</td>
<td>4.02</td>
</tr>
<tr>
<td>Campbell</td>
<td>1.60</td>
<td>6.43</td>
<td>0.87</td>
</tr>
<tr>
<td>Kenton</td>
<td>3.40</td>
<td>11.05</td>
<td>1.28</td>
</tr>
<tr>
<td>Gallatin</td>
<td>0.82</td>
<td>3.37</td>
<td>0.69</td>
</tr>
<tr>
<td>Grant</td>
<td>0.12</td>
<td>2.75</td>
<td>0.40</td>
</tr>
<tr>
<td>Ohio</td>
<td>20.26</td>
<td>4.34</td>
<td>1.77</td>
</tr>
<tr>
<td>Pendleton</td>
<td>1.58</td>
<td>8.83</td>
<td>0.60</td>
</tr>
</tbody>
</table>

Major Employers
Source: Ohio Department of Development 2007

Most of the major employers in the greater Cincinnati area the surrounding counties (in Ohio) are in the categories of manufacturing, government and service as shown in the following tables.

Butler County

<table>
<thead>
<tr>
<th>AK Steel Holding Corp</th>
<th>Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amylin Pharmaceuticals Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Armor Holdings Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Butler County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Cincinnati Financial Corp</td>
<td>Insurance</td>
</tr>
<tr>
<td>Cornerstone Brands Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Fairfield City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Ft Hamilton Memorial Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Hamilton City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Lakota Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Liberty Mutual/Ohio Casualty Corp</td>
<td>Insurance</td>
</tr>
<tr>
<td>Mercy regional Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Miami University</td>
<td>Government</td>
</tr>
<tr>
<td>Middletown regional Health System</td>
<td>Service</td>
</tr>
</tbody>
</table>
### Clermont County

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clermont County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Duke Energy Corp</td>
<td>Utility</td>
</tr>
<tr>
<td>Fifth Third Bank</td>
<td>Finance</td>
</tr>
<tr>
<td>International Paper Co</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>Meijer Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Mercy Health Partners</td>
<td>Service</td>
</tr>
<tr>
<td>Midland Co/American Modern Ins</td>
<td>Insurance</td>
</tr>
<tr>
<td>Milacron Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Milford Exempted Village Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Siemens AG/UGS Corp</td>
<td>Service</td>
</tr>
<tr>
<td>Total Quality Logistics</td>
<td></td>
</tr>
<tr>
<td>West Clermont Local Bd of Ed</td>
<td>Government</td>
</tr>
</tbody>
</table>

### Hamilton County

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Financial Group Inc</td>
<td>Insurance</td>
</tr>
<tr>
<td>Chiquita Brands International Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Convergys Corp</td>
<td>Service</td>
</tr>
<tr>
<td>Duke Energy Corp</td>
<td>Utility</td>
</tr>
<tr>
<td>Fifth Third Bancorp</td>
<td>Finance</td>
</tr>
<tr>
<td>Ford Motor Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>General Electric Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Health Alliance of Greater Cincinnati</td>
<td>Service</td>
</tr>
<tr>
<td>Johnson &amp; Johnson/Ethicon</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Kroger Co</td>
<td>Trade</td>
</tr>
<tr>
<td>Macy's Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Mercy Health Partners</td>
<td>Service</td>
</tr>
<tr>
<td>Procter &amp; Gamble Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>TriHealth Inc</td>
<td>Service</td>
</tr>
<tr>
<td>University of Cincinnati</td>
<td>Government</td>
</tr>
</tbody>
</table>

### Warren County

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aisin Seiki/ADVICS Co Ltd</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Blackhawk Automotive Plastics Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Cedar Fair/Kings Island</td>
<td>Service</td>
</tr>
<tr>
<td>Cintas Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>HJ Heinz/Portion Pac Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Luxottica Group SpA</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Macy's Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Mason Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Procter &amp; Gamble Co</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
<tr>
<td>Sumco Phoenix</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>WellPoint Inc/Anthem</td>
<td>Insurance</td>
</tr>
</tbody>
</table>
Factor 3:  Population and Projected Growth
Sources:  Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The largest populated places in the Cincinnati-Hamilton area are: the greater Cincinnati area in Hamilton County; Hamilton, Fairfield and Middletown in Butler County; Lebanon, Mason, Franklin and Springboro in Warren County; Batavia, Milford and New Richmond in Clermont County.

As indicated in the following table and graphs, Hamilton County has the highest population in this area, however it is projected steadily decrease. The population in the surrounding counties is projected to increase.

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butler</td>
<td>345,755</td>
<td>349,966</td>
<td>354,992</td>
<td>367,670</td>
<td>403,860</td>
<td>439,740</td>
</tr>
<tr>
<td>Clermont</td>
<td>188,025</td>
<td>190,329</td>
<td>192,706</td>
<td>202,830</td>
<td>225,340</td>
<td>245,000</td>
</tr>
<tr>
<td>Hamilton</td>
<td>832,250</td>
<td>828,487</td>
<td>822,596</td>
<td>807,560</td>
<td>771,540</td>
<td>730,570</td>
</tr>
<tr>
<td>Warren</td>
<td>189,823</td>
<td>196,793</td>
<td>201,871</td>
<td>215,020</td>
<td>276,250</td>
<td>338,350</td>
</tr>
<tr>
<td>Brown</td>
<td>44,106</td>
<td>44,255</td>
<td>44,423</td>
<td>48,050</td>
<td>53,290</td>
<td>56,580</td>
</tr>
<tr>
<td>Clinton</td>
<td>42,177</td>
<td>42,561</td>
<td>43,399</td>
<td>45,470</td>
<td>49,810</td>
<td>53,730</td>
</tr>
</tbody>
</table>

Butler County

![Population Growth Over Time](image-url)
Factor 4: Traffic and commuting patterns

All four of the counties in the Cincinnati-Hamilton area have shown an upward trend in the kDVMT as shown in the following graphs. Hamilton County has the highest level of kDVMT in the 21,000 range and Warren County experienced the most significant increase in kDVMT of 368 miles from 2005 to 2006.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)
Source: Ohio Department of Transportation, Office of Technical Services

Butler County: Total County kDVMT 1990-2006

Clermont County: Total County kDVMT 1990-2006
Commuter Patterns
Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

The vast majority of workers (traveling out of county) from Butler, Warren and Clermont counties commute to Hamilton County. Approximately 15 percent of Hamilton County workers commute outside the county, the majority traveling to Butler County, with Warren and Clermont coming in second and third.

### Butler

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Butler County</th>
<th>Number of workers 16+ years of age working in Butler County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To Number Percent</td>
<td>Commute In From Number Percent</td>
</tr>
<tr>
<td>Hamilton Co. OH 47,984 29.9%</td>
<td>Hamilton Co. OH 18,452 13.8%</td>
</tr>
<tr>
<td>Warren Co. OH 11,133 6.9%</td>
<td>Warren Co. OH 8,586 6.4%</td>
</tr>
<tr>
<td>Montgomery Co. OH 4,635 2.9%</td>
<td>Clermont Co. OH 2,912 2.2%</td>
</tr>
<tr>
<td>Clermont Co. OH 1,072 0.7%</td>
<td>Montgomery Co. OH 2,622 2.0%</td>
</tr>
<tr>
<td>Boone Co. KY 857 0.5%</td>
<td>Preble Co. OH 2,575 1.9%</td>
</tr>
<tr>
<td>Kenton Co. KY 696 0.4%</td>
<td>Kenton Co. KY 908 0.7%</td>
</tr>
<tr>
<td>Greene Co. OH 400 0.2%</td>
<td>Dearborn Co. IN 750 0.6%</td>
</tr>
<tr>
<td>Campbell Co. KY 318 0.2%</td>
<td>Union Co. IN 698 0.5%</td>
</tr>
<tr>
<td>Preble Co. OH 239 0.1%</td>
<td>Franklin Co. IN 677 0.5%</td>
</tr>
<tr>
<td>Clinton Co. OH 209 0.1%</td>
<td>Campbell Co. KY 652 0.5%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Clermont

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Clermont County</th>
<th>Number of workers 16+ years of age working in Clermont County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To Number Percent</td>
<td>Commute In From Number Percent</td>
</tr>
<tr>
<td>Hamilton Co. OH 40,090 45.4%</td>
<td>Hamilton Co. OH 8,240 14.7%</td>
</tr>
<tr>
<td>Warren Co. OH 3,269 3.7%</td>
<td>Brown Co. OH 4,802 8.6%</td>
</tr>
<tr>
<td>Butler Co. OH 2,912 3.3%</td>
<td>Warren Co. OH 1,448 2.6%</td>
</tr>
<tr>
<td>Kenton Co. KY 1,630 1.8%</td>
<td>Butler Co. OH 1,072 1.9%</td>
</tr>
<tr>
<td>Boone Co. KY 1,422 1.6%</td>
<td>Kenton Co. KY 761 1.4%</td>
</tr>
<tr>
<td>Campbell Co. KY 744 0.8%</td>
<td>Campbell Co. KY 579 1.0%</td>
</tr>
<tr>
<td>Brown Co. OH 529 0.6%</td>
<td>Adams Co. OH 527 0.9%</td>
</tr>
<tr>
<td>Montgomery Co. OH 433 0.5%</td>
<td>Clinton Co. OH 483 0.9%</td>
</tr>
<tr>
<td>Clinton Co. OH 403 0.5%</td>
<td>Highland Co. OH 427 0.8%</td>
</tr>
<tr>
<td>Dearborn Co. IN 154 0.2%</td>
<td>Boone Co. KY 350 0.6%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.
### Hamilton

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>398,465</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Butler Co. OH</td>
<td>18,452</td>
</tr>
<tr>
<td>Warren Co. OH</td>
<td>9,303</td>
</tr>
<tr>
<td>Clermont Co. OH</td>
<td>8,240</td>
</tr>
<tr>
<td>Kenton Co. KY</td>
<td>7,937</td>
</tr>
<tr>
<td>Boone Co. KY</td>
<td>6,505</td>
</tr>
<tr>
<td>Campbell Co. KY</td>
<td>2,739</td>
</tr>
<tr>
<td>Montgomery Co. OH</td>
<td>1,747</td>
</tr>
<tr>
<td>Dearborn Co. IN</td>
<td>1,335</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>472</td>
</tr>
<tr>
<td>Ripley Co. IN</td>
<td>295</td>
</tr>
</tbody>
</table>

### Warren

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>76,548</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>21,347</td>
</tr>
<tr>
<td>Montgomery Co. OH</td>
<td>11,325</td>
</tr>
<tr>
<td>Butler Co. OH</td>
<td>8,586</td>
</tr>
<tr>
<td>Clermont Co. OH</td>
<td>1,448</td>
</tr>
<tr>
<td>Greene Co. OH</td>
<td>1,321</td>
</tr>
<tr>
<td>Clinton Co. OH</td>
<td>1,038</td>
</tr>
<tr>
<td>Boone Co. KY</td>
<td>337</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>286</td>
</tr>
<tr>
<td>Kenton Co. KY</td>
<td>249</td>
</tr>
<tr>
<td>Clark Co. OH</td>
<td>125</td>
</tr>
</tbody>
</table>

### Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Cincinnati-Hamilton area.

### Factor 6: Topography/Land use/Land cover

The eastern portion of Hamilton County lies in the Till Plains section of the Central Lowland physiographic Province while the western portion of the county lies in the Bluegrass section of the Interior Low Plateau (see Appendix F). The landscape of the county is characterized by wide terraces, flood plains, steep
hillsides along the major rivers and tributary stream valleys, and gently rolling glacial till plains. The altitude varies from about 962 feet down to 455 feet above sea level.

Butler County lies in the Till Plains section of the Central Lowland Province. The topography of the county is rolling hills, river terraces and outwash plains.

Like Butler County, Warren County is located in the Till Plains section of the Central Lowland Province. The western and northern parts of the county are nearly level to gently rolling hills. In the southern and southeastern parts of the county the topography is gently sloping but highly dissected due to numerous streams that are narrow and deeply entrenched.

Clermont County lies in the Till Plains section of the Central Lowland Province. The surface of the county is characterized by deep, narrow valleys and by level interstream areas. From the Ohio River, along the East Fork of the Little Miami River the surface is very broken and hilly.

As shown in the following pie charts, the land use/land cover in Butler and Warren counties is predominately characterized as cropland. Clermont County is nearly 50 percent forest while Hamilton County is split between urban and forest. As expected, Hamilton County has the highest percentage of urban area at 41 percent.
Factor 7: Jurisdictional boundaries

The Cincinnati-Middletown, OH-KY-IN Metropolitan Statistical Area includes the following counties in Indiana: Dearborn, Franklin and Ohio, in Kentucky: Boone, Bracken, Campbell, Gallatin, Grant, Kenton and Pendleton, and in Ohio: Brown, Butler, Clermont, Hamilton and Warren. The principal cities are Cincinnati and Middletown, Ohio.

The Ohio-Kentucky-Indiana regional Council of Governments (OKI) is the planning agency designated as the Metropolitan Planning Organization for the greater Cincinnati area. The OKI region is composed of eight counties in three states: Butler, Clermont, Hamilton and Warren counties in Ohio; Boone, Campbell and Kenton counties in Kentucky; and Dearborn County in Indiana. Please note that the cities of Franklin and Carlisle in Warren County are part of the Miami Valley regional Planning Commission (MVRPC) planning area.

Factor 8: Level of control of emission sources

In Cincinnati-Hamilton area, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal) resulting in air quality improvements in these counties. This region is bounded on the south by the Ohio River. There are coal fired utility plants located along the river with several of them making significant reductions in NO$_x$ and SO$_2$ as a result of the NOx SIP call and CAIR.
Cleveland-Akron-Lorain, OH

Current county nonattainment: Ashtabula (P), Cuyahoga, Lake, Lorain, Medina, Portage and Summit

Recommended county nonattainment: Cuyahoga, Lake, Lorain, Medina, Portage and Summit

Source: Office of Strategic Research, Ohio Department of Development
Discussion:

There are seven counties in this existing PM$_{2.5}$ nonattainment area: Ashtabula (partial), Cuyahoga, Lake, Lorain, Medina, Portage, and Summit counties. Geauga County is part of this metropolitan area but is not included in the existing PM$_{2.5}$ nonattainment area due to very low emissions. Ohio EPA recommends retaining six of the seven counties as nonattainment for the Cleveland-Akron-Lorain area; Cuyahoga and Summit counties have violating monitors, Lake and Lorain counties have high 2005 SO$_2$ emissions and a high commuting pattern into Cuyahoga, Medina also has a high commuting pattern into Cuyahoga County while Portage County has a high number of commuters traveling to Summit County, thus, Ohio EPA considers four of the six counties contributing counties. Ohio EPA recommends excluding Ashtabula County from this nonattainment area. The coal fired utility located in this county has only operated one unit since 2002 and actual emissions are currently 11 tons per day (t/d) whereas allowable emissions (SIP allowable are over 417 t/d). The projections for this area are that this plant will be a source of reductions under CAIR. In addition, Ashtabula County has insignificant emissions, low population and commuting. Ohio EPA believes the above factors demonstrate that Ashtabula is not contributing to the PM$_{2.5}$ problems in this nonattainment area.

Currently, there is not sufficient data to determine if the monitors in Lake or Medina counties are violating the standards. Toward the latter part of 2007, more data will be available in order to make this determination. In addition to Geauga County, the counties of; Erie, Huron, Ashland, Wayne, Columbiana, Mahoning and Trumbull counties are adjacent to this nonattainment area. Mahoning, Trumbull and Columbiana are discussed in the Youngstown-Warren section. Wayne is included within this section and in the Stark County section.

The three-year average of the 98$^{th}$ percentile is being exceeded at five monitors in Cuyahoga County and at both monitors in Summit County. The three-year annual average concentration is being exceeded at five monitors in Cuyahoga County as shown in the tables below.
Factor 1: Air quality data

= Exceeds standard

AQS: 24-Hour Average – 98th Percentile (μg/m³)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-035-0027</td>
<td>Cuyahoga</td>
<td>39.5</td>
<td>35.7</td>
<td>31.5</td>
<td>36</td>
</tr>
<tr>
<td>39-035-0034</td>
<td></td>
<td>32.9</td>
<td>43.8</td>
<td>29.1</td>
<td>35</td>
</tr>
<tr>
<td>39-035-0038</td>
<td></td>
<td>42.5</td>
<td>51.2</td>
<td>36.1</td>
<td>43</td>
</tr>
<tr>
<td>39-035-0045</td>
<td></td>
<td>36.1</td>
<td>46.2</td>
<td>29.5</td>
<td>37</td>
</tr>
<tr>
<td>39-035-0060</td>
<td></td>
<td>42.2</td>
<td>49.5</td>
<td>31.0</td>
<td>41</td>
</tr>
<tr>
<td>39-035-0065</td>
<td></td>
<td>36.1</td>
<td>47.9</td>
<td>27.8</td>
<td>37</td>
</tr>
<tr>
<td>39-035-0066</td>
<td></td>
<td></td>
<td>32.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-035-1002</td>
<td></td>
<td>30.5</td>
<td>41.6</td>
<td>27.7</td>
<td>33</td>
</tr>
<tr>
<td>39-085-1001</td>
<td>Lake</td>
<td>31.8</td>
<td>43.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-085-3002</td>
<td></td>
<td></td>
<td></td>
<td>32.9</td>
<td></td>
</tr>
<tr>
<td>39-093-0016</td>
<td>Lorain</td>
<td>30.0</td>
<td>39.7</td>
<td>24.9</td>
<td>32</td>
</tr>
<tr>
<td>39-093-3002</td>
<td></td>
<td>31.1</td>
<td>33.9</td>
<td>27.4</td>
<td>31</td>
</tr>
<tr>
<td>39-103-0003</td>
<td>Medina</td>
<td></td>
<td>38.8</td>
<td></td>
<td>28.5</td>
</tr>
<tr>
<td>39-133-0002</td>
<td>Portage</td>
<td>29.8</td>
<td>42.2</td>
<td>30.5</td>
<td>34</td>
</tr>
<tr>
<td>39-153-0017</td>
<td>Summit</td>
<td>36.9</td>
<td>45.2</td>
<td>31.5</td>
<td>38</td>
</tr>
<tr>
<td>39-153-0023</td>
<td></td>
<td>37.0</td>
<td>42.3</td>
<td>30.4</td>
<td>37</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture

AQS: Annual Average (μg/m³)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-035-0027</td>
<td>Cuyahoga</td>
<td>15.6</td>
<td>17.3</td>
<td>13.0</td>
<td>15.3</td>
</tr>
<tr>
<td>39-035-0034</td>
<td></td>
<td>12.6</td>
<td>16.3</td>
<td>11.5</td>
<td>13.5</td>
</tr>
<tr>
<td>39-035-0038</td>
<td></td>
<td>17.5</td>
<td>19.2</td>
<td>14.9</td>
<td>17.2</td>
</tr>
<tr>
<td>39-035-0045</td>
<td></td>
<td>15.3</td>
<td>19.3</td>
<td>14.1</td>
<td>16.2</td>
</tr>
<tr>
<td>39-035-0060</td>
<td></td>
<td>16.4</td>
<td>19.4</td>
<td>15.0</td>
<td>16.9</td>
</tr>
<tr>
<td>39-035-0065</td>
<td></td>
<td>15.2</td>
<td>18.6</td>
<td>13.1</td>
<td>15.6</td>
</tr>
<tr>
<td>39-035-0066</td>
<td></td>
<td></td>
<td>11.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-035-1002</td>
<td></td>
<td>13.2</td>
<td>16.8</td>
<td>11.6</td>
<td>13.9</td>
</tr>
<tr>
<td>39-085-1001</td>
<td>Lake</td>
<td>11.6</td>
<td>15.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-085-3002</td>
<td></td>
<td></td>
<td></td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>39-093-0016</td>
<td>Lorain</td>
<td>12.9</td>
<td>16.4</td>
<td>11.5</td>
<td>13.6</td>
</tr>
<tr>
<td>39-093-3002</td>
<td></td>
<td>11.8</td>
<td>14.7</td>
<td>11.4</td>
<td>12.6</td>
</tr>
<tr>
<td>39-103-0003</td>
<td>Medina</td>
<td></td>
<td>15.2</td>
<td></td>
<td>11.9</td>
</tr>
<tr>
<td>39-133-0002</td>
<td>Portage</td>
<td>12.5</td>
<td>15.0</td>
<td>12.0</td>
<td>13.2</td>
</tr>
<tr>
<td>39-153-0017</td>
<td>Summit</td>
<td>15.0</td>
<td>16.4</td>
<td>13.5</td>
<td>15.0</td>
</tr>
<tr>
<td>39-153-0023</td>
<td></td>
<td>13.9</td>
<td>15.7</td>
<td>12.8</td>
<td>14.1</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
Akron Area PM$_{2.5}$ Monitor Locations and Site ID Numbers
### Factor 2: Emissions data (tons per day)

#### 2005

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUYAHOGA</td>
<td>23.97</td>
<td>63.47</td>
<td>6.31</td>
</tr>
<tr>
<td>LORAIN</td>
<td>152.82</td>
<td>42.34</td>
<td>3.46</td>
</tr>
<tr>
<td>MEDINA</td>
<td>1.19</td>
<td>6.91</td>
<td>1.45</td>
</tr>
<tr>
<td>SUMMIT</td>
<td>32.08</td>
<td>19.05</td>
<td>1.64</td>
</tr>
<tr>
<td>PORTAGE</td>
<td>1.02</td>
<td>8.03</td>
<td>1.26</td>
</tr>
<tr>
<td>LAKE</td>
<td>252.71</td>
<td>48.41</td>
<td>1.61</td>
</tr>
<tr>
<td>Ashtabula (P)</td>
<td>13.75</td>
<td>13.27</td>
<td>1.98</td>
</tr>
<tr>
<td>Geauga</td>
<td>0.64</td>
<td>3.75</td>
<td>1.51</td>
</tr>
<tr>
<td>Erie</td>
<td>1.17</td>
<td>8.53</td>
<td>0.83</td>
</tr>
<tr>
<td>Huron</td>
<td>0.57</td>
<td>6.19</td>
<td>0.79</td>
</tr>
<tr>
<td>Ashland</td>
<td>0.52</td>
<td>5.62</td>
<td>1.05</td>
</tr>
<tr>
<td>Wayne</td>
<td>68.69</td>
<td>17.22</td>
<td>1.87</td>
</tr>
</tbody>
</table>

#### 2009

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUYAHOGA</td>
<td>49.21</td>
<td>65.30</td>
<td>6.96</td>
</tr>
<tr>
<td>LORAIN</td>
<td>8.64</td>
<td>20.19</td>
<td>4.82</td>
</tr>
<tr>
<td>MEDINA</td>
<td>0.53</td>
<td>6.05</td>
<td>1.36</td>
</tr>
<tr>
<td>SUMMIT</td>
<td>31.32</td>
<td>16.79</td>
<td>1.51</td>
</tr>
<tr>
<td>PORTAGE</td>
<td>0.67</td>
<td>7.20</td>
<td>1.17</td>
</tr>
<tr>
<td>LAKE</td>
<td>95.77</td>
<td>40.48</td>
<td>4.05</td>
</tr>
<tr>
<td>Ashtabula (P)</td>
<td>14.12</td>
<td>13.85</td>
<td>2.56</td>
</tr>
<tr>
<td>Geauga</td>
<td>0.45</td>
<td>3.14</td>
<td>1.47</td>
</tr>
<tr>
<td>Erie</td>
<td>0.63</td>
<td>8.19</td>
<td>0.73</td>
</tr>
<tr>
<td>Huron</td>
<td>0.38</td>
<td>5.75</td>
<td>0.73</td>
</tr>
<tr>
<td>Ashland</td>
<td>0.29</td>
<td>4.89</td>
<td>1.00</td>
</tr>
<tr>
<td>Wayne</td>
<td>52.12</td>
<td>13.47</td>
<td>3.65</td>
</tr>
</tbody>
</table>
Major Employers
Source: Ohio Department of Development 2007

Most of the major employers in the Cleveland-Akron area are in the categories of manufacturing, government and service as shown below.

**Ashtabula County**

<table>
<thead>
<tr>
<th>Company</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashtabula Area City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Ashtabula County Govt</td>
<td>Government</td>
</tr>
<tr>
<td>Ashtabula County Medical Center</td>
<td>Service</td>
</tr>
<tr>
<td>General Aluminum Mfg Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Kennametal Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Lyondell Chemical Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Masco/KraftMaid Cabinetry</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Molded Fiber Glass Companies</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Premix Inc</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

**Cuyahoga County**

<table>
<thead>
<tr>
<th>Company</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Greetings Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Case Western Reserve University</td>
<td>Service</td>
</tr>
<tr>
<td>Cleveland Clinic Health System</td>
<td>Service</td>
</tr>
<tr>
<td>Continental Airlines</td>
<td>Transportation</td>
</tr>
<tr>
<td>Ford Motor Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>General Motors Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>KeyCorp</td>
<td>Finance</td>
</tr>
<tr>
<td>Lincoln Electric Holding Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>National City Corp</td>
<td>Finance</td>
</tr>
<tr>
<td>Parker Hannifin Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Progressive Corp</td>
<td>Insurance</td>
</tr>
<tr>
<td>Sherwin-Williams Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>University Hospitals Health System</td>
<td>Service</td>
</tr>
</tbody>
</table>

**Lake County**

<table>
<thead>
<tr>
<th>Company</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABB Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Avery Dennison Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Cleveland Clinic Health System</td>
<td>Service</td>
</tr>
<tr>
<td>FirstEnergy Corp</td>
<td>Utility</td>
</tr>
<tr>
<td>Lake County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Lake Hospital System</td>
<td>Service</td>
</tr>
<tr>
<td>Lubrizol Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Mentor Exempted Village Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>STERIS Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Willoughby-Eastlake City Bd of Ed</td>
<td>Government</td>
</tr>
</tbody>
</table>
### Lorain County

<table>
<thead>
<tr>
<th>Company/Institution</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Health Partners</td>
<td>Service</td>
</tr>
<tr>
<td>Elyria City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Emerson Electric/Ridge Tool</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>EMH regional Medical Center</td>
<td>Service</td>
</tr>
<tr>
<td>Ford Motor Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Invacare Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Lorain City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Lorain County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Nordson Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Oberlin College</td>
<td>Service</td>
</tr>
<tr>
<td>PolyOne Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Republic Engineered Products Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
</tbody>
</table>

### Portage County

<table>
<thead>
<tr>
<th>Company/Institution</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Manufacturing Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>General Electric Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Kent City Board of Education</td>
<td>Government</td>
</tr>
<tr>
<td>Kent State University</td>
<td>Government</td>
</tr>
<tr>
<td>McMaster-Carr Supply Co</td>
<td>Trade</td>
</tr>
<tr>
<td>Ravenna City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Robinson Memorial Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
<tr>
<td>Step2 Company</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

### Summit County

<table>
<thead>
<tr>
<th>Company/Institution</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akron City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Akron General Health System</td>
<td>Service</td>
</tr>
<tr>
<td>Children's Hospital Medical Center</td>
<td>Service</td>
</tr>
<tr>
<td>Chrysler LLC</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Diebold Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>FirstEnergy Corp</td>
<td>Utility</td>
</tr>
<tr>
<td>Goodyear Tire &amp; Rubber Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Jo-Ann Stores Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>McDermott Int'l/Babcock &amp; Wilcox</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Signet Group plc/Sterling Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Summa Health System</td>
<td>Service</td>
</tr>
<tr>
<td>University of Akron</td>
<td>Government</td>
</tr>
</tbody>
</table>

### Factor 3: Population and Projected Growth

Sources: Office of Strategic Research, Ohio Department of Development

U.S. Census Bureau Population Estimates Program 2007

The largest populated places in the Cleveland-Akron-Lorain area are; the greater Cleveland area in Cuyahoga County; Elyria, Avon and North Ridgeville in Lorain County; Medina, Brunswick and Wadsworth in Medina County; Akron, Barberton, Cuyahoga Falls and Stow in Summit County; Kent and Ravenna in Portage County; Chardon and Middlefield in Geauga County; Mentor, Willoughby and Eastlake in Lake County; and Conneaut and Ashtabula in Ashtabula County.
As indicated in the following table and graphs, Cuyahoga County has the highest population in this area, however it is projected steadily decrease. The population in the surrounding counties is remaining generally constant with slight trends upward with Medina County having the most significant upward trend.

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuyahoga</td>
<td>1,346,194</td>
<td>1,330,428</td>
<td>1,314,241</td>
<td>1,332,540</td>
<td>1,301,870</td>
<td>1,274,020</td>
</tr>
<tr>
<td>Lake</td>
<td>232,059</td>
<td>232,416</td>
<td>232,892</td>
<td>233,890</td>
<td>234,520</td>
<td>232,350</td>
</tr>
<tr>
<td>Lorain</td>
<td>296,717</td>
<td>300,266</td>
<td>301,993</td>
<td>290,840</td>
<td>299,630</td>
<td>312,540</td>
</tr>
<tr>
<td>Medina</td>
<td>164,644</td>
<td>166,968</td>
<td>169,353</td>
<td>173,760</td>
<td>191,850</td>
<td>206,770</td>
</tr>
<tr>
<td>Portage</td>
<td>155,079</td>
<td>155,150</td>
<td>155,012</td>
<td>158,160</td>
<td>161,660</td>
<td>161,880</td>
</tr>
<tr>
<td>Summit</td>
<td>546,366</td>
<td>546,285</td>
<td>545,931</td>
<td>557,660</td>
<td>564,810</td>
<td>564,210</td>
</tr>
<tr>
<td>Ashtabula (P)</td>
<td>102,960</td>
<td>103,044</td>
<td>102,703</td>
<td>104,970</td>
<td>106,090</td>
<td>106,420</td>
</tr>
<tr>
<td>Geauga</td>
<td>94,379</td>
<td>95,060</td>
<td>95,676</td>
<td>98,820</td>
<td>104,810</td>
<td>109,180</td>
</tr>
<tr>
<td>Erie</td>
<td>78,830</td>
<td>78,374</td>
<td>78,116</td>
<td>81,420</td>
<td>82,400</td>
<td>83,060</td>
</tr>
<tr>
<td>Huron</td>
<td>60,129</td>
<td>60,291</td>
<td>60,313</td>
<td>62,040</td>
<td>63,430</td>
<td>64,020</td>
</tr>
<tr>
<td>Ashland</td>
<td>53,848</td>
<td>54,184</td>
<td>54,727</td>
<td>56,160</td>
<td>59,010</td>
<td>61,050</td>
</tr>
<tr>
<td>Wayne</td>
<td>113,086</td>
<td>113,496</td>
<td>113,950</td>
<td>119,850</td>
<td>128,670</td>
<td>136,690</td>
</tr>
</tbody>
</table>

Ashtabula County

![Ashtabula County Population Chart]

Cuyahoga County

![Cuyahoga County Population Chart]
Factor 4: Traffic and commuting patterns

The kDVMT within the Cleveland-Akron-Lorain area have had an upward trend with the exception of Lorain County that has had a slight downward trend. Ashtabula experienced the most increase between 2005 and 2006 with 71.76 kDVMT. As expected, Cuyahoga has the overall highest kDVMT in the 28,000 range and Ashtabula has the lowest kDVMT in the 2,900 range as shown in the following graphs.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)
Source: Ohio Department of Transportation, Office of Technical Services

Ashtabula County: Total County kDVMT 1990-2006

2004 = 2914.48  2005 = 2887.77  2006 = 2959.53
Cuyahoga County: Total County kDVMT 1990-2006

Lake County: Total County kDVMT 1990-2006

Cuyahoga County receives the most of its work-commuters from Lorain, Lake and Summit counties and the least from Wayne County. Portage and Cuyahoga counties provide the most commuters to Summit County and Ashtabula has the least as shown in the tables below.
## Ashtabula

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Ashtabula County</th>
<th>Number of workers 16+ years of age working in Ashtabula County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute Out To</strong></td>
<td><strong>Commute In From</strong></td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>Lake Co. OH</td>
</tr>
<tr>
<td>5,775</td>
<td>1,200</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>Trumbull Co. OH</td>
</tr>
<tr>
<td>2,683</td>
<td>892</td>
</tr>
<tr>
<td>Geauga Co. OH</td>
<td>Crawford Co. PA</td>
</tr>
<tr>
<td>2,265</td>
<td>644</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>Erie Co. PA</td>
</tr>
<tr>
<td>485</td>
<td>569</td>
</tr>
<tr>
<td>Erie Co. PA</td>
<td>Cuyahoga Co. OH</td>
</tr>
<tr>
<td>412</td>
<td>397</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>Geauga Co. OH</td>
</tr>
<tr>
<td>151</td>
<td>257</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>Summit Co. OH</td>
</tr>
<tr>
<td>134</td>
<td>196</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>Mercer Co. PA</td>
</tr>
<tr>
<td>113</td>
<td>146</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>Lorain Co. OH</td>
</tr>
<tr>
<td>100</td>
<td>138</td>
</tr>
<tr>
<td>Crawford Co. PA</td>
<td>Portage Co. OH</td>
</tr>
<tr>
<td>91</td>
<td>127</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Percent of workers that work outside the county
27.9%

### Average commute time in minutes
23.9

## Cuyahoga

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Cuyahoga County</th>
<th>Number of workers 16+ years of age working in Cuyahoga County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute Out To</strong></td>
<td><strong>Commute In From</strong></td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>Lorain Co. OH</td>
</tr>
<tr>
<td>15,692</td>
<td>36,888</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>Lake Co. OH</td>
</tr>
<tr>
<td>14,207</td>
<td>36,741</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>Summit Co. OH</td>
</tr>
<tr>
<td>9,289</td>
<td>34,476</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>Medina Co. OH</td>
</tr>
<tr>
<td>4,795</td>
<td>26,572</td>
</tr>
<tr>
<td>Geauga Co. OH</td>
<td>Geauga Co. OH</td>
</tr>
<tr>
<td>2,973</td>
<td>16,676</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>Portage Co. OH</td>
</tr>
<tr>
<td>2,632</td>
<td>11,934</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>Ashtabula Co. OH</td>
</tr>
<tr>
<td>565</td>
<td>2,683</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>Stark Co. OH</td>
</tr>
<tr>
<td>524</td>
<td>2,443</td>
</tr>
<tr>
<td>Ashtabula Co. OH</td>
<td>Trumbull Co. OH</td>
</tr>
<tr>
<td>397</td>
<td>1,976</td>
</tr>
<tr>
<td>Cook Co. IL</td>
<td>Wayne Co. OH</td>
</tr>
<tr>
<td>298</td>
<td>1,193</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Percent of workers that work outside the county
9.1%

### Average commute time in minutes
24.4
### Geauga

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Geauga County</th>
<th>Number of workers 16+ years of age working in Geauga County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Commute In From</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>Cuyahoga Co. OH</td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>Lake Co. OH</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>Summit Co. OH</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>Ashtabula Co. OH</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>Portage Co. OH</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>Summ Co. OH</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>Mahoning Co. OH</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>Lorain Co. OH</td>
</tr>
<tr>
<td></td>
<td>Mercer Co. PA</td>
</tr>
<tr>
<td></td>
<td>Percent is of workers living in county.</td>
</tr>
<tr>
<td>Number of workers 16+ years of age living in Geauga County</td>
<td>Number of workers 16+ years of age working in Geauga County</td>
</tr>
<tr>
<td>Commute Out To</td>
<td>Commute In From</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>Cuyahoga Co. OH</td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>Lake Co. OH</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>Summit Co. OH</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>Ashtabula Co. OH</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>Portage Co. OH</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>Summ Co. OH</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>Mahoning Co. OH</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>Lorain Co. OH</td>
</tr>
<tr>
<td></td>
<td>Mercer Co. PA</td>
</tr>
<tr>
<td></td>
<td>Percent is of workers working in county.</td>
</tr>
</tbody>
</table>

### Lake

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Lake County</th>
<th>Number of workers 16+ years of age working in Lake County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Commute In From</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>Cuyahoga Co. OH</td>
</tr>
<tr>
<td>Geauga Co. OH</td>
<td>Ashtabula Co. OH</td>
</tr>
<tr>
<td>Ashtabula Co. OH</td>
<td>Geauga Co. OH</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>Summit Co. OH</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>Portage Co. OH</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>Lorain Co. OH</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>Medina Co. OH</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>Stark Co. OH</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>Trumbull Co. OH</td>
</tr>
<tr>
<td></td>
<td>Percent is of workers living in county.</td>
</tr>
<tr>
<td>Number of workers 16+ years of age living in Lake County</td>
<td>Number of workers 16+ years of age working in Lake County</td>
</tr>
<tr>
<td>Commute Out To</td>
<td>Commute In From</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>Cuyahoga Co. OH</td>
</tr>
<tr>
<td>Geauga Co. OH</td>
<td>Ashtabula Co. OH</td>
</tr>
<tr>
<td>Ashtabula Co. OH</td>
<td>Geauga Co. OH</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>Summit Co. OH</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>Portage Co. OH</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>Lorain Co. OH</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>Medina Co. OH</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>Stark Co. OH</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>Trumbull Co. OH</td>
</tr>
<tr>
<td></td>
<td>Percent is of workers working in county.</td>
</tr>
</tbody>
</table>

### Lorain

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Lorain County</th>
<th>Number of workers 16+ years of age working in Lorain County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Commute In From</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>Cuyahoga Co. OH</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>Erie Co. OH</td>
</tr>
<tr>
<td>Erie Co. OH</td>
<td>Huron Co. OH</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>Medina Co. OH</td>
</tr>
<tr>
<td>Huron Co. OH</td>
<td>Ashland Co. OH</td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>Summit Co. OH</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>Lake Co. OH</td>
</tr>
<tr>
<td>Ashtabula Co. OH</td>
<td>Portage Co. OH</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>Wayne Co. OH</td>
</tr>
<tr>
<td></td>
<td>Percent is of workers living in county.</td>
</tr>
<tr>
<td>Number of workers 16+ years of age living in Lorain County</td>
<td>Number of workers 16+ years of age working in Lorain County</td>
</tr>
<tr>
<td>Commute Out To</td>
<td>Commute In From</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>Cuyahoga Co. OH</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>Erie Co. OH</td>
</tr>
<tr>
<td>Erie Co. OH</td>
<td>Huron Co. OH</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>Medina Co. OH</td>
</tr>
<tr>
<td>Huron Co. OH</td>
<td>Ashland Co. OH</td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>Summit Co. OH</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>Lake Co. OH</td>
</tr>
<tr>
<td>Ashtabula Co. OH</td>
<td>Portage Co. OH</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>Wayne Co. OH</td>
</tr>
<tr>
<td></td>
<td>Percent is of workers working in county.</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.
### Medina

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Medina County</th>
<th>76,548</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute Out To</strong></td>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>26,572</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>8,647</td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>1,726</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>1,418</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>445</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>322</td>
</tr>
<tr>
<td>Ashland Co. OH</td>
<td>307</td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>307</td>
</tr>
<tr>
<td>Richland Co. OH</td>
<td>148</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Medina County</th>
<th>55,311</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute In From</strong></td>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>5,248</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>4,795</td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>4,667</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>1,874</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>770</td>
</tr>
<tr>
<td>Ashland Co. OH</td>
<td>720</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>314</td>
</tr>
<tr>
<td>Huron Co. OH</td>
<td>102</td>
</tr>
<tr>
<td>Richland Co. OH</td>
<td>89</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Portage

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Portage County</th>
<th>78,023</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute Out To</strong></td>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>19,049</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>11,934</td>
</tr>
<tr>
<td>Geauga Co. OH</td>
<td>1,989</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>1,578</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>1,449</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>603</td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>436</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>314</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>182</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>152</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Portage County</th>
<th>60,123</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute In From</strong></td>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>9,702</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>2,632</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>2,256</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>1,863</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>1,171</td>
</tr>
<tr>
<td>Geauga Co. OH</td>
<td>1,002</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>322</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>316</td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>307</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>182</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.
**Summit**

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Summit County</th>
<th>258,414</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>34,476</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>9,702</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>7,665</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>5,248</td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>1,148</td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>1,095</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>588</td>
</tr>
<tr>
<td>Geauga Co. OH</td>
<td>563</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>460</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Summit County</th>
<th>270,431</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>21,094</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>19,049</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>14,207</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>8,647</td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>3,948</td>
</tr>
<tr>
<td>Lake Co. OH</td>
<td>1,157</td>
</tr>
<tr>
<td>Geauga Co. OH</td>
<td>1,130</td>
</tr>
<tr>
<td>Mahoning Co. OH</td>
<td>1,096</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>1,038</td>
</tr>
</tbody>
</table>

**Wayne**

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Wayne County</th>
<th>54,487</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>4,667</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>3,948</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>1,672</td>
</tr>
<tr>
<td>Holmes Co. OH</td>
<td>1,247</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>1,193</td>
</tr>
<tr>
<td>Ashland Co. OH</td>
<td>565</td>
</tr>
<tr>
<td>Richland Co. OH</td>
<td>297</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>145</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Wayne County</th>
<th>52,259</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>3,026</td>
</tr>
<tr>
<td>Holmes Co. OH</td>
<td>2,411</td>
</tr>
<tr>
<td>Medina Co. OH</td>
<td>1,726</td>
</tr>
<tr>
<td>Ashland Co. OH</td>
<td>1,712</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>1,095</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>688</td>
</tr>
<tr>
<td>Richland Co. OH</td>
<td>443</td>
</tr>
<tr>
<td>Coshocton Co. OH</td>
<td>178</td>
</tr>
</tbody>
</table>

**Factor 5: Meteorology**

Please refer to Appendix E for applicable meteorology information for the Cleveland-Akron area.

**Factor 6: Topography/Land use/Land cover**

Cuyahoga County is one of the most highly urbanized counties in Ohio. It is located within two physiographic Provinces: the glaciated Allegheny Plateau of the Appalachian Plateaus Province on the south and east and the Huron-Erie Lake Plains and Till Plains sections of the Central Lowland Province on the west and north (see Appendix F). The shore of Lake Erie is 569 feet above sea level. The city of Cleveland lies on a series of irregular bluffs lying roughly parallel to the lake. The land rises quickly from the lakeshore with an elevation of 791 feet above sea level at the Hopkins Airport five miles inland from the lake.
Lorain County is located on the eastern fringe of the till plain area of the Great Central Lowlands. The topography is generally flat to gently rolling. Exceptions to the nearly flat topography are the gorges of the Black River near Elyria and the Vermillion River at Mill Hollow.

Medina County includes parts of two physiographic Provinces; the Great Central Lowlands and the glaciated part of the Appalachian Plateau, each making up about half the county. The topography is generally level to sloping along stream valleys. The elevation ranges from 765 to 1,325 feet above sea level.

Summit County lies entirely within the glaciated Allegheny Plateau region. In the southern portion of the county, the topography is made up of a series of glacial till-covered plateaus and outwash-filled valleys. Elevations of the plateau are between 1,100 and 1,200 feet above sea level and the valleys are about 950 to 1,000 feet. The northern portion of the county has greater elevation because the old valley fill has been dissected by the Cuyahoga River and its tributaries. The highest point in Summit County is 1,320 feet near West Richfield. The lowest point is about eight miles away, along the Cuyahoga River where the river leaves the county.

Portage County is located in the northwestern part of the glaciated Allegheny Plateau and lies on the divide between the Lake Erie and the Ohio River basins. The relief of the county is generally level with gently rolling plateaus. Elevation ranges from 910 feet to 1,340.

Geauga County is part of the Appalachian Plateau region. The relief of the county is primarily gently sloping and steeper slopes along streams. The lowest elevation is 770 feet along the Chagrin River at the Geauga-Lake County line, and the highest elevation is 1,396 feet at Sugarloaf Mountain in the south-central part of the county.

Ashtabula County is in two contrasting major physiographic Provinces. The northern part of the county is in the Eastern Lake Section of the Central Lowland Province while the southern part of the county is in the Southern New York Section of the Appalachian Plateau Province. The relief of the county is primarily level and gently undulating in the northern, western and south central parts of the county. Elevation ranges from 572 feet to 1,100 feet above sea level, with steep areas along the streams.

As shown in the following pie charts, the land use/land cover in Cuyahoga and Summit counties, as expected is predominately residential, commercial and industrial. However, both have fairly large percentages of forest areas like Portage, Lake and Ashtabula counties. Lorain County has the largest percentage of cropland with Ashtabula and Portage coming in a close second and third.
Factor 7:  **Jurisdictional boundaries**

The Cleveland-Elyria-Mentor, OH Metropolitan Statistical Area includes Cuyahoga, Geauga, Lake, Lorain and Medina counties in Ohio. The principal cities are Cleveland, Elyria and Mentor.

The Northeast Ohio Areawide coordinating Agency (NOACA) is the planning agency designated as the Metropolitan Planning Organization for the greater Cleveland area. The NOACA region is composed of five counties: Cuyahoga, Geauga, Lake, Lorain and Medina.

The Akron Metropolitan Area Transportation Study (AMATS) is the planning agency designated as the MPO for the Akron area. The AMATS region is composed of two counties: Summit and Portage.

Factor 8:  **Level of control of emission sources**

In the Cleveland-Akron-Lorain area, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- on-road motor vehicle control program
- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)
- NO$_x$ RACT
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities
CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal) affecting this area.
**Columbus, OH**

**Current** county nonattainment:
Delaware, Fairfield, Franklin, Licking, Coshocton

---

**Recommended** county nonattainment:
Delaware, Fairfield, Franklin, Licking

---

Source: Office of Strategic Research, Ohio Department of Development
Discussion

There are three total monitors in the Columbus area, all located in Franklin County. Franklin County contains two violating monitors. Delaware, Fairfield and Licking counties are included in the nonattainment area due to the current significant population, projected upward trend in growth and significant commuting into Franklin County. As a result they are considered contributing counties. The exception is Coshocton County which is included as a partial county in the nonattainment area. The Conesville power plant is located in Coshocton County and is a source of significant emissions. However, the facility is installing additional scrubbers and has installed NOx controls in response to the CAIR and NOx trading programs, respectively. Ohio EPA does not believe the emissions from the Conesville power plant will contribute to future violations at the monitors located in Franklin County and therefore is recommending that Coshocton County be excluded from this nonattainment area. The adjacent counties of Marion, Union, Madison, Pickaway, Hocking, Perry, Muskingum, and Knox have low emissions, low population and insignificant commuting into Franklin County and do not warrant further discussion.

The three-year average of the 98th percentile is being exceeded at two monitors in Franklin County. The three-year annual average concentration is not being exceeded at any of the monitors in Franklin County as shown in the tables below.

Factor 1:  Air quality data

![Exceeds standard]

AQS: 24-Hour Average – 98th Percentile (μg/m³)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-049-0024</td>
<td>Franklin</td>
<td>35.1</td>
<td>45.0</td>
<td>34.0</td>
<td>38</td>
</tr>
<tr>
<td>39-049-0025</td>
<td>Franklin</td>
<td>35.5</td>
<td>44.9</td>
<td>34.0</td>
<td>38</td>
</tr>
<tr>
<td>39-049-0081</td>
<td>Franklin</td>
<td>34.1</td>
<td>34.7</td>
<td>31.2</td>
<td>33</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture

AQS: Annual Average (μg/m³)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-049-0024</td>
<td>Franklin</td>
<td>15.0</td>
<td>16.4</td>
<td>13.6</td>
<td>15.0</td>
</tr>
<tr>
<td>39-049-0025</td>
<td>Franklin</td>
<td>14.6</td>
<td>16.5</td>
<td>13.8</td>
<td>15.0</td>
</tr>
<tr>
<td>39-049-0081</td>
<td>Franklin</td>
<td>13.6</td>
<td>14.6</td>
<td>12.9</td>
<td>13.7</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
Columbus PM$_{2.5}$ Monitor Locations and Site ID Numbers
## Factor 2: Emission data (tons per day)

### 2005

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM&lt;sub&gt;2.5&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRANKLIN</td>
<td>6.52</td>
<td>105.67</td>
<td>4.44</td>
</tr>
<tr>
<td>DELAWARE</td>
<td>1.34</td>
<td>18.64</td>
<td>1.22</td>
</tr>
<tr>
<td>FAIRFIELD</td>
<td>1.42</td>
<td>16.89</td>
<td>1.46</td>
</tr>
<tr>
<td>LICKING</td>
<td>1.23</td>
<td>20.30</td>
<td>3.54</td>
</tr>
<tr>
<td>Coshocton (P)</td>
<td>364.00</td>
<td>55.98</td>
<td>2.75</td>
</tr>
<tr>
<td>Knox</td>
<td>0.38</td>
<td>5.86</td>
<td>0.68</td>
</tr>
<tr>
<td>Morrow</td>
<td>0.40</td>
<td>6.81</td>
<td>0.54</td>
</tr>
<tr>
<td>Marion</td>
<td>1.59</td>
<td>9.82</td>
<td>1.17</td>
</tr>
<tr>
<td>Union</td>
<td>0.72</td>
<td>6.73</td>
<td>0.49</td>
</tr>
<tr>
<td>Madison</td>
<td>0.53</td>
<td>9.08</td>
<td>0.47</td>
</tr>
<tr>
<td>Fayette</td>
<td>0.37</td>
<td>5.97</td>
<td>0.41</td>
</tr>
<tr>
<td>Pickaway</td>
<td>33.08</td>
<td>12.19</td>
<td>0.89</td>
</tr>
<tr>
<td>Ross</td>
<td>64.54</td>
<td>17.99</td>
<td>1.16</td>
</tr>
<tr>
<td>Hocking</td>
<td>0.28</td>
<td>5.46</td>
<td>0.57</td>
</tr>
<tr>
<td>Muskingum</td>
<td>1.74</td>
<td>12.01</td>
<td>1.30</td>
</tr>
<tr>
<td>Perry</td>
<td>0.19</td>
<td>3.89</td>
<td>0.48</td>
</tr>
</tbody>
</table>

### 2009

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM&lt;sub&gt;2.5&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRANKLIN</td>
<td>3.35</td>
<td>107.23</td>
<td>4.10</td>
</tr>
<tr>
<td>DELAWARE</td>
<td>0.57</td>
<td>19.19</td>
<td>1.11</td>
</tr>
<tr>
<td>FAIRFIELD</td>
<td>0.90</td>
<td>15.49</td>
<td>1.37</td>
</tr>
<tr>
<td>LICKING</td>
<td>0.67</td>
<td>19.52</td>
<td>3.44</td>
</tr>
<tr>
<td>Coshocton (P)</td>
<td>103.71</td>
<td>17.80</td>
<td>6.73</td>
</tr>
<tr>
<td>Knox</td>
<td>0.15</td>
<td>5.06</td>
<td>0.64</td>
</tr>
<tr>
<td>Morrow</td>
<td>0.21</td>
<td>6.73</td>
<td>0.49</td>
</tr>
<tr>
<td>Marion</td>
<td>1.33</td>
<td>11.31</td>
<td>1.16</td>
</tr>
<tr>
<td>Union</td>
<td>0.37</td>
<td>8.05</td>
<td>0.45</td>
</tr>
<tr>
<td>Madison</td>
<td>0.19</td>
<td>8.71</td>
<td>0.39</td>
</tr>
<tr>
<td>Fayette</td>
<td>0.14</td>
<td>6.26</td>
<td>0.37</td>
</tr>
<tr>
<td>Pickaway</td>
<td>0.35</td>
<td>9.99</td>
<td>0.80</td>
</tr>
<tr>
<td>Ross</td>
<td>64.33</td>
<td>19.16</td>
<td>1.16</td>
</tr>
<tr>
<td>Hocking</td>
<td>0.22</td>
<td>5.40</td>
<td>0.56</td>
</tr>
<tr>
<td>Muskingum</td>
<td>1.49</td>
<td>11.17</td>
<td>1.25</td>
</tr>
<tr>
<td>Perry</td>
<td>0.10</td>
<td>4.12</td>
<td>0.47</td>
</tr>
</tbody>
</table>
Major Employers  
Source: Ohio Department of Development 2007

Most of the major employers in the Columbus area are in the categories of manufacturing, government, service and trade as shown below.

**Delaware County**

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delaware City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>JP Morgan Chase &amp; Co</td>
<td>Finance</td>
</tr>
<tr>
<td>Kroger Co</td>
<td>Trade</td>
</tr>
<tr>
<td>McGraw Hill Companies</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Ohio Wesleyan University</td>
<td>Service</td>
</tr>
<tr>
<td>OhioHealth/Grady Memorial Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Olentangy Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>PPG Industries Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Showa Corp/American Showa Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
</tbody>
</table>

**Fairfield County**

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor Hocking Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Cyril-Scott Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Fairfield Medical Center</td>
<td>Service</td>
</tr>
<tr>
<td>Kroger Co</td>
<td>Trade</td>
</tr>
<tr>
<td>Lancaster City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>McDermott Int’l/Diamond Power</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Meijer Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Pickerington Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Ralcorp/Ralston Foods</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
</tbody>
</table>

**Franklin County**

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott Laboratories/Ross Products</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>American Electric Power Co</td>
<td>Utility</td>
</tr>
<tr>
<td>Battelle Memorial Institute</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>Cardinal Health Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Huntington Bancshares Inc</td>
<td>Finance</td>
</tr>
<tr>
<td>JP Morgan Chase &amp; Co</td>
<td>Finance</td>
</tr>
<tr>
<td>Limited Brands Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>National City Corp</td>
<td>Finance</td>
</tr>
<tr>
<td>Nationwide Mutual Insurance Co</td>
<td>Insurance</td>
</tr>
<tr>
<td>Ohio State University</td>
<td>Government</td>
</tr>
<tr>
<td>OhioHealth</td>
<td>Service</td>
</tr>
<tr>
<td>Schottenstein Stores Corp</td>
<td>Trade</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
<tr>
<td>Wendy’s International Inc</td>
<td>Trade</td>
</tr>
</tbody>
</table>
**Licking County**

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anomatic Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>ArvinMeritor Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Boeing Co</td>
<td>Service</td>
</tr>
<tr>
<td>Denison University</td>
<td>Service</td>
</tr>
<tr>
<td>Kroger Co</td>
<td>Trade</td>
</tr>
<tr>
<td>Licking Memorial Health Systems</td>
<td>Service</td>
</tr>
<tr>
<td>Newark City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Owens-Corning</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>State Farm Mutual Automobile Ins Co</td>
<td>Insurance</td>
</tr>
</tbody>
</table>

**Coshocton County**

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK Steel Holding Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>American Electric Power Co</td>
<td>Utility</td>
</tr>
<tr>
<td>Coshocton City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Coshocton County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Coshocton County Memorial Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Kraft Foods Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>McWane Corp/Clow Water Systems</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Riverview Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Smurfit-Stone Container Corp</td>
<td>Government</td>
</tr>
</tbody>
</table>

**Factor 3: Population and Projected Growth**

Sources: Office of Strategic Research, Ohio Department of Development  
U.S. Census Bureau Population Estimates Program 2007

The largest populated places in the Columbus area are; the greater Columbus area in Franklin County; Delaware, Powell and Sunbury in Delaware County; Lancaster and Canal Winchester and Pickerington in Fairfield County; Newark, Pataskala, Heath and Hebron in Licking County; Coshocton in Coshocton County.

As expected, Franklin County has the highest population in this area. All of the surrounding counties are projected to experience an upward trend in population as shown in the table below.
<table>
<thead>
<tr>
<th>COUNTY</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delaware</td>
<td>142,849</td>
<td>150,496</td>
<td>156,697</td>
<td>161,730</td>
<td>215,480</td>
<td>266,200</td>
</tr>
<tr>
<td>Fairfield</td>
<td>135,857</td>
<td>138,403</td>
<td>140,591</td>
<td>143,860</td>
<td>169,540</td>
<td>201,010</td>
</tr>
<tr>
<td>Franklin</td>
<td>1,086,152</td>
<td>1,089,365</td>
<td>1,095,662</td>
<td>1,155,910</td>
<td>1,238,250</td>
<td>1,326,180</td>
</tr>
<tr>
<td>Licking</td>
<td>152,699</td>
<td>154,683</td>
<td>156,287</td>
<td>161,280</td>
<td>179,050</td>
<td>198,760</td>
</tr>
<tr>
<td>Coshocton (P)</td>
<td>37,070</td>
<td>36,969</td>
<td>36,976</td>
<td>37,070</td>
<td>37,700</td>
<td>37,610</td>
</tr>
<tr>
<td>Knox</td>
<td>57,676</td>
<td>58,207</td>
<td>58,561</td>
<td>60,600</td>
<td>65,940</td>
<td>69,890</td>
</tr>
<tr>
<td>Morrow</td>
<td>34,080</td>
<td>34,309</td>
<td>34,529</td>
<td>34,410</td>
<td>36,890</td>
<td>38,650</td>
</tr>
<tr>
<td>Marion</td>
<td>66,031</td>
<td>65,834</td>
<td>65,583</td>
<td>66,210</td>
<td>67,190</td>
<td>68,200</td>
</tr>
<tr>
<td>Union</td>
<td>44,689</td>
<td>45,600</td>
<td>46,702</td>
<td>50,740</td>
<td>64,570</td>
<td>85,190</td>
</tr>
<tr>
<td>Madison</td>
<td>40,927</td>
<td>41,220</td>
<td>41,496</td>
<td>43,130</td>
<td>45,190</td>
<td>46,520</td>
</tr>
<tr>
<td>Fayette</td>
<td>28,044</td>
<td>28,193</td>
<td>28,305</td>
<td>28,680</td>
<td>29,570</td>
<td>30,290</td>
</tr>
<tr>
<td>Pickaway</td>
<td>52,010</td>
<td>52,837</td>
<td>53,606</td>
<td>55,680</td>
<td>58,200</td>
<td>59,980</td>
</tr>
<tr>
<td>Ross</td>
<td>74,749</td>
<td>75,135</td>
<td>75,556</td>
<td>78,380</td>
<td>82,930</td>
<td>87,430</td>
</tr>
<tr>
<td>Hocking</td>
<td>28,864</td>
<td>28,927</td>
<td>28,973</td>
<td>29,840</td>
<td>31,000</td>
<td>31,500</td>
</tr>
<tr>
<td>Muskingum</td>
<td>85,419</td>
<td>85,606</td>
<td>86,125</td>
<td>87,300</td>
<td>91,140</td>
<td>94,560</td>
</tr>
<tr>
<td>Perry</td>
<td>35,033</td>
<td>35,106</td>
<td>35,313</td>
<td>36,920</td>
<td>39,500</td>
<td>41,990</td>
</tr>
</tbody>
</table>

### Delaware County

![Population Chart for Delaware County](chart1.png)

### Fairfield County

![Population Chart for Fairfield County](chart2.png)
Factor 4:  Traffic and commuting patterns

The kDVMT between 2004 and 2006 in the Columbus area have remained fairly constant as shown in the graphs below. Franklin County has the highest level of kDVMT and Coshocton has the lowest. Franklin County was the only county in this area to have an increase in kDMVT between 2005 and 2006.
Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

Source: Ohio Department of Transportation, Office of Technical Services

### Delaware County: Total County kDVMT 1990-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>kDVMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>4264.16</td>
</tr>
<tr>
<td>2005</td>
<td>4211.03</td>
</tr>
<tr>
<td>2006</td>
<td>4207.91</td>
</tr>
</tbody>
</table>

### Fairfield County: Total County kDVMT 1990-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>kDVMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>3045.87</td>
</tr>
<tr>
<td>2005</td>
<td>3060.66</td>
</tr>
<tr>
<td>2006</td>
<td>2916.9</td>
</tr>
</tbody>
</table>
Commuter Patterns
Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Delaware, Fairfield and Licking counties each have a high level of commuters traveling into Franklin County. The majority of Franklin County workers commuting outside the county, travel to Delaware County. Coshocton County has a low level of commuting and a very insignificant number traveling to Franklin County.

<table>
<thead>
<tr>
<th>Delaware</th>
<th>Percent of workers that work outside the county</th>
<th>63.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average commute time in minutes</td>
<td>26.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Delaware County</th>
<th>57,840</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>31,708</td>
</tr>
<tr>
<td>Union Co. OH</td>
<td>1,782</td>
</tr>
<tr>
<td>Marion Co. OH</td>
<td>839</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>374</td>
</tr>
<tr>
<td>Knox Co. OH</td>
<td>218</td>
</tr>
<tr>
<td>Logan Co. OH</td>
<td>200</td>
</tr>
<tr>
<td>Morrow Co. OH</td>
<td>172</td>
</tr>
<tr>
<td>Madison Co. OH</td>
<td>111</td>
</tr>
<tr>
<td>Fairfield Co. OH</td>
<td>102</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Delaware County</th>
<th>43,463</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>14,222</td>
</tr>
<tr>
<td>Morrow Co. OH</td>
<td>1,983</td>
</tr>
<tr>
<td>Marion Co. OH</td>
<td>1,609</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>900</td>
</tr>
<tr>
<td>Union Co. OH</td>
<td>890</td>
</tr>
<tr>
<td>Knox Co. OH</td>
<td>831</td>
</tr>
<tr>
<td>Fairfield Co. OH</td>
<td>395</td>
</tr>
<tr>
<td>Madison Co. OH</td>
<td>174</td>
</tr>
<tr>
<td>Richland Co. OH</td>
<td>129</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.
### Fairfield

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>60,465</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To Number</td>
<td>Percent</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>28,259</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>1,563</td>
</tr>
<tr>
<td>Pickaway Co. OH</td>
<td>1,289</td>
</tr>
<tr>
<td>Delaware Co. OH</td>
<td>395</td>
</tr>
<tr>
<td>Hocking Co. OH</td>
<td>361</td>
</tr>
<tr>
<td>Perry Co. OH</td>
<td>273</td>
</tr>
<tr>
<td>Ross Co. OH</td>
<td>255</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>158</td>
</tr>
<tr>
<td>Athens Co. OH</td>
<td>142</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>36,957</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From Number</td>
<td>Percent</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>3,261</td>
</tr>
<tr>
<td>Perry Co. OH</td>
<td>1,980</td>
</tr>
<tr>
<td>Hocking Co. OH</td>
<td>1,897</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>915</td>
</tr>
<tr>
<td>Athens Co. OH</td>
<td>431</td>
</tr>
<tr>
<td>Pickaway Co. OH</td>
<td>349</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>211</td>
</tr>
<tr>
<td>Ross Co. OH</td>
<td>191</td>
</tr>
<tr>
<td>Delaware Co. OH</td>
<td>102</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Franklin

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>548,655</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To Number</td>
<td>Percent</td>
</tr>
<tr>
<td>Delaware Co. OH</td>
<td>14,222</td>
</tr>
<tr>
<td>Union Co. OH</td>
<td>4,527</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>4,089</td>
</tr>
<tr>
<td>Fairfield Co. OH</td>
<td>3,261</td>
</tr>
<tr>
<td>Madison Co. OH</td>
<td>1,903</td>
</tr>
<tr>
<td>Pickaway Co. OH</td>
<td>1,517</td>
</tr>
<tr>
<td>Montgomery Co. OH</td>
<td>612</td>
</tr>
<tr>
<td>Marion Co. OH</td>
<td>590</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>552</td>
</tr>
<tr>
<td>Logan Co. OH</td>
<td>506</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>652,261</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From Number</td>
<td>Percent</td>
</tr>
<tr>
<td>Delaware Co. OH</td>
<td>31,708</td>
</tr>
<tr>
<td>Fairfield Co. OH</td>
<td>28,259</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>23,755</td>
</tr>
<tr>
<td>Pickaway Co. OH</td>
<td>9,613</td>
</tr>
<tr>
<td>Madison Co. OH</td>
<td>7,921</td>
</tr>
<tr>
<td>Union Co. OH</td>
<td>5,473</td>
</tr>
<tr>
<td>Morrow Co. OH</td>
<td>3,108</td>
</tr>
<tr>
<td>Knox Co. OH</td>
<td>3,014</td>
</tr>
<tr>
<td>Perry Co. OH</td>
<td>2,433</td>
</tr>
<tr>
<td>Ross Co. OH</td>
<td>2,335</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Licking

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>71,213</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To Number</td>
<td>Percent</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>23,755</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>1,100</td>
</tr>
<tr>
<td>Fairfield Co. OH</td>
<td>915</td>
</tr>
<tr>
<td>Delaware Co. OH</td>
<td>900</td>
</tr>
<tr>
<td>Knox Co. OH</td>
<td>744</td>
</tr>
<tr>
<td>Perry Co. OH</td>
<td>107</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>56,215</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From Number</td>
<td>Percent</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>4,089</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>2,667</td>
</tr>
<tr>
<td>Perry Co. OH</td>
<td>1,656</td>
</tr>
<tr>
<td>Fairfield Co. OH</td>
<td>1,563</td>
</tr>
<tr>
<td>Knox Co. OH</td>
<td>1,304</td>
</tr>
<tr>
<td>Coshocton Co. OH</td>
<td>536</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.
**Coshocton**

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Coshocton County</th>
<th>16,585</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>1,393</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>780</td>
</tr>
<tr>
<td>Holmes Co. OH</td>
<td>774</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>536</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>271</td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>178</td>
</tr>
<tr>
<td>Knox Co. OH</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Coshocton County</th>
<th>13,993</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>709</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>464</td>
</tr>
<tr>
<td>Guernsey Co. OH</td>
<td>210</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>92</td>
</tr>
<tr>
<td>Knox Co. OH</td>
<td>71</td>
</tr>
<tr>
<td>Holmes Co. OH</td>
<td>68</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>34</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

**Factor 5: Meteorology**

Please refer to Appendix E for applicable meteorology information for the Columbus area.

**Factor 6: Topography/Land use/Land cover**

Delaware County is in the Central Lowland Province (see Appendix F). The highest elevation is 1,239 feet and the lowest is 754 feet above sea level. The western and central parts of the county consist of an almost level plain at about 950 feet. The eastern part of the county rises to about 1,200 feet.

Fairfield County is in the Allegheny Plateau and the Central Lowland Provinces. Relief of the county can be nearly level to strongly undulating with steep-sided ridges and very rugged. In the southeastern part of the county, in the unglaciated section of the Allegheny Plateau, the relief from the ridgetops to the flood plains can be about 250 to 300 feet.

Franklin County is within the glaciated till plains of the Central Lowland Province. The elevation in the county ranges from 1,130 feet in the northeast corner to about 670 feet along the southern border where the Scioto River leave the county. The relief is nearly level to gently rolling.

Licking County is in two physiographic Provinces. The eastern third is part of the Allegheny Plateau Province, and the rest is on the eastern edge of the glaciated section of the Central Lowlands Province. The elevation ranges from about 1,360 feet to 740 feet above sea level. Relief throughout the west-central part of the county is gently undulating and rolling to moderately steep to very steep. The eastern part of the county has hilly topography with a relief of about 200 feet between ridgetops and flood plains.
Coshocton County is primarily located within the Western Allegheny Plateau area. A very small area along the west-central edge of the county is in the Eastern Ohio Till Plain area. The unglaciated portion of the county is characterized by steep or very steep hillsides and narrow valleys. Relief is generally high. Elevation ranges from 1,300 feet to 720 feet above sea level.

As shown in the following pie charts, the land use/land cover in as expected Franklin County has the highest percentage of urban area. Coshocton County has the largest percentage of forest area while Delaware, Fairfield and Licking counties have a significant percentage of cropland.
Factor 7: Jurisdictional boundaries

The Columbus, OH Metropolitan Statistical Area includes: Delaware, Fairfield, Franklin, Licking, Madison, Morrow, Pickaway and Union counties. The principal city is Columbus.

The Mid-Ohio regional Planning Commission (MORPC) is the planning agency designated as the Metropolitan Planning Organization for the greater Columbus area. The MORPC region is composed of two counties: Delaware and Franklin.

The Licking County Area Transportation Study (LCATS) is the planning agency designated as the MPO for Licking County.

Factor 8: Level of control of emission sources

In the Columbus area, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities

CAIR and local on-road and off-road reductions are the programs which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal).
**Dayton-Springfield, OH**

**Current** county nonattainment: Clark, Greene, Montgomery

---

**Recommended** county nonattainment: Greene, Montgomery

---

Source: Office of Strategic Research, Ohio Department of Development
Discussion

There are three counties in this existing PM$_{2.5}$ nonattainment area; Clark, Greene and Montgomery. Ohio EPA recommends retaining Greene and Montgomery counties as nonattainment for the Dayton-Springfield area. Montgomery County has a violating monitor and significant population. Greene County has a high level of commuting into Montgomery County Ohio EPA is recommending attainment for Clark County due to no monitor violations, low emissions and low level of commuting into Montgomery County. There are four adjacent counties that are discussed in this section; Preble, Darke, Miami and Champaign. Madison, Fayette and Clinton are also adjacent counties but they are included in the Columbus and Cincinnati sections respectively. The 2005 SO$_2$ and NO$_x$ emissions in Montgomery County are not high but are forecasted to remain relatively constant into 2009. Clark, Greene and the adjacent counties have low emissions.

The three-year average of the 98th percentile and the three-year annual average concentration at site 39-113-0032 in Montgomery County are not attaining the 24-hour revised standard or the annual standard.

Factor 1: Air quality data

= Exceeds standard

AQS: 24-Hour Average – 98th Percentile (μg/m$^3$)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-023-0005</td>
<td>Clark</td>
<td>32.1</td>
<td>41.6</td>
<td>30.5</td>
<td>35</td>
</tr>
<tr>
<td>39-057-0005</td>
<td>Greene</td>
<td>27.7</td>
<td>40.0</td>
<td>26.5</td>
<td>31</td>
</tr>
<tr>
<td>39-113-0031</td>
<td>Montgomery</td>
<td>31.5</td>
<td>42.9</td>
<td>28.9</td>
<td>34</td>
</tr>
<tr>
<td>39-113-0032</td>
<td>Montgomery</td>
<td>32.5</td>
<td>45.0</td>
<td>30.3</td>
<td>36</td>
</tr>
<tr>
<td>39-135-1001</td>
<td>Preble</td>
<td>27.7</td>
<td>39.0</td>
<td>28.7</td>
<td>32</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture

AQS: Annual Average (μg/m$^3$)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-023-0005</td>
<td>Clark</td>
<td>13.5</td>
<td>16.7</td>
<td>13.1</td>
<td>14.4</td>
</tr>
<tr>
<td>39-057-0005</td>
<td>Greene</td>
<td>12.1</td>
<td>15.5</td>
<td>11.9</td>
<td>13.2</td>
</tr>
<tr>
<td>39-113-0031</td>
<td>Montgomery</td>
<td>13.9</td>
<td>16.8</td>
<td>13.1</td>
<td>14.6</td>
</tr>
<tr>
<td>39-113-0032</td>
<td>Montgomery</td>
<td>14.5</td>
<td>17.4</td>
<td>13.6</td>
<td>15.2</td>
</tr>
<tr>
<td>39-135-1001</td>
<td>Preble</td>
<td>12.5</td>
<td>15.6</td>
<td>12.5</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
Factor 2:  Emissions data  
(tons per day)

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>MONTGOMERY</td>
<td>40.69</td>
<td>65.88</td>
<td>3.72</td>
</tr>
<tr>
<td>CLARK</td>
<td>0.91</td>
<td>15.94</td>
<td>0.81</td>
</tr>
<tr>
<td>GREENE</td>
<td>3.60</td>
<td>20.63</td>
<td>1.11</td>
</tr>
<tr>
<td>Preble</td>
<td>0.50</td>
<td>7.80</td>
<td>0.47</td>
</tr>
<tr>
<td>Darke</td>
<td>0.54</td>
<td>7.30</td>
<td>0.47</td>
</tr>
<tr>
<td>Miami</td>
<td>0.70</td>
<td>11.80</td>
<td>0.77</td>
</tr>
<tr>
<td>Champaign</td>
<td>0.60</td>
<td>4.79</td>
<td>0.34</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>MONTGOMERY</td>
<td>45.39</td>
<td>58.52</td>
<td>3.35</td>
</tr>
<tr>
<td>CLARK</td>
<td>0.49</td>
<td>14.22</td>
<td>0.73</td>
</tr>
<tr>
<td>GREENE</td>
<td>3.11</td>
<td>18.46</td>
<td>1.03</td>
</tr>
<tr>
<td>Preble</td>
<td>0.26</td>
<td>6.65</td>
<td>0.40</td>
</tr>
<tr>
<td>Darke</td>
<td>0.23</td>
<td>6.83</td>
<td>0.41</td>
</tr>
<tr>
<td>Miami</td>
<td>19.33</td>
<td>14.59</td>
<td>1.73</td>
</tr>
<tr>
<td>Champaign</td>
<td>0.41</td>
<td>4.59</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Major Employers:  
Source: Ohio Department of Development 2007

Most of the major employers in the Dayton-Springfield area are in the categories of service, government and manufacturing as shown below.

Clark County

<table>
<thead>
<tr>
<th>Company</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assurant Inc</td>
<td>Insurance</td>
</tr>
<tr>
<td>Community Mercy Health Partners</td>
<td>Service</td>
</tr>
<tr>
<td>Dole Fresh Vegetables</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Gordon Food Service</td>
<td>Trade</td>
</tr>
<tr>
<td>International Truck and Engine Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Marathon/Speedway SuperAmerica LLC</td>
<td>Trade</td>
</tr>
<tr>
<td>Mercy Medical Center</td>
<td>Service</td>
</tr>
<tr>
<td>Ohio Masonic Home</td>
<td>Service</td>
</tr>
<tr>
<td>Springfield City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Wittenberg University</td>
<td>Service</td>
</tr>
</tbody>
</table>
Greene County

Beavercreek Local Bd of Ed Government
Cedarville University Service
Fairborn City Bd of Ed Government
Fifth Third Bank Finance
General Electric Co/Unison Industries Manufacturing
Greene Memorial Hospital Service
SAIC Inc Service
Supervalu Inc Trade
US Federal Govt/Wright Patterson AFB Government
Wright State University Government
Xenia Community City Board of Education Government

Montgomery County

Behr Dayton Thermal Products LLC Manufacturing
Dayton City Bd of Ed Government
DPL Inc/Dayton Power & Light Co Utility
General Motors Corp Manufacturing
Kettering Medical Center Service
NCR Corp Manufacturing
Premier Health Partners Inc Service
Reed Elsevier/LexisNexis Service
Reynolds & Reynolds Co Inc Manufacturing
University of Dayton Service
US Federal Government Government

Factor 3: Population and Projected Growth

Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in the Dayton-Springfield area are; Springfield and Enon in Clark County; Xenia, Beavercreek and Fairborn in Greene County; Dayton and Kettering in Montgomery County.

As indicated in the following table and graphs, Montgomery County has the highest population in this area and it is projected to steadily decrease. The population in Clark, Preble and Darke counties is projected remain fairly constant with only slight increases. Greene, Miami and Champaign are projected to experience gradual increases.

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clark</td>
<td>142,230</td>
<td>141,908</td>
<td>141,872</td>
<td>142,300</td>
<td>141,660</td>
<td>143,960</td>
</tr>
<tr>
<td>Greene</td>
<td>151,892</td>
<td>151,823</td>
<td>152,298</td>
<td>151,760</td>
<td>156,590</td>
<td>158,860</td>
</tr>
<tr>
<td>Montgomery</td>
<td>548,561</td>
<td>545,603</td>
<td>542,237</td>
<td>540,420</td>
<td>528,800</td>
<td>524,060</td>
</tr>
<tr>
<td>Preble</td>
<td>42,423</td>
<td>42,400</td>
<td>42,491</td>
<td>44,200</td>
<td>45,070</td>
<td>45,380</td>
</tr>
<tr>
<td>Darke</td>
<td>53,074</td>
<td>52,967</td>
<td>52,780</td>
<td>52,730</td>
<td>52,550</td>
<td>52,710</td>
</tr>
<tr>
<td>Miami</td>
<td>100,670</td>
<td>101,414</td>
<td>101,914</td>
<td>103,460</td>
<td>106,770</td>
<td>107,930</td>
</tr>
<tr>
<td>Champaign</td>
<td>39,540</td>
<td>39,692</td>
<td>39,921</td>
<td>41,270</td>
<td>44,050</td>
<td>47,020</td>
</tr>
</tbody>
</table>
Factor 4: Traffic and commuting patterns

The kDVMT in the Dayton-Springfield area have had remained generally constant with only minor variations from 2004 to 2006. Montgomery and Greene counties had slight increases in kDVMT between 2005 and 2006 while Clark County had a slight decrease as shown in the graphs below.
Estimated Vehicle Miles Traveled (kDVMT = in thousands)
Source: Ohio Department of Transportation, Office of Technical Services

Clark County: Total County kDVMT 1990-2006

Year

kDVMT


2004 = 4453.71 2005 = 4498.94 2006 = 4475.04

Greene County: Total County kDVMT 1990-2006

Year

kDVMT


2004 = 4276.57 2005 = 4238.33 2006 = 4281.29

Commuter Patterns
Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Montgomery receives a high number of commuters from Greene County and in turn, Greene County receives a similar number of commuters from Montgomery County. Clark County commuters travel to Montgomery and Greene counties but in lower numbers as shown in the following tables.

Clark

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Clark County</th>
<th>65,887</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td></td>
</tr>
<tr>
<td>Montgomery Co. OH</td>
<td>7,856</td>
</tr>
<tr>
<td>Greene Co. OH</td>
<td>5,508</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>1,437</td>
</tr>
<tr>
<td>Champaign Co. OH</td>
<td>1,299</td>
</tr>
<tr>
<td>Miami Co. OH</td>
<td>1,240</td>
</tr>
<tr>
<td>Madison Co. OH</td>
<td>1,092</td>
</tr>
<tr>
<td>Union Co. OH</td>
<td>775</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>205</td>
</tr>
<tr>
<td>Logan Co. OH</td>
<td>186</td>
</tr>
<tr>
<td>Shelby Co. OH</td>
<td>132</td>
</tr>
</tbody>
</table>

Percent of workers working in county.

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Clark County</th>
<th>57,637</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td></td>
</tr>
<tr>
<td>Champaign Co. OH</td>
<td>3,493</td>
</tr>
<tr>
<td>Montgomery Co. OH</td>
<td>2,517</td>
</tr>
<tr>
<td>Greene Co. OH</td>
<td>2,516</td>
</tr>
<tr>
<td>Miami Co. OH</td>
<td>882</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>446</td>
</tr>
<tr>
<td>Madison Co. OH</td>
<td>373</td>
</tr>
<tr>
<td>Logan Co. OH</td>
<td>256</td>
</tr>
<tr>
<td>Preble Co. OH</td>
<td>142</td>
</tr>
<tr>
<td>Warren Co. OH</td>
<td>125</td>
</tr>
<tr>
<td>Fayette Co. OH</td>
<td>124</td>
</tr>
</tbody>
</table>

Percent of workers living in county.

Percent of workers that work outside the county: 31.5%
Average commute time in minutes: 21.6

Montgomery County: Total County kDVMT 1990-2006

### Greene

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Greene County</th>
<th>72,958</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Montgomery Co. OH</td>
<td>24,925</td>
</tr>
<tr>
<td>Clark Co. OH</td>
<td>2,516</td>
</tr>
<tr>
<td>Clinton Co. OH</td>
<td>808</td>
</tr>
<tr>
<td>Warren Co. OH</td>
<td>797</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>610</td>
</tr>
<tr>
<td>Miami Co. OH</td>
<td>522</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>441</td>
</tr>
<tr>
<td>Butler Co. OH</td>
<td>358</td>
</tr>
<tr>
<td>Fayette Co. OH</td>
<td>350</td>
</tr>
<tr>
<td>Champaign Co. OH</td>
<td>121</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Greene County</th>
<th>76,312</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Montgomery Co. OH</td>
<td>24,214</td>
</tr>
<tr>
<td>Clark Co. OH</td>
<td>5,508</td>
</tr>
<tr>
<td>Miami Co. OH</td>
<td>1,514</td>
</tr>
<tr>
<td>Warren Co. OH</td>
<td>1,321</td>
</tr>
<tr>
<td>Clinton Co. OH</td>
<td>451</td>
</tr>
<tr>
<td>Butler Co. OH</td>
<td>400</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>245</td>
</tr>
<tr>
<td>Champaign Co. OH</td>
<td>239</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>236</td>
</tr>
<tr>
<td>Preble Co. OH</td>
<td>220</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Montgomery

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Montgomery County</th>
<th>259,419</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Greene Co. OH</td>
<td>24,214</td>
</tr>
<tr>
<td>Miami Co. OH</td>
<td>4,722</td>
</tr>
<tr>
<td>Warren Co. OH</td>
<td>4,488</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>2,698</td>
</tr>
<tr>
<td>Butler Co. OH</td>
<td>2,622</td>
</tr>
<tr>
<td>Clark Co. OH</td>
<td>2,517</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>1,022</td>
</tr>
<tr>
<td>Preble Co. OH</td>
<td>933</td>
</tr>
<tr>
<td>Champaign Co. OH</td>
<td>675</td>
</tr>
<tr>
<td>Darke Co. OH</td>
<td>647</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Montgomery County</th>
<th>288,140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Greene Co. OH</td>
<td>24,925</td>
</tr>
<tr>
<td>Miami Co. OH</td>
<td>11,368</td>
</tr>
<tr>
<td>Warren Co. OH</td>
<td>11,325</td>
</tr>
<tr>
<td>Clark Co. OH</td>
<td>7,856</td>
</tr>
<tr>
<td>Preble Co. OH</td>
<td>4,837</td>
</tr>
<tr>
<td>Butler Co. OH</td>
<td>4,635</td>
</tr>
<tr>
<td>Darke Co. OH</td>
<td>2,557</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>1,747</td>
</tr>
<tr>
<td>Clinton Co. OH</td>
<td>782</td>
</tr>
<tr>
<td>Champaign Co. OH</td>
<td>662</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Dayton-Springfield area.

### Factor 6: Topography/Land use/Land cover

Clark County lies within the glaciated till plains of the Central Lowlands Province (see Appendix F). Relief ranges from nearly level to steep, but the land surface is predominately undulating. The highest elevation in the county is 1,250 feet above sea level close to Catawba near the Champaign County line. The lowest
Elevation is 820 feet in the southwest corner where the Mad River crosses the county line.

Greene County is located in the glaciated till plains of the Central Lowlands Province. Relief varies very little throughout the county. The eastern part is nearly level to gently undulating, while the central and western part of the county is more pronounced with undulating to rolling hills.

Montgomery County, like Greene and Clark counties, lies within the glaciated till plains of the Central Lowlands Province. The relief varies greatly throughout the county, from nearly level to significant relief changes along the Great Miami River, Stillwater River and other drainageways.

As shown in the following pie charts, the land use/land cover in Montgomery County has the highest percentage of urban area. Clark and Greene counties share very similar characteristics with nearly the same percentage of all categories.
Factor 7: Jurisdictional boundaries

The Dayton, OH Metropolitan Statistical Area includes: Greene, Miami, Montgomery and Preble counties. The principal city is Dayton. The Springfield, OH MSA includes Clark County. The principal city is Springfield.

The Miami Valley regional Planning Commission (MVRPC) is the planning agency designated as the Metropolitan Planning Organization for the region composed of three counties: Greene, Miami and Montgomery counties. The cities of Franklin and Carlisle in Warren County are part of the Miami Valley regional Planning Commission (MVRPC) planning area.

The Clark County-Springfield Transportation Coordinating Committee (CCSTCC) is the planning agency designated as the MPO for the region composed of Clark County.
Factor 8: Level of control of emission sources

In the Dayton-Springfield area, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal) impacting the nonattainment monitor in Montgomery County. This area is just north of the Ohio River and north of several coal-fired electronic utilities. The major units in this area have, or will be, controlling NO$_x$ and SO$_2$ emissions in response to the NO$_x$ trading program and CAIR programs.
**Huntington-Ashland, WV-KY-OH**

**Current** county nonattainment: Lawrence, Scioto, Adams (P), Gallia (P)

- **Current nonattainment counties**
- **Current partial nonattainment**

**Recommended** county nonattainment: None

Source: Office of Strategic Research, Ohio Department of Development
Discussion

There are no violating monitors in Lawrence or Scioto counties. Adams County contains the DP&L Killen Generating Station and the DP&L J.M. Stuart Generating Station. Gallia County contains the Ohio Power Gavin power plant and the Ohio Valley Electric Corporation Kyger Creek power plant. The 2005 SO\textsubscript{2} emissions in Adams and Gallia counties are high but as part of the CAIR requirements, it is forecasted that significant reductions in emissions will occur. The counties in this area have low population and growth, low kDVMT and no significant levels of commuters.

Ohio EPA is recommending attainment for Lawrence and Scioto counties due to no monitor violations, low population and insignificant commuting. Due to the location of the monitor in Lawrence County, it is likely the levels being detected are coming from across the Ohio River. The low emissions demonstrate that Lawrence and Scioto counties are not a significant source of PM\textsubscript{2.5}. In addition, Ohio EPA is recommending attainment for Adams and Gallia counties due to the forecasted reductions as a result of the CAIR requirements and the low population and insignificant commuting in these counties.

Factor 1:  Air quality data

![Exceeds standard]

AQS: 24-Hour Average – 98\textsuperscript{th} Percentile (μg/m\textsuperscript{3})

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-087-0010</td>
<td>Lawrence</td>
<td>31.2</td>
<td>38.5</td>
<td>30.8</td>
<td>34</td>
</tr>
<tr>
<td>39-145-0013</td>
<td>Scioto</td>
<td>29.4</td>
<td>40.3</td>
<td>30.5</td>
<td>33</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture

AQS: Annual Average (μg/m\textsuperscript{3})

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-087-0010</td>
<td>Lawrence</td>
<td>13.7</td>
<td>17.0</td>
<td>14.4</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
**West Virginia**

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-011-0006</td>
<td>Cabell, WV</td>
<td>30.9</td>
<td>40.5</td>
<td>30.1</td>
<td>34</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture

**AQS: Annual Average (μg/m³)**

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-011-0006</td>
<td>Cabell, WV</td>
<td>15.2</td>
<td>18.1</td>
<td>15.0</td>
<td>16.1</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture

**Kentucky**

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-019-0017</td>
<td>Boyd, KY</td>
<td>30.3</td>
<td>36.1</td>
<td>28.6</td>
<td>32</td>
</tr>
<tr>
<td>21-043-0500</td>
<td>Carter, KY</td>
<td>24.5</td>
<td>37.2</td>
<td>25.5</td>
<td>29</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture

**AQS: Annual Average (μg/m³)**

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-019-0017</td>
<td>Boyd, KY</td>
<td>13.3</td>
<td>16.0</td>
<td>13.8</td>
<td>14.4</td>
</tr>
<tr>
<td>21-043-0500</td>
<td>Carter, KY</td>
<td>11.1</td>
<td>13.6</td>
<td>11.5</td>
<td>12.1</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
Huntington-Ashland Area PM$_{2.5}$ Monitor Locations and Site ID Numbers
## Factor 2: Emissions data (tons per year)

### 2005

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂·₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAWRENCE</td>
<td>0.37</td>
<td>7.49</td>
<td>0.51</td>
</tr>
<tr>
<td>SCIOTO</td>
<td>3.03</td>
<td>10.32</td>
<td>0.70</td>
</tr>
<tr>
<td>Adams (P)</td>
<td>400.96</td>
<td>34.23</td>
<td>10.93</td>
</tr>
<tr>
<td>Gallia (P)</td>
<td>249.47</td>
<td>34.01</td>
<td>3.21</td>
</tr>
<tr>
<td>Highland</td>
<td>0.37</td>
<td>4.73</td>
<td>0.53</td>
</tr>
<tr>
<td>Pike</td>
<td>3.95</td>
<td>4.68</td>
<td>0.70</td>
</tr>
<tr>
<td>Jackson</td>
<td>0.17</td>
<td>2.92</td>
<td>0.42</td>
</tr>
<tr>
<td>Vinton</td>
<td>0.08</td>
<td>1.52</td>
<td>0.23</td>
</tr>
<tr>
<td>Meigs</td>
<td>0.20</td>
<td>3.36</td>
<td>0.28</td>
</tr>
</tbody>
</table>

### 2009

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂·₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAWRENCE</td>
<td>0.26</td>
<td>7.82</td>
<td>0.51</td>
</tr>
<tr>
<td>SCIOTO</td>
<td>2.88</td>
<td>11.04</td>
<td>0.69</td>
</tr>
<tr>
<td>Adams (P)</td>
<td>63.08</td>
<td>24.80</td>
<td>11.19</td>
</tr>
<tr>
<td>Gallia (P)</td>
<td>64.76</td>
<td>32.32</td>
<td>11.53</td>
</tr>
<tr>
<td>Highland</td>
<td>0.18</td>
<td>4.17</td>
<td>0.48</td>
</tr>
<tr>
<td>Pike</td>
<td>3.88</td>
<td>5.34</td>
<td>0.70</td>
</tr>
<tr>
<td>Jackson</td>
<td>0.11</td>
<td>3.82</td>
<td>0.43</td>
</tr>
<tr>
<td>Vinton</td>
<td>0.05</td>
<td>1.39</td>
<td>0.22</td>
</tr>
<tr>
<td>Meigs</td>
<td>0.14</td>
<td>3.59</td>
<td>0.28</td>
</tr>
</tbody>
</table>

### West Virginia

#### 2005

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂·₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabell</td>
<td>4.60</td>
<td>17.36</td>
<td>2.34</td>
</tr>
<tr>
<td>Mason</td>
<td>0.57</td>
<td>8.71</td>
<td>0.70</td>
</tr>
<tr>
<td>Wayne</td>
<td>2.52</td>
<td>23.04</td>
<td>1.14</td>
</tr>
<tr>
<td>Kanawha</td>
<td>11.31</td>
<td>50.39</td>
<td>3.44</td>
</tr>
<tr>
<td>Putnam</td>
<td>2.99</td>
<td>8.15</td>
<td>0.82</td>
</tr>
</tbody>
</table>

#### 2009

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂·₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabell</td>
<td>3.89</td>
<td>11.19</td>
<td>1.91</td>
</tr>
<tr>
<td>Mason</td>
<td>123.92</td>
<td>38.50</td>
<td>8.06</td>
</tr>
<tr>
<td>Wayne</td>
<td>2.31</td>
<td>17.87</td>
<td>0.87</td>
</tr>
<tr>
<td>Kanawha</td>
<td>55.32</td>
<td>56.03</td>
<td>4.01</td>
</tr>
<tr>
<td>Putnam</td>
<td>71.14</td>
<td>28.99</td>
<td>9.86</td>
</tr>
</tbody>
</table>
Kentucky

2005

<table>
<thead>
<tr>
<th>County</th>
<th>SO$_2$</th>
<th>NO$_x$</th>
<th>PM$_{2.5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boyd</td>
<td>31.14</td>
<td>28.70</td>
<td>4.85</td>
</tr>
<tr>
<td>Carter</td>
<td>0.27</td>
<td>0.60</td>
<td>0.69</td>
</tr>
<tr>
<td>Greenup</td>
<td>6.15</td>
<td>8.20</td>
<td>0.73</td>
</tr>
<tr>
<td>Lewis</td>
<td>1.21</td>
<td>7.28</td>
<td>0.61</td>
</tr>
</tbody>
</table>

2009

<table>
<thead>
<tr>
<th>County</th>
<th>SO$_2$</th>
<th>NO$_x$</th>
<th>PM$_{2.5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boyd</td>
<td>31.14</td>
<td>30.63</td>
<td>4.88</td>
</tr>
<tr>
<td>Carter</td>
<td>2.81</td>
<td>0.59</td>
<td>0.74</td>
</tr>
<tr>
<td>Greenup</td>
<td>7.82</td>
<td>8.18</td>
<td>0.75</td>
</tr>
<tr>
<td>Lewis</td>
<td>1.20</td>
<td>8.17</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Major Employers:
Source: Ohio Department of Development 2007

Most of the major employers in the Huntington-Ashland area are in the categories of manufacturing, government and service as shown below.

Lawrence County

<table>
<thead>
<tr>
<th>Employer</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dow Chemical Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Duke Energy Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Emerson Electric/Liebert Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Engines Inc of Ohio</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Ironton City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Jo-Lin Health Center</td>
<td>Service</td>
</tr>
<tr>
<td>Lawrence County Government</td>
<td>Government</td>
</tr>
<tr>
<td>McGinnis Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>McSweeney's Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Ohio University</td>
<td>Government</td>
</tr>
<tr>
<td>Rock Hill Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>South Point Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Superior Marine Ways Inc</td>
<td>Service</td>
</tr>
<tr>
<td>Wal-Mart Stores Inc</td>
<td>Trade</td>
</tr>
</tbody>
</table>
Scioto County

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>G&amp;J Pepsi-Cola Bottlers Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Mitchellace Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>OSCO Industries</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Portsmouth City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Scioto County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Shawnee State University</td>
<td>Government</td>
</tr>
<tr>
<td>Southern Ohio Medical Center</td>
<td>Service</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
<tr>
<td>Sunoco In/Sun Coke</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Taylor Lumber Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Wal-Mart Stores Inc</td>
<td>Trade</td>
</tr>
</tbody>
</table>

Adams County

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams County Government</td>
<td>Service</td>
</tr>
<tr>
<td>Adams County Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Adams County/Ohio Valley Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>DPL Inc/Dayton Power &amp; Light Co</td>
<td>Utility</td>
</tr>
<tr>
<td>Eagle Creek Nursing Center</td>
<td>Service</td>
</tr>
<tr>
<td>General Electric Co</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>Maca Plastics Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Toyo Denso Co/Weastec Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Wal-Mart Stores Inc</td>
<td>Trade</td>
</tr>
</tbody>
</table>

Gallia County

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Electric Power</td>
<td>Utility</td>
</tr>
<tr>
<td>DMI Technology/ElectroCraft</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Gallia County Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Gallipolis City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>GKN Sinter Metals</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Holzer Clinic</td>
<td>Service</td>
</tr>
<tr>
<td>Holzer Medical Center</td>
<td>Service</td>
</tr>
<tr>
<td>Infocision Management Corp</td>
<td>Service</td>
</tr>
<tr>
<td>Ohio Valley Bank</td>
<td>Finance</td>
</tr>
<tr>
<td>Ohio Valley Electric Corp</td>
<td>Utility</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
<tr>
<td>University of Rio Grande</td>
<td>Service</td>
</tr>
<tr>
<td>Wal-Mart Stores Inc</td>
<td>Trade</td>
</tr>
</tbody>
</table>

Factor 3: Population and Projected Growth

Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in the Ohio portion of the Huntington-Ashland area are; Ironton in Lawrence County; Portsmouth in Scioto County; West Union and Seaman in Adams County; and Gallipolis in Gallia County.

As indicated in the following table and graphs, Scioto County has the highest population in this area and it is projected to gradually decrease. The population in the surrounding counties is projected to gradually increase.
<table>
<thead>
<tr>
<th>COUNTY</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lawrence</td>
<td>62,573</td>
<td>62,946</td>
<td>63,179</td>
<td>62,910</td>
<td>63,830</td>
<td>64,060</td>
</tr>
<tr>
<td>Scioto</td>
<td>76,579</td>
<td>76,506</td>
<td>76,441</td>
<td>78,820</td>
<td>78,330</td>
<td>78,270</td>
</tr>
<tr>
<td>Adams (P)</td>
<td>28,278</td>
<td>28,454</td>
<td>28,516</td>
<td>29,410</td>
<td>31,490</td>
<td>33,510</td>
</tr>
<tr>
<td>Gallia (P)</td>
<td>31,232</td>
<td>31,241</td>
<td>31,313</td>
<td>32,230</td>
<td>33,360</td>
<td>34,020</td>
</tr>
<tr>
<td>Pike</td>
<td>28,265</td>
<td>28,058</td>
<td>28,269</td>
<td>29,770</td>
<td>31,080</td>
<td>31,560</td>
</tr>
<tr>
<td>Jackson</td>
<td>33,302</td>
<td>33,576</td>
<td>33,543</td>
<td>34,020</td>
<td>35,060</td>
<td>35,680</td>
</tr>
</tbody>
</table>

Lawrence County

![Graph showing population of Lawrence County from 1950 to 2030.]

Scioto County

![Graph showing population of Scioto County from 1950 to 2030.]

Adams County

![Graph showing population of Adams County from 1950 to 2030.]

Page 100 of 177
**Factor 4: Traffic and commuting patterns**

The kDVMT in the Huntington-Ashland area did not change significantly 2004 to 2006 as shown in the following graphs. Lawrence County experienced a slight trend upward while Scioto and Gallia counties had slight decreases in kDVMT. Adams County kDVMT remained about the same during this time period. Scioto County has the prestige of having the highest kDVMT in this area.
Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)
Source: Ohio Department of Transportation, Office of Technical Services

Lawrence County: Total County kDVMT 1990-2006

2004 = 1272.93
2005 = 1315.02
2006 = 1345.98

Scioto County: Total County kDVMT 1990-2006

2004 = 1705.15
2005 = 1616.94
2006 = 1602.83
Adams County: Total County kDVMT 1990-2006

Gallia County: Total County kDVMT 1990-2006

The majority of Lawrence County workers commuting outside the county, travel to West Virginia and Kentucky. The largest portion of Scioto County workers commuting outside the county, travel to Pike County. Most of the commuting workers from Holmes County drive to Wayne County, while Adams County workers travel to Hamilton and Brown counties, and Gallia County commuters drive to Jackson County and Mason County, West Virginia as shown in the tables below.

**Lawrence**

<table>
<thead>
<tr>
<th>Commute Out To</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabell Co. WV</td>
<td>7,179</td>
<td>31.0%</td>
</tr>
<tr>
<td>Boyd Co. KY</td>
<td>2,926</td>
<td>12.6%</td>
</tr>
<tr>
<td>Greenup Co. KY</td>
<td>715</td>
<td>3.1%</td>
</tr>
<tr>
<td>Wayne Co. WV</td>
<td>622</td>
<td>2.7%</td>
</tr>
<tr>
<td>Scioto Co. OH</td>
<td>616</td>
<td>2.7%</td>
</tr>
<tr>
<td>Jackson Co. OH</td>
<td>179</td>
<td>0.8%</td>
</tr>
<tr>
<td>Kanawha Co. WV</td>
<td>175</td>
<td>0.8%</td>
</tr>
<tr>
<td>Gallia Co. OH</td>
<td>164</td>
<td>0.7%</td>
</tr>
<tr>
<td>Putnam Co. WV</td>
<td>95</td>
<td>0.4%</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>82</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commute In From</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabell Co. WV</td>
<td>626</td>
<td>4.9%</td>
</tr>
<tr>
<td>Boyd Co. KY</td>
<td>540</td>
<td>4.3%</td>
</tr>
<tr>
<td>Scioto Co. OH</td>
<td>455</td>
<td>3.6%</td>
</tr>
<tr>
<td>Greenup Co. KY</td>
<td>443</td>
<td>3.5%</td>
</tr>
<tr>
<td>Wayne Co. WV</td>
<td>400</td>
<td>3.2%</td>
</tr>
<tr>
<td>Gallia Co. OH</td>
<td>111</td>
<td>0.9%</td>
</tr>
<tr>
<td>Carter Co. KY</td>
<td>58</td>
<td>0.5%</td>
</tr>
<tr>
<td>Lewis Co. KY</td>
<td>36</td>
<td>0.3%</td>
</tr>
<tr>
<td>Jackson Co. OH</td>
<td>31</td>
<td>0.2%</td>
</tr>
<tr>
<td>Lawrence Co. KY</td>
<td>31</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county.

**Scioto**

<table>
<thead>
<tr>
<th>Commute Out To</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pike Co. OH</td>
<td>2,453</td>
<td>8.7%</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>540</td>
<td>1.9%</td>
</tr>
<tr>
<td>Ross Co. OH</td>
<td>494</td>
<td>1.7%</td>
</tr>
<tr>
<td>Lawrence Co. OH</td>
<td>455</td>
<td>1.6%</td>
</tr>
<tr>
<td>Jackson Co. OH</td>
<td>428</td>
<td>1.5%</td>
</tr>
<tr>
<td>Boyd Co. KY</td>
<td>390</td>
<td>1.4%</td>
</tr>
<tr>
<td>Greenup Co. KY</td>
<td>332</td>
<td>1.2%</td>
</tr>
<tr>
<td>Adams Co. OH</td>
<td>223</td>
<td>0.8%</td>
</tr>
<tr>
<td>Cabell Co. WV</td>
<td>108</td>
<td>0.4%</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>99</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commute In From</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenup Co. KY</td>
<td>1,252</td>
<td>4.9%</td>
</tr>
<tr>
<td>Lawrence Co. OH</td>
<td>616</td>
<td>2.4%</td>
</tr>
<tr>
<td>Pike Co. OH</td>
<td>504</td>
<td>2.0%</td>
</tr>
<tr>
<td>Lewis Co. KY</td>
<td>341</td>
<td>1.3%</td>
</tr>
<tr>
<td>Jackson Co. OH</td>
<td>211</td>
<td>0.8%</td>
</tr>
<tr>
<td>Boyd Co. KY</td>
<td>166</td>
<td>0.6%</td>
</tr>
<tr>
<td>Adams Co. OH</td>
<td>126</td>
<td>0.5%</td>
</tr>
<tr>
<td>Ross Co. OH</td>
<td>92</td>
<td>0.4%</td>
</tr>
<tr>
<td>Wayne Co. WV</td>
<td>73</td>
<td>0.3%</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>38</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county.

Percent of workers that work outside the county - 58.0%
Average commute time in minutes - 24.1

Percent of workers that work outside the county - 22.7%
Average commute time in minutes - 26.0
Adams

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Adams County</th>
<th>11,133</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>935</td>
</tr>
<tr>
<td>Brown Co. OH</td>
<td>793</td>
</tr>
<tr>
<td>Clermont Co. OH</td>
<td>527</td>
</tr>
<tr>
<td>Highland Co. OH</td>
<td>523</td>
</tr>
<tr>
<td>Mason Co. KY</td>
<td>412</td>
</tr>
<tr>
<td>Clinton Co. OH</td>
<td>293</td>
</tr>
<tr>
<td>Scioto Co. OH</td>
<td>126</td>
</tr>
<tr>
<td>Warren Co. OH</td>
<td>118</td>
</tr>
<tr>
<td>Boone Co. KY</td>
<td>105</td>
</tr>
<tr>
<td>Montgomery Co. OH</td>
<td>76</td>
</tr>
</tbody>
</table>

Number of workers 16+ years of age working in Adams County | 7,882 |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Brown Co. OH</td>
<td>252</td>
</tr>
<tr>
<td>Scioto Co. OH</td>
<td>223</td>
</tr>
<tr>
<td>Highland Co. OH</td>
<td>196</td>
</tr>
<tr>
<td>Mason Co. KY</td>
<td>124</td>
</tr>
<tr>
<td>Pike Co. OH</td>
<td>67</td>
</tr>
<tr>
<td>Carter Co. KY</td>
<td>54</td>
</tr>
<tr>
<td>Clermont Co. OH</td>
<td>52</td>
</tr>
<tr>
<td>Fleming Co. KY</td>
<td>28</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>22</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>21</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

Gallia

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Gallia County</th>
<th>11,813</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Mason Co. WV</td>
<td>669</td>
</tr>
<tr>
<td>Jackson Co. OH</td>
<td>595</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>218</td>
</tr>
<tr>
<td>Cabell Co. WV</td>
<td>190</td>
</tr>
<tr>
<td>Meigs Co. OH</td>
<td>187</td>
</tr>
<tr>
<td>Athens Co. OH</td>
<td>165</td>
</tr>
<tr>
<td>Lawrence Co. OH</td>
<td>111</td>
</tr>
<tr>
<td>Ross Co. OH</td>
<td>108</td>
</tr>
<tr>
<td>Kanawha Co. WV</td>
<td>96</td>
</tr>
<tr>
<td>Jackson Co. WV</td>
<td>71</td>
</tr>
</tbody>
</table>

Number of workers 16+ years of age working in Gallia County | 12,073 |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Mason Co. WV</td>
<td>1,358</td>
</tr>
<tr>
<td>Meigs Co. OH</td>
<td>844</td>
</tr>
<tr>
<td>Jackson Co. OH</td>
<td>403</td>
</tr>
<tr>
<td>Lawrence Co. OH</td>
<td>164</td>
</tr>
<tr>
<td>Putnam Co. WV</td>
<td>51</td>
</tr>
<tr>
<td>Vinton Co. OH</td>
<td>45</td>
</tr>
<tr>
<td>Athens Co. OH</td>
<td>44</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>37</td>
</tr>
<tr>
<td>Scioto Co. OH</td>
<td>36</td>
</tr>
<tr>
<td>Cabell Co. WV</td>
<td>35</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Huntington-Ashland area.

Factor 6: Topography/Land use/Land cover

Adams County is in three distinct land resource areas. A gently sloping landscape in the northwestern part of the county, a rolling to steep region in the central and southwestern parts and a steep and very steep Western Allegheny
Plateau in the eastern part of the county (see Appendix F). Elevation ranges from 1,270 feet to about 780 feet above sea level.

Scioto County is on the unglaciated Allegheny Plateau. The landscape consists of hills, narrow and wide ridgetops, and stream valleys. Elevation in the county ranges from 464 feet along the Adams-Scioto county line to 1,338 feet near Mt. Joy in the northwest part of the county.

Lawrence County is the southernmost county in Ohio. The county is located on the unglaciated Allegheny Plateau. Relief consists of steep and very steep slopes and V-shaped valleys. The elevation ranges from 515 feet to 1,061 feet above sea level.

Gallia County is in the unglaciated Allegheny Plateau region. It is extensively dissected by drainageways and has hilly and rough topography. The highest point in the county is about 1,060 feet and the lowest is about 515 feet above sea level.

As shown in the following pie charts, the land use/land cover in this area is predominately characterized as forest area.
Factor 7: Jurisdictional Boundaries

The Huntington-Ashland, WV-KY-OH Metropolitan Statistical Area includes: Boyd and Greenup counties in Kentucky, Cabell and Wayne counties in West Virginia and Lawrence County in Ohio. The principal cities are Huntington, WV and Ashland, KY.

KYOVA Interstate Planning Commission (KYOVA) is the planning agency designated as the Metropolitan Planning Organization for the Huntington-Ashland area. The KYOVA region is composed of three counties: Cabell and Wayne counties in KY and Lawrence County in Ohio.

Factor 8: Level of control of emission sources

In the Huntington-Ashland area, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives
- Reductions in industrial activity

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal) in this area, although there has also been a loss of industry within this part of the Ohio River Valley.
Parkersburg-Marietta, WV-OH:

**Current** county nonattainment: Washington

Current nonattainment counties

**Recommended** county nonattainment: Washington

Current partial nonattainment

Source: Office of Strategic Research, Ohio Department of Development
Discussion:

There is one Ohio county and one West Virginia county in this existing PM$_{2.5}$ nonattainment area, Washington County, Ohio and Wood County, WV. Ohio EPA recommends retaining Washington County as nonattainment for the Parkersburg-Marietta area due to the high SO$_2$ emissions. Athens and Morgan counties are two of four adjacent counties to Washington County. Athens and Morgan counties are discussed in this section while Noble and Monroe counties are discussed in the Wheeling, WV-OH section. These counties have insignificant emissions, low population and growth, low commuting and consequently are not considered contributing counties.

As shown in the tables below, the three-year annual average concentration at site 54-107-1002 in Wood County, WV is not attaining the annual standard. There is a monitor in Athens County. This is not a violating monitor and is included for informational purposes.

Factor 1: Air quality data

= Exceeds standard

West Virginia

AQS: 24-Hour Average – 98$^{th}$ Percentile (μg/m$^3$)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-107-1002</td>
<td>WOOD, WV</td>
<td>34.7</td>
<td>36.2</td>
<td>35.1</td>
<td>35</td>
</tr>
</tbody>
</table>

AQS: Annual Average (μg/m$^3$)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-107-1002</td>
<td>WOOD, WV</td>
<td>14.9</td>
<td>16.4</td>
<td>14.7</td>
<td>15.3</td>
</tr>
</tbody>
</table>

Ohio

AQS: 24-Hour Average – 98$^{th}$ Percentile (μg/m$^3$)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-009-0003</td>
<td>Athens</td>
<td>33.1</td>
<td>33.1</td>
<td>29.5</td>
<td>32</td>
</tr>
</tbody>
</table>

AQS: Annual Average (μg/m$^3$)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-009-0003</td>
<td>Athens</td>
<td>11.4</td>
<td>13.3</td>
<td>11.8</td>
<td>12.2</td>
</tr>
</tbody>
</table>
Parkersburg-Marietta Area PM$_{2.5}$ Monitor Locations and Site ID Numbers

Wood County, WV

Athens County, OH (Adjacent to current/recommended nonattainment area)
Factor 2: Emissions data  
(tons per year)

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>WASHINGTON</td>
<td>486.60</td>
<td>38.02</td>
<td>2.91</td>
</tr>
<tr>
<td>Athens</td>
<td>0.24</td>
<td>4.64</td>
<td>0.77</td>
</tr>
<tr>
<td>Morgan</td>
<td>0.08</td>
<td>1.18</td>
<td>0.28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>WASHINGTON</td>
<td>222.48</td>
<td>25.99</td>
<td>9.21</td>
</tr>
<tr>
<td>Athens</td>
<td>0.12</td>
<td>5.16</td>
<td>0.77</td>
</tr>
<tr>
<td>Morgan</td>
<td>0.05</td>
<td>1.57</td>
<td>0.28</td>
</tr>
</tbody>
</table>

West Virginia

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasants</td>
<td>25.61</td>
<td>7.18</td>
<td>1.10</td>
</tr>
<tr>
<td>Wood</td>
<td>14.48</td>
<td>16.68</td>
<td>2.07</td>
</tr>
<tr>
<td>Wirt</td>
<td>0.05</td>
<td>0.53</td>
<td>0.15</td>
</tr>
<tr>
<td>Tyler</td>
<td>0.11</td>
<td>3.92</td>
<td>0.32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasants</td>
<td>122.01</td>
<td>18.44</td>
<td>6.15</td>
</tr>
<tr>
<td>Wood</td>
<td>13.53</td>
<td>7.50</td>
<td>1.65</td>
</tr>
<tr>
<td>Wirt</td>
<td>0.04</td>
<td>0.19</td>
<td>0.10</td>
</tr>
<tr>
<td>Tyler</td>
<td>0.05</td>
<td>2.77</td>
<td>0.23</td>
</tr>
</tbody>
</table>

Major Employers:
Source: Ohio Department of Development 2007

Most of the major employers in Parkersburg-Marietta area are in the categories of government, manufacturing and service as shown below.
### Washington County

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Electric Power Co</td>
<td>Utility</td>
</tr>
<tr>
<td>Eramet Marietta Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>KRATON Polymers LLC</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Marietta City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Marietta College</td>
<td>Service</td>
</tr>
<tr>
<td>Marietta Memorial Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>RJF International Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Thermo Fisher Scientific Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Wal-Mart Stores Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Warren Local Bd of Ed</td>
<td>Government</td>
</tr>
</tbody>
</table>

### Athens County

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexander Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Athens City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Athens County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Diagnostic Hybrids Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>ED MAP Inc</td>
<td>Service</td>
</tr>
<tr>
<td>Federal Hocking Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Hocking College</td>
<td>Government</td>
</tr>
<tr>
<td>Nelsonville-York City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>O'Bleness Memorial Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Ohio University</td>
<td>Government</td>
</tr>
<tr>
<td>Wal-Mart Stores Inc</td>
<td>Trade</td>
</tr>
</tbody>
</table>

### Morgan County

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Careserve Inc/Mark Rest Center</td>
<td>Service</td>
</tr>
<tr>
<td>Draper Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Hann Manufacturing</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Kroger Co</td>
<td>Trade</td>
</tr>
<tr>
<td>MAHLE International</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Miba Bearings US LLC</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Morgan County Govt</td>
<td>Government</td>
</tr>
<tr>
<td>Morgan Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Warren's Morgan Co IGA</td>
<td>Trade</td>
</tr>
</tbody>
</table>

### Factor 3: Population and Projected Growth

Sources: Office of Strategic Research, Ohio Department of Development  
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in the Ohio portion of the Parkersburg-Marietta area are; Marietta in Washington County. In the adjacent counties: Athens, Nelsonville and Glouster in Athens County; and McConnelsville in Morgan County.

As indicated in the following table and graphs, Washington and Athens counties have been in a population competition but it appears that Athens County is projected to pull ahead of Washington County in the near future. Washington and Morgan counties are projected to experience a decrease in population.
<table>
<thead>
<tr>
<th>City</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington</td>
<td>62,582</td>
<td>62,155</td>
<td>61,867</td>
<td>63,510</td>
<td>63,090</td>
<td>61,650</td>
</tr>
<tr>
<td>Athens</td>
<td>62,185</td>
<td>62,028</td>
<td>61,860</td>
<td>64,540</td>
<td>66,000</td>
<td>66,340</td>
</tr>
<tr>
<td>Morgan</td>
<td>14,932</td>
<td>14,895</td>
<td>14,821</td>
<td>15,200</td>
<td>15,120</td>
<td>14,620</td>
</tr>
</tbody>
</table>

Washington County

Athens County

Morgan County
Factor 4:  Traffic and commuting patterns

Unlike population, Washington County has first place for kDVMT between 2004 and 2006. Washington and Athens counties both experienced a slight increase in kDVMT, while Morgan County has had a consistent downward trend in kDVMT for quite a few years.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)
Source: Ohio Department of Transportation, Office of Technical Services

![Graph showing Washington County's Total County kDVMT 1990-2006](image)

![Graph showing Athens County's Total County kDVMT 1990-2006](image)
Commuter Patterns
Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Not surprisingly, the majority of Washington County workers commuting outside the county, travel to Wood County, WV. Likewise, Wood County, WV has a number of workers traveling across the river to Washington County. A low number of workers from Athens and Morgan County commute to Washington County.

### Washington

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Washington County</th>
<th>28,171</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Wood Co. WV</td>
<td>5,927</td>
</tr>
<tr>
<td>Pleasants Co. WV</td>
<td>378</td>
</tr>
<tr>
<td>Monroe Co. OH</td>
<td>221</td>
</tr>
<tr>
<td>Athens Co. OH</td>
<td>208</td>
</tr>
<tr>
<td>Noble Co. OH</td>
<td>197</td>
</tr>
<tr>
<td>Morgan Co. OH</td>
<td>125</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>124</td>
</tr>
<tr>
<td>Jackson Co. WV</td>
<td>95</td>
</tr>
<tr>
<td>Guernsey Co. OH</td>
<td>83</td>
</tr>
<tr>
<td>Tyler Co. WV</td>
<td>71</td>
</tr>
</tbody>
</table>

Percent is of workers living in county.

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Washington County</th>
<th>26,792</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Wood Co. WV</td>
<td>3,316</td>
</tr>
<tr>
<td>Morgan Co. OH</td>
<td>501</td>
</tr>
<tr>
<td>Athens Co. OH</td>
<td>462</td>
</tr>
<tr>
<td>Noble Co. OH</td>
<td>453</td>
</tr>
<tr>
<td>Pleasants Co. WV</td>
<td>391</td>
</tr>
<tr>
<td>Meigs Co. OH</td>
<td>340</td>
</tr>
<tr>
<td>Monroe Co. OH</td>
<td>237</td>
</tr>
<tr>
<td>Ritchie Co. WV</td>
<td>137</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>84</td>
</tr>
<tr>
<td>Tyler Co. WV</td>
<td>81</td>
</tr>
</tbody>
</table>

Percent is of workers working in county.
### Athens

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Athens County</th>
<th>25,586</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>712</td>
</tr>
<tr>
<td>Hocking Co. OH</td>
<td>580</td>
</tr>
<tr>
<td>Wood Co. WV</td>
<td>563</td>
</tr>
<tr>
<td>Washington Co. OH</td>
<td>462</td>
</tr>
<tr>
<td>Fairfield Co. OH</td>
<td>431</td>
</tr>
<tr>
<td>Vinton Co. OH</td>
<td>149</td>
</tr>
<tr>
<td>Meigs Co. OH</td>
<td>142</td>
</tr>
<tr>
<td>Jackson Co. OH</td>
<td>130</td>
</tr>
<tr>
<td>Perry Co. OH</td>
<td>123</td>
</tr>
<tr>
<td>Ross Co. OH</td>
<td>112</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Athens County</th>
<th>26,145</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Meigs Co. OH</td>
<td>1,334</td>
</tr>
<tr>
<td>Hocking Co. OH</td>
<td>945</td>
</tr>
<tr>
<td>Vinton Co. OH</td>
<td>420</td>
</tr>
<tr>
<td>Morgan Co. OH</td>
<td>380</td>
</tr>
<tr>
<td>Jackson Co. OH</td>
<td>220</td>
</tr>
<tr>
<td>Washington Co. OH</td>
<td>208</td>
</tr>
<tr>
<td>Gallia Co. OH</td>
<td>165</td>
</tr>
<tr>
<td>Fairfield Co. OH</td>
<td>142</td>
</tr>
<tr>
<td>Wood Co. WV</td>
<td>116</td>
</tr>
<tr>
<td>Perry Co. OH</td>
<td>110</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Morgan

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Morgan County</th>
<th>5,858</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>707</td>
</tr>
<tr>
<td>Washington Co. OH</td>
<td>501</td>
</tr>
<tr>
<td>Athens Co. OH</td>
<td>380</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>307</td>
</tr>
<tr>
<td>Perry Co. OH</td>
<td>225</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>157</td>
</tr>
<tr>
<td>Guernsey Co. OH</td>
<td>80</td>
</tr>
<tr>
<td>Fairfield Co. OH</td>
<td>68</td>
</tr>
<tr>
<td>Wood Co. WV</td>
<td>51</td>
</tr>
<tr>
<td>Pickaway Co. OH</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Morgan County</th>
<th>3,632</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>211</td>
</tr>
<tr>
<td>Washington Co. OH</td>
<td>125</td>
</tr>
<tr>
<td>Athens Co. OH</td>
<td>54</td>
</tr>
<tr>
<td>Perry Co. OH</td>
<td>52</td>
</tr>
<tr>
<td>Guernsey Co. OH</td>
<td>21</td>
</tr>
<tr>
<td>Noble Co. OH</td>
<td>13</td>
</tr>
<tr>
<td>Brooke Co. WV</td>
<td>10</td>
</tr>
<tr>
<td>Jackson Co. WV</td>
<td>7</td>
</tr>
<tr>
<td>Virginia Beach city VA</td>
<td>7</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>6</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Parkersburg-Marietta area.

### Factor 6: Topography/Land use/Land cover

Washington County is entirely within the unglaciated Allegheny Plateau region (see Appendix F). The landscape is one of hills, narrow ridgetops, and stream valleys. The eastern part of the county is rugged with steep to very steep slopes while the central and western parts of the county have a more rolling topography,
wider ridgetops and fewer steep side slopes. The lowest point in the county is 580 feet and the highest is more than 1,200 feet above sea level.

Morgan County lies in the unglaciated Appalachian Plateaus Province. Rugged, it consists mostly of steep hillsides and narrow ridgetops. Some broad, gently sloping uplands are in the western part of the county and in stream valleys. The elevation ranges from about 630 feet to 1115 feet above sea level.

Athens County, like Morgan and Washington counties, is in the unglaciated Allegheny Plateau region. The northern part of the county is rugged with steep to very steep slopes and the southern part of the county has more rolling hills and fewer steep hillsides. The highest point is 1,055 and lowest point is about 640 feet above sea level.

As shown in the following pie charts, the land use/land cover in this area is predominately characterized as forest area.
Factor 7: Jurisdictional boundaries

The Parkersburg-Marietta-Vienna, WV-OH Metropolitan Statistical Area includes: Pleasants, Wirt and Wood counties in West Virginia; and Washington County, Ohio. The principal cities are Parkersburg and Vienna, West Virginia; and Marietta, Ohio.

The Wood, Wirt, Washington Interstate Planning Commission (WWWIPC) is the planning agency designated as the Metropolitan Planning Organization for Parkersburg-Marietta area. The WWWIPC region is composed of two counties: Wood County, WV and the greater Marietta area of Washington County, OH.

Factor 8: Level of control of emission sources

In the Parkersburg-Marietta area, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal) affecting this area.
Steubenville-Weirton, OH:

**Current** county nonattainment:  Jefferson

- Current nonattainment counties
- Current partial nonattainment

**Recommended** county nonattainment:  Jefferson

Source: Office of Strategic Research, Ohio Department of Development
**Discussion:**

There is one Ohio county and two West Virginia counties in this existing PM$_{2.5}$ nonattainment area, Jefferson County, Ohio and Hancock and Brooke counties in WV. Ohio EPA recommends retaining Jefferson County as nonattainment for the Weirton-Steubenville WV-OH area due to monitor violations and high SO$_2$ emissions.

There is one adjacent county discussed in this section; Harrison County. Columbiana, Carroll and Belmont counties are also adjacent to Jefferson County but are included in the Youngstown-Warren, Canton-Massillion and Wheeling, WV-OH sections respectively. Harrison County is not considered a contributing county due to insignificant emissions, low population, no expected growth and insignificant commuting levels. The 2005 emissions in Brooke and Hancock counties in WV and Washington and Beaver counties in PA, are also low as shown in the following tables.

The three-year average of the 98$^{th}$ percentile and the three-year annual average concentration at both sites in Jefferson County are not attaining the 24-hour revised standard or the annual standard.

**Factor 1: Air quality data**

[Red box] = Exceeds standard

| AQS: 24-Hour Average – 98$^{th}$ Percentile (μg/m$^3$) |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| Site            | County          | 2004            | 2005            | 2006            | 24-Hour Average |
| 39-081-0017     | Jefferson       | 43.8            | 43.8            | 32.1            | 40              |
| 39-081-1001     |                 | 51.5            | 44.2            | 32.9            | 43              |

Sites with less than 75% capture

<table>
<thead>
<tr>
<th>AQS: Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site</td>
</tr>
<tr>
<td>39-081-0017</td>
</tr>
<tr>
<td>39-081-1001</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
West Virginia

\[\text{Exceeds standard}\]

### AQS: 24-Hour Average – 98th Percentile (μg/m³)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-009-0005</td>
<td>BROOKE</td>
<td>48.4</td>
<td>38.8</td>
<td>32.2</td>
<td>40</td>
</tr>
<tr>
<td>54-029-0011</td>
<td>HANCOCK</td>
<td>47.5</td>
<td>44.7</td>
<td>36.9</td>
<td>43</td>
</tr>
<tr>
<td>54-029-1004</td>
<td></td>
<td>42.0</td>
<td>43.9</td>
<td>33.7</td>
<td>40</td>
</tr>
</tbody>
</table>

**Sites with less than 75% capture**

### AQS: Annual Average

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-009-0005</td>
<td>BROOKE</td>
<td>16.6</td>
<td>17.4</td>
<td>15.2</td>
<td>16.4</td>
</tr>
<tr>
<td>54-029-0011</td>
<td>HANCOCK</td>
<td>15.2</td>
<td>17.3</td>
<td>14.6</td>
<td>15.7</td>
</tr>
<tr>
<td>54-029-1004</td>
<td></td>
<td>16.2</td>
<td>16.3</td>
<td>13.7</td>
<td>15.4</td>
</tr>
</tbody>
</table>

**Sites with less than 75% capture**

### Steubenville-Weirton Area PM₂.₅ Monitor Locations and Site ID Numbers

[Map of Steubenville-Weirton Area PM₂.₅ Monitor Locations and Site ID Numbers]
Factor 2: Emissions data  
(tons per day)

<table>
<thead>
<tr>
<th>Year</th>
<th>County</th>
<th>SO_2</th>
<th>NO_x</th>
<th>PM_{2.5}</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>JEFFERSON</td>
<td>613.28</td>
<td>84.62</td>
<td>5.48</td>
</tr>
<tr>
<td></td>
<td>Harrison</td>
<td>0.17</td>
<td>2.26</td>
<td>0.23</td>
</tr>
<tr>
<td>2009</td>
<td>JEFFERSON</td>
<td>207.81</td>
<td>51.18</td>
<td>16.93</td>
</tr>
<tr>
<td></td>
<td>Harrison</td>
<td>0.11</td>
<td>2.54</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Pennsylvania and West Virginia

<table>
<thead>
<tr>
<th>Year</th>
<th>County</th>
<th>SO_2</th>
<th>NO_x</th>
<th>PM_{2.5}</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Brooke, WV</td>
<td>3.36</td>
<td>5.45</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td>Hancock, WV</td>
<td>2.81</td>
<td>7.44</td>
<td>17.36</td>
</tr>
<tr>
<td></td>
<td>Beaver, PA</td>
<td>16.87</td>
<td>18.85</td>
<td>2.41</td>
</tr>
<tr>
<td></td>
<td>Washington, PA</td>
<td>4.03</td>
<td>25.26</td>
<td>3.06</td>
</tr>
<tr>
<td>2009</td>
<td>Brooke</td>
<td>3.22</td>
<td>4.83</td>
<td>1.11</td>
</tr>
<tr>
<td></td>
<td>Hancock</td>
<td>4.24</td>
<td>10.15</td>
<td>15.53</td>
</tr>
<tr>
<td></td>
<td>Beaver, PA*</td>
<td>108.36</td>
<td>29.04</td>
<td>12.20</td>
</tr>
<tr>
<td></td>
<td>Washington, PA*</td>
<td>38.23</td>
<td>21.86</td>
<td>4.70</td>
</tr>
</tbody>
</table>

* Does not include on-road data

Major Employers:
Source: Ohio Department of Development 2007

Most of the major employers in the Ohio portion of the Weirton-Steubenville, WV-OH area are in the categories of government, manufacturing and service as shown in the following tables. It is likely that the utilities employ a significant number of people in this area.
Jefferson County

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Electric Power</td>
<td>Utility</td>
</tr>
<tr>
<td>Buckeye Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Edison Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>FirstEnergy Corp</td>
<td>Utility</td>
</tr>
<tr>
<td>Franciscan Univ of Steubenville</td>
<td>Service</td>
</tr>
<tr>
<td>Indian Creek Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Steubenville City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Titanium Metals Corp/Timet</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Trinity Health System</td>
<td>Service</td>
</tr>
<tr>
<td>Wal-Mart Stores Inc</td>
<td>Trade</td>
</tr>
<tr>
<td>Wheeling-Pittsburgh Steel</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

Harrison County

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>CamOhio LLC</td>
<td>Mining</td>
</tr>
<tr>
<td>Carriage Inn of Cadiz</td>
<td>Service</td>
</tr>
<tr>
<td>Freeport Press Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Gables Care Center</td>
<td>Service</td>
</tr>
<tr>
<td>Harrison Community Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Harrison County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Harrison Hills City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>McDonough Corp/L J Smith</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Saint-Gobain/Bayform</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

Factor 3: Population and Projected Growth

Sources: Office of Strategic Research, Ohio Department of Development
          U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in the Ohio portion of the Weirton-Steubenville, WV-OH area are; Steubenville in Jefferson County; and in the adjacent Harrison County, the city of Cadiz.

As indicated in the following table and graphs, Jefferson County has the highest population in this area and it is projected to decrease. The population in Harrison County is also projected to decrease.

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jefferson</td>
<td>71,277</td>
<td>70,631</td>
<td>70,125</td>
<td>66,530</td>
<td>60,770</td>
<td>55,850</td>
</tr>
<tr>
<td>Harrison</td>
<td>15,873</td>
<td>15,881</td>
<td>15,799</td>
<td>15,710</td>
<td>15,680</td>
<td>15,460</td>
</tr>
</tbody>
</table>
Factor 4: Traffic and commuting patterns

The kDVMT in Jefferson County have had an interesting fifteen years of ups and downs. From 2005 to 2006 the kDVMT in Jefferson County was virtually unchanged. Harrison County has remained generally constant.
Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)
Source: Ohio Department of Transportation, Office of Technical Services

Jefferson County: Total County kDVMT 1990-2006

Harrison County: Total County kDVMT 1990-2006

Commuter Patterns
Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

The majority of Jefferson County workers commuting outside the county, travel to Brooke County, WV County. The largest portion Harrison County workers commuting outside the county travel to Tuscarawas County.
### Jefferson

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Jefferson County</th>
<th>28,793</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Brooke Co. WV</td>
<td>2,377</td>
</tr>
<tr>
<td>Belmont Co. OH</td>
<td>1,236</td>
</tr>
<tr>
<td>Allegheny Co. PA</td>
<td>1,094</td>
</tr>
<tr>
<td>Hancock Co. WV</td>
<td>784</td>
</tr>
<tr>
<td>Ohio Co. WV</td>
<td>706</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>632</td>
</tr>
<tr>
<td>Harrison Co. OH</td>
<td>383</td>
</tr>
<tr>
<td>Carroll Co. OH</td>
<td>265</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>195</td>
</tr>
<tr>
<td>Beaver Co. PA</td>
<td>154</td>
</tr>
</tbody>
</table>

Percent is of workers living in county.

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Jefferson County</th>
<th>25,922</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Brooke Co. WV</td>
<td>1,296</td>
</tr>
<tr>
<td>Belmont Co. OH</td>
<td>1,129</td>
</tr>
<tr>
<td>Hancock Co. WV</td>
<td>1,007</td>
</tr>
<tr>
<td>Harrison Co. OH</td>
<td>593</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>517</td>
</tr>
<tr>
<td>Ohio Co. WV</td>
<td>436</td>
</tr>
<tr>
<td>Carroll Co. OH</td>
<td>178</td>
</tr>
<tr>
<td>Allegheny Co. PA</td>
<td>175</td>
</tr>
<tr>
<td>Washington Co. PA</td>
<td>171</td>
</tr>
<tr>
<td>Marshall Co. WV</td>
<td>147</td>
</tr>
</tbody>
</table>

Percent is of workers working in county.

### Harrison

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Harrison County</th>
<th>6,585</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>1,410</td>
</tr>
<tr>
<td>Jefferson Co. OH</td>
<td>593</td>
</tr>
<tr>
<td>Belmont Co. OH</td>
<td>361</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>292</td>
</tr>
<tr>
<td>Carroll Co. OH</td>
<td>188</td>
</tr>
<tr>
<td>Ohio Co. WV</td>
<td>83</td>
</tr>
<tr>
<td>Brooke Co. WV</td>
<td>65</td>
</tr>
<tr>
<td>Wayne Co. OH</td>
<td>62</td>
</tr>
<tr>
<td>Holmes Co. OH</td>
<td>34</td>
</tr>
<tr>
<td>Allegheny Co. PA</td>
<td>33</td>
</tr>
</tbody>
</table>

Percent is of workers living in county.

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Harrison County</th>
<th>4,416</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Jefferson Co. OH</td>
<td>383</td>
</tr>
<tr>
<td>Belmont Co. OH</td>
<td>280</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>182</td>
</tr>
<tr>
<td>Carroll Co. OH</td>
<td>160</td>
</tr>
<tr>
<td>Guernsey Co. OH</td>
<td>52</td>
</tr>
<tr>
<td>Holmes Co. OH</td>
<td>41</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>27</td>
</tr>
<tr>
<td>Brooke Co. WV</td>
<td>18</td>
</tr>
<tr>
<td>Allegheny Co. PA</td>
<td>13</td>
</tr>
<tr>
<td>Hamilton Co. OH</td>
<td>12</td>
</tr>
</tbody>
</table>

Percent is of workers working in county.

### Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Weirton-Steubenville area.

### Factor 6: Topography/Land use/Land cover

Jefferson County is in the unglaciated Allegheny Plateau region (see Appendix F). The county has been extensively dissected by drainageways that empty into the Ohio River, which is the sinuous eastern border of the county. Relief is
generally greatest in the eastern part of the county. The elevation ranges from 1,388 feet to about 644 feet above sea level.

Harrison County is located in the, you guessed it, the unglaciated Allegheny Plateau region and is similar in topography to that of Jefferson County. The highest point in the county is 1,366 feet and the lowest point is about 861 feet above sea level.

As shown in the following pie charts, the land use/land cover in Jefferson and Harrison counties are nearly the same, predominately characterized as forest area.
Factor 7: Jurisdictional boundaries

The Weirton-Steubenville, WV-OH Metropolitan Statistical Area includes: Brooke and Hancock, West Virginia and Jefferson County, Ohio. The principal cities are Weirton, WV and Steubenville, OH.

The Brooke-Hancock-Jefferson Metropolitan Planning Commission (BHJMPO) is the planning agency designated as the Metropolitan Planning Organization for the Weirton-Steubenville area. The BHJMPO region is composed of three counties: Hancock and Brooke counties in WV and Jefferson County, OH.

Factor 8: Level of control of emission sources

In the Weirton-Steubenville area, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal) in this area. In addition, this area will be targeted for diesel emission reductions and there are also significant point sources which may be controlled which will contribute to improved air quality in Jefferson County.
Toledo, OH:

Current county nonattainment: none

Recommended county nonattainment: none

Source: Office of Strategic Research, Ohio Department of Development
**Discussion:**

There are two counties included in the Toledo area, Lucas and Wood. Ohio EPA recommends retaining Lucas and Wood counties as attainment for PM$_{2.5}$ due to no monitored violations. While there are no monitored violations, the concentrations are very near the revised 24-hour revised standard at one monitor. Therefore, Ohio EPA is providing the same level of detailed information as the other areas in Ohio that have PM$_{2.5}$ monitored violations. There are seven adjacent counties to the Toledo area discussed in this section; Fulton, Henry, Putnam, Hancock, Seneca, Sandusky, and Ottawa.

The 2005 SO$_2$ and NO$_x$ emissions in Lucas County are notable and the SO$_2$ emissions are forecasted to increase by 2009.

**Factor 1: Air quality data**

[ ] = Exceeds standard

**AQS: 24-Hour Average – 98$^{th}$ Percentile (μg/m$^3$)**

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-095-0024</td>
<td>Lucas</td>
<td>34.3</td>
<td>45.3</td>
<td>25.9</td>
<td>35</td>
</tr>
<tr>
<td>39-095-0025</td>
<td></td>
<td>31.6</td>
<td>44.6</td>
<td>25.2</td>
<td>34</td>
</tr>
<tr>
<td>39-095-0026</td>
<td></td>
<td>30.6</td>
<td>42.9</td>
<td>27.1</td>
<td>34</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture

**AQS: Annual Average**

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-095-0024</td>
<td>Lucas</td>
<td>13.7</td>
<td>15.8</td>
<td>12.7</td>
<td>14.1</td>
</tr>
<tr>
<td>39-095-0025</td>
<td></td>
<td>13.3</td>
<td>15.5</td>
<td>11.9</td>
<td>13.6</td>
</tr>
<tr>
<td>39-095-0026</td>
<td></td>
<td>13.0</td>
<td>15.7</td>
<td>12.6</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
Factor 2:  Emissions data
(tons per day)

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUCAS</td>
<td>68.49</td>
<td>70.96</td>
<td>5.03</td>
</tr>
<tr>
<td>WOOD</td>
<td>1.80</td>
<td>24.61</td>
<td>1.61</td>
</tr>
<tr>
<td>Fulton</td>
<td>0.98</td>
<td>12.27</td>
<td>0.75</td>
</tr>
<tr>
<td>Henry</td>
<td>5.65</td>
<td>5.97</td>
<td>0.41</td>
</tr>
<tr>
<td>Hancock</td>
<td>0.67</td>
<td>12.31</td>
<td>0.67</td>
</tr>
<tr>
<td>Seneca</td>
<td>15.67</td>
<td>24.72</td>
<td>1.17</td>
</tr>
<tr>
<td>Sandusky</td>
<td>6.72</td>
<td>20.45</td>
<td>1.03</td>
</tr>
<tr>
<td>Ottawa</td>
<td>3.10</td>
<td>11.75</td>
<td>0.91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUCAS</td>
<td>101.26</td>
<td>60.50</td>
<td>6.94</td>
</tr>
<tr>
<td>WOOD</td>
<td>1.23</td>
<td>25.55</td>
<td>1.52</td>
</tr>
<tr>
<td>Fulton</td>
<td>0.67</td>
<td>10.18</td>
<td>0.65</td>
</tr>
<tr>
<td>Henry</td>
<td>5.44</td>
<td>6.69</td>
<td>0.39</td>
</tr>
<tr>
<td>Hancock</td>
<td>0.27</td>
<td>12.46</td>
<td>0.60</td>
</tr>
<tr>
<td>Seneca</td>
<td>15.40</td>
<td>24.71</td>
<td>1.12</td>
</tr>
<tr>
<td>Sandusky</td>
<td>6.39</td>
<td>19.86</td>
<td>0.94</td>
</tr>
<tr>
<td>Ottawa</td>
<td>2.75</td>
<td>12.21</td>
<td>0.86</td>
</tr>
</tbody>
</table>

Major Employers:
Source: Ohio Department of Development 2007

Most of the major employers in the Toledo area are in the categories of manufacturing, government and service as shown below.

**Lucas County**

- Andersons Inc: Trade
- Carlyle Group/HCR Manor Care: Service
- Chrysler LLC: Manufacturing
- City of Toledo: Government
- Dana Corp: Manufacturing
- General Motors Corp: Manufacturing
- Libbey Inc: Manufacturing
- Lucas County Government: Government
- Mercy Health Partners: Service
- Owens Corning: Manufacturing
- Promedica Health System: Service
- Toledo City Bd of Ed: Government
- United Parcel Service Inc: Transportation
- University of Toledo: Government
### Wood County
- **Bowling Green State University** | Government
- **Chrysler LLC** | Manufacturing
- **Cooper Standard Automotive Inc** | Manufacturing
- **First Solar Inc** | Manufacturing
- **Great Lakes Window Inc** | Manufacturing
- **Magna Intl/Norplas Inc** | Manufacturing
- **Owens Community College** | Government
- **Owens Illinois Inc** | Manufacturing
- **Perrysburg Exempted Village Bd of Ed** | Government
- **Rudolph-Libbe Companies** | Construction
- **Walgreen Co** | Trade
- **Wood County Government** | Government
- **Wood County Hospital Assoc** | Service

### Fulton County
- **Dana Corp** | Manufacturing
- **Fulton County Government** | Government
- **Fulton County Health Center** | Service
- **International Automotive Components** | Manufacturing
- **ITT Industries Inc** | Manufacturing
- **North Star BlueScope Steel LLC** | Manufacturing
- **Sauder Woodworking Co** | Manufacturing
- **TRW Automotive** | Manufacturing

### Henry County
- **Alex Products** | Manufacturing
- **Campbell Soup Co** | Manufacturing
- **Deshler Group/Claud Sintz Inc** | Manufacturing
- **Filling Memorial Home of Mercy** | Service
- **Henry County Hospital** | Service
- **Lutheran Home at Napoleon** | Service
- **Napoleon Area City Bd of Ed** | Government
- **Silgan Holding Inc** | Manufacturing
- **Tenneco Inc** | Manufacturing
- **Wal-Mart Stores Inc** | Trade

### Hancock County
- **Blanchard Valley regional Health** | Service
- **Consolidated Biscuit Co** | Manufacturing
- **Cooper Tire & Rubber Co** | Manufacturing
- **Findlay City Bd of Ed** | Government
- **Kohl's Corp** | Trade
- **Lowe's Companies Inc** | Trade
- **Marathon Petroleum Co LLC** | Trade
- **Nissin Brake Ohio** | Manufacturing
- **Sanoh America Inc** | Manufacturing
- **University of Findlay** | Service
- **Whirlpool Corp** | Manufacturing
### Seneca County

<table>
<thead>
<tr>
<th>Company/Institution</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Standard Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Dorel Industries/Ameriwood Ind</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Fostoria City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Heidleberg College</td>
<td>Service</td>
</tr>
<tr>
<td>Mercy Hospital of Tiffin</td>
<td>Service</td>
</tr>
<tr>
<td>National Machinery LLC</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
<tr>
<td>ThyssenKrupp/TKA Atlas Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Tiffin City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Tiffin University</td>
<td>Service</td>
</tr>
</tbody>
</table>

### Sandusky County

<table>
<thead>
<tr>
<th>Company/Institution</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlas Industries</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Bellevue Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Crown Battery</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Eaton INOAC</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Fremont City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>HJ Heinz Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Memorial Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Poly-Foam Int'l/Style Crest</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Revere Plastics Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Sandusky County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Whirlpool Corp</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

### Ottawa County

<table>
<thead>
<tr>
<th>Company/Institution</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benton-Carroll-Salem Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Brush Wellman Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>FirstEnergy Corp</td>
<td>Utility</td>
</tr>
<tr>
<td>Luther Home of Mercy</td>
<td>Service</td>
</tr>
<tr>
<td>Magruder Hospital</td>
<td>Service</td>
</tr>
<tr>
<td>Ottawa County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Port Clinton City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Silgan Holdings Inc</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>USG Corp/US Gypsum Co</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

### Factor 3: Population and Projected Growth

Sources: Office of Strategic Research, Ohio Department of Development  
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in the Toledo area and adjacent counties are; Toledo, Oregon and Sylvania in Lucas County; Bowling Green, Perrysburg, Rossford and Maumee in Wood County; Wauseon in Fulton County; Napoleon in Henry County, Ottawa in Putnam County; Findlay in Hancock County; Tiffin in Seneca County, Fremont and Clyde in Sandusky; and Port Clinton, Marblehead and Kelleys Island in Ottawa County. Lucas County has the highest population in this area and it is projected to steadily decrease while the population in Wood County is projected to steadily increase. The population in Fulton, Henry and Hancock is projected to increase and in Seneca, Sandusky and Ottawa counties the
population is expected to gradually decrease as shown in the table and graphs below.

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lucas</td>
<td>449,588</td>
<td>447,410</td>
<td>445,281</td>
<td>444,870</td>
<td>434,650</td>
<td>417,870</td>
</tr>
<tr>
<td>Wood</td>
<td>123,377</td>
<td>123,889</td>
<td>124,183</td>
<td>127,020</td>
<td>133,330</td>
<td>141,880</td>
</tr>
<tr>
<td>Fulton</td>
<td>42,785</td>
<td>42,888</td>
<td>42,900</td>
<td>44,610</td>
<td>47,210</td>
<td>49,110</td>
</tr>
<tr>
<td>Henry</td>
<td>29,364</td>
<td>29,431</td>
<td>29,520</td>
<td>29,540</td>
<td>29,990</td>
<td>30,110</td>
</tr>
<tr>
<td>Hancock</td>
<td>73,470</td>
<td>73,508</td>
<td>73,824</td>
<td>74,180</td>
<td>76,910</td>
<td>79,040</td>
</tr>
<tr>
<td>Seneca</td>
<td>57,724</td>
<td>57,373</td>
<td>57,255</td>
<td>56,750</td>
<td>54,260</td>
<td>50,920</td>
</tr>
<tr>
<td>Sandusky</td>
<td>61,689</td>
<td>61,579</td>
<td>61,625</td>
<td>59,940</td>
<td>57,900</td>
<td>56,420</td>
</tr>
<tr>
<td>Ottawa</td>
<td>41,436</td>
<td>41,430</td>
<td>41,331</td>
<td>40,800</td>
<td>40,270</td>
<td>38,520</td>
</tr>
</tbody>
</table>

**Lucas County**

![Lucas County population chart]

**Wood County**

![Wood County population chart]
Factor 4: Traffic and commuting patterns

As expected, Lucas County has the highest kDVMT in the Toledo area as indicated in the tables below. Fulton County has experienced a very slight increase of kDVMT between 2005 and 2006 while all other surrounding counties have had slight decreases. Seneca, Sandusky and Ottawa counties had the most notable downward trend in kDVMT between 2004 and 2006.
Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

Source: Ohio Department of Transportation, Office of Technical Services

Lucas County: Total County kDVMT 1990-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>kDVMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>8805.55</td>
</tr>
<tr>
<td>1991</td>
<td>9034.95</td>
</tr>
<tr>
<td>1992</td>
<td>9236.54</td>
</tr>
<tr>
<td>1993</td>
<td>9430.11</td>
</tr>
<tr>
<td>1994</td>
<td>9604.18</td>
</tr>
<tr>
<td>1995</td>
<td>9733.38</td>
</tr>
<tr>
<td>1996</td>
<td>9832.96</td>
</tr>
<tr>
<td>1997</td>
<td>9896.27</td>
</tr>
<tr>
<td>1998</td>
<td>9923.49</td>
</tr>
<tr>
<td>1999</td>
<td>9930.55</td>
</tr>
<tr>
<td>2000</td>
<td>10000.01</td>
</tr>
<tr>
<td>2001</td>
<td>10095.03</td>
</tr>
<tr>
<td>2002</td>
<td>10175.09</td>
</tr>
<tr>
<td>2003</td>
<td>10220.14</td>
</tr>
<tr>
<td>2004</td>
<td>12032.29</td>
</tr>
<tr>
<td>2005</td>
<td>11895.43</td>
</tr>
<tr>
<td>2006</td>
<td>11980.01</td>
</tr>
</tbody>
</table>

Wood County: Total County kDVMT 1990-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>kDVMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>2915.16</td>
</tr>
<tr>
<td>1991</td>
<td>3049.63</td>
</tr>
<tr>
<td>1992</td>
<td>3195.54</td>
</tr>
<tr>
<td>1993</td>
<td>3343.95</td>
</tr>
<tr>
<td>1994</td>
<td>3494.85</td>
</tr>
<tr>
<td>1995</td>
<td>3647.28</td>
</tr>
<tr>
<td>1996</td>
<td>3791.31</td>
</tr>
<tr>
<td>1997</td>
<td>3937.05</td>
</tr>
<tr>
<td>1998</td>
<td>4084.49</td>
</tr>
<tr>
<td>1999</td>
<td>4233.67</td>
</tr>
<tr>
<td>2000</td>
<td>4384.64</td>
</tr>
<tr>
<td>2001</td>
<td>4537.41</td>
</tr>
<tr>
<td>2002</td>
<td>4692.02</td>
</tr>
<tr>
<td>2003</td>
<td>4848.53</td>
</tr>
<tr>
<td>2004</td>
<td>5316.14</td>
</tr>
<tr>
<td>2005</td>
<td>5228.79</td>
</tr>
<tr>
<td>2006</td>
<td>5179.89</td>
</tr>
</tbody>
</table>

Fulton County: Total County kDVMT 1990-2006

Henry County: Total County kDVMT 1990-2006
Hancock County: Total County kDVMT 1990-2006

2004 = 2900.9
2005 = 2866.29
2006 = 2861.8

Seneca County: Total County kDVMT 1990-2006

2004 = 1306.61
2005 = 1278.29
2006 = 1269.44

Sandusky County: Total County kDVMT 1990-2006

Year
kDVMT 2004 = 2751.89 2005 = 2762.48 2006 = 2632.8

Ottawa County: Total County kDVMT 1990-2006

Year
kDVMT 2004 = 1382.95 2005 = 1375.25 2006 = 1244.3

Commuter Patterns
Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

As shown in the following tables, the majority of Ohio commuters traveling into Lucas County are from Wood, Fulton and Ottawa counties. Due to the commuting pattern from Wood County into Lucas County where a violating monitor is located, Wood County (partial) is considered a contributing county. Ohio EPA recommends including the five townships located along the Wood-Lucas county line as part of the nonattainment area. These five townships are likely the major contributors to the volume of commuters as the rest of Wood County is predominately rural.

<table>
<thead>
<tr>
<th>Lucas County</th>
<th>Number of workers 16+ years of age living in Lucas County</th>
<th>207,585</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute Out To</strong></td>
<td><strong>Number</strong></td>
<td><strong>Percent</strong></td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>17,054</td>
<td>8.2%</td>
</tr>
<tr>
<td>Monroe Co. MI</td>
<td>4,456</td>
<td>2.1%</td>
</tr>
<tr>
<td>Fulton Co. OH</td>
<td>1,957</td>
<td>0.9%</td>
</tr>
<tr>
<td>Wayne Co. MI</td>
<td>1,906</td>
<td>0.9%</td>
</tr>
<tr>
<td>Washtenaw Co. MI</td>
<td>867</td>
<td>0.4%</td>
</tr>
<tr>
<td>Ottawa Co. OH</td>
<td>738</td>
<td>0.4%</td>
</tr>
<tr>
<td>Lenawee Co. MI</td>
<td>583</td>
<td>0.3%</td>
</tr>
<tr>
<td>Hancock Co. OH</td>
<td>514</td>
<td>0.2%</td>
</tr>
<tr>
<td>Sandusky Co. OH</td>
<td>418</td>
<td>0.2%</td>
</tr>
<tr>
<td>Oakland Co. MI</td>
<td>375</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lucas County</th>
<th>Number of workers 16+ years of age working in Lucas County</th>
<th>226,840</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute In From</strong></td>
<td><strong>Number</strong></td>
<td><strong>Percent</strong></td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>19,504</td>
<td>8.6%</td>
</tr>
<tr>
<td>Monroe Co. MI</td>
<td>12,654</td>
<td>5.6%</td>
</tr>
<tr>
<td>Fulton Co. OH</td>
<td>5,203</td>
<td>2.3%</td>
</tr>
<tr>
<td>Ottawa Co. OH</td>
<td>3,418</td>
<td>1.5%</td>
</tr>
<tr>
<td>Lenawee Co. MI</td>
<td>1,557</td>
<td>0.7%</td>
</tr>
<tr>
<td>Sandusky Co. OH</td>
<td>1,537</td>
<td>0.7%</td>
</tr>
<tr>
<td>Henry Co. OH</td>
<td>952</td>
<td>0.4%</td>
</tr>
<tr>
<td>Wayne Co. MI</td>
<td>922</td>
<td>0.4%</td>
</tr>
<tr>
<td>Hancock Co. OH</td>
<td>607</td>
<td>0.3%</td>
</tr>
<tr>
<td>Seneca Co. OH</td>
<td>480</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wood County</th>
<th>Number of workers 16+ years of age living in Wood County</th>
<th>61,207</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute Out To</strong></td>
<td><strong>Number</strong></td>
<td><strong>Percent</strong></td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>19,504</td>
<td>31.9%</td>
</tr>
<tr>
<td>Hancock Co. OH</td>
<td>2,177</td>
<td>3.6%</td>
</tr>
<tr>
<td>Seneca Co. OH</td>
<td>889</td>
<td>1.5%</td>
</tr>
<tr>
<td>Ottawa Co. OH</td>
<td>760</td>
<td>1.2%</td>
</tr>
<tr>
<td>Sandusky Co. OH</td>
<td>587</td>
<td>1.0%</td>
</tr>
<tr>
<td>Monroe Co. MI</td>
<td>384</td>
<td>0.6%</td>
</tr>
<tr>
<td>Henry Co. OH</td>
<td>359</td>
<td>0.6%</td>
</tr>
<tr>
<td>Wayne Co. MI</td>
<td>307</td>
<td>0.5%</td>
</tr>
<tr>
<td>Fulton Co. OH</td>
<td>269</td>
<td>0.4%</td>
</tr>
<tr>
<td>Defiance Co. OH</td>
<td>172</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wood County</th>
<th>Number of workers 16+ years of age working in Wood County</th>
<th>60,992</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commute In From</strong></td>
<td><strong>Number</strong></td>
<td><strong>Percent</strong></td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>17,054</td>
<td>28.0%</td>
</tr>
<tr>
<td>Ottawa Co. OH</td>
<td>1,652</td>
<td>2.7%</td>
</tr>
<tr>
<td>Hancock Co. OH</td>
<td>1,603</td>
<td>2.6%</td>
</tr>
<tr>
<td>Sandusky Co. OH</td>
<td>1,408</td>
<td>2.3%</td>
</tr>
<tr>
<td>Seneca Co. OH</td>
<td>1,019</td>
<td>1.7%</td>
</tr>
<tr>
<td>Henry Co. OH</td>
<td>865</td>
<td>1.4%</td>
</tr>
<tr>
<td>Monroe Co. MI</td>
<td>778</td>
<td>1.3%</td>
</tr>
<tr>
<td>Fulton Co. OH</td>
<td>622</td>
<td>1.0%</td>
</tr>
<tr>
<td>Lenawee Co. MI</td>
<td>128</td>
<td>0.2%</td>
</tr>
<tr>
<td>Putnam Co. OH</td>
<td>109</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.
### Fulton

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Fulton County</th>
<th>Number of workers 16+ years of age working in Fulton County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Commute Out To</td>
<td></td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>5,203</td>
</tr>
<tr>
<td>Williams Co. OH</td>
<td>677</td>
</tr>
<tr>
<td>Henry Co. OH</td>
<td>659</td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>622</td>
</tr>
<tr>
<td>Lenawee Co. MI</td>
<td>233</td>
</tr>
<tr>
<td>Defiance Co. OH</td>
<td>217</td>
</tr>
<tr>
<td>Monroe Co. MI</td>
<td>122</td>
</tr>
<tr>
<td>Wayne Co. MI</td>
<td>30</td>
</tr>
<tr>
<td>Hillsdale Co. MI</td>
<td>29</td>
</tr>
<tr>
<td>Sandusky Co. OH</td>
<td>29</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

---

### Henry

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Henry County</th>
<th>Number of workers 16+ years of age working in Henry County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Commute Out To</td>
<td></td>
</tr>
<tr>
<td>Fulton Co. OH</td>
<td>1,981</td>
</tr>
<tr>
<td>Defiance Co. OH</td>
<td>1,327</td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>952</td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>865</td>
</tr>
<tr>
<td>Williams Co. OH</td>
<td>295</td>
</tr>
<tr>
<td>Hancock Co. OH</td>
<td>189</td>
</tr>
<tr>
<td>Putnam Co. OH</td>
<td>138</td>
</tr>
<tr>
<td>Allen Co. OH</td>
<td>38</td>
</tr>
<tr>
<td>Lenawee Co. MI</td>
<td>23</td>
</tr>
<tr>
<td>Monroe Co. MI</td>
<td>18</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.
### Hancock

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Hancock County</th>
<th>35,845</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td></td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>1,603</td>
</tr>
<tr>
<td>Seneca Co. OH</td>
<td>1,296</td>
</tr>
<tr>
<td>Allen Co. OH</td>
<td>1,074</td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>607</td>
</tr>
<tr>
<td>Wyandot Co. OH</td>
<td>491</td>
</tr>
<tr>
<td>Putnam Co. OH</td>
<td>382</td>
</tr>
<tr>
<td>Hardin Co. OH</td>
<td>379</td>
</tr>
<tr>
<td>Sandusky Co. OH</td>
<td>126</td>
</tr>
<tr>
<td>Ottawa Co. OH</td>
<td>50</td>
</tr>
<tr>
<td>Van Wert Co. OH</td>
<td>49</td>
</tr>
<tr>
<td><strong>Percent</strong></td>
<td>4.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Hancock County</th>
<th>41,331</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td></td>
</tr>
<tr>
<td>Seneca Co. OH</td>
<td>3,118</td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>2,177</td>
</tr>
<tr>
<td>Putnam Co. OH</td>
<td>1,722</td>
</tr>
<tr>
<td>Allen Co. OH</td>
<td>1,169</td>
</tr>
<tr>
<td>Wyandot Co. OH</td>
<td>1,107</td>
</tr>
<tr>
<td>Hardin Co. OH</td>
<td>1,082</td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>514</td>
</tr>
<tr>
<td>Sandusky Co. OH</td>
<td>191</td>
</tr>
<tr>
<td>Henry Co. OH</td>
<td>189</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>91</td>
</tr>
<tr>
<td><strong>Percent</strong></td>
<td>7.5%</td>
</tr>
</tbody>
</table>

**Percent is of workers living in county.**

**Percent is of workers working in county.**

### Seneca

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Seneca County</th>
<th>28,274</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td></td>
</tr>
<tr>
<td>Hancock Co. OH</td>
<td>3,118</td>
</tr>
<tr>
<td>Sandusky Co. OH</td>
<td>2,735</td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>1,019</td>
</tr>
<tr>
<td>Huron Co. OH</td>
<td>954</td>
</tr>
<tr>
<td>Wyandot Co. OH</td>
<td>781</td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>480</td>
</tr>
<tr>
<td>Erie Co. OH</td>
<td>317</td>
</tr>
<tr>
<td>Crawford Co. OH</td>
<td>284</td>
</tr>
<tr>
<td>Ottawa Co. OH</td>
<td>177</td>
</tr>
<tr>
<td>Allen Co. OH</td>
<td>68</td>
</tr>
<tr>
<td><strong>Percent</strong></td>
<td>11.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Seneca County</th>
<th>23,261</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td></td>
</tr>
<tr>
<td>Hancock Co. OH</td>
<td>1,296</td>
</tr>
<tr>
<td>Sandusky Co. OH</td>
<td>1,217</td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>889</td>
</tr>
<tr>
<td>Wyandot Co. OH</td>
<td>675</td>
</tr>
<tr>
<td>Crawford Co. OH</td>
<td>323</td>
</tr>
<tr>
<td>Huron Co. OH</td>
<td>282</td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>138</td>
</tr>
<tr>
<td>Erie Co. OH</td>
<td>89</td>
</tr>
<tr>
<td>Ottawa Co. OH</td>
<td>81</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>48</td>
</tr>
<tr>
<td><strong>Percent</strong></td>
<td>5.6%</td>
</tr>
</tbody>
</table>

**Percent is of workers living in county.**

**Percent is of workers working in county.**
### Sandusky

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>Percent of workers that work outside the county</th>
<th>Average commute time in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>living in Sandusky County</td>
<td>29,971</td>
<td>31.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>Percent of workers that work outside the county</th>
<th>Average commute time in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>working in Sandusky County</td>
<td>28,184</td>
<td>31.1%</td>
</tr>
</tbody>
</table>

#### Commute Out To

<table>
<thead>
<tr>
<th>Commute Out To</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erie Co. OH</td>
<td>1,659</td>
<td>5.5%</td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>1,537</td>
<td>5.1%</td>
</tr>
<tr>
<td>Ottawa Co. OH</td>
<td>1,426</td>
<td>4.8%</td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>1,408</td>
<td>4.7%</td>
</tr>
<tr>
<td>Huron Co. OH</td>
<td>1,305</td>
<td>4.4%</td>
</tr>
<tr>
<td>Seneca Co. OH</td>
<td>1,217</td>
<td>4.1%</td>
</tr>
<tr>
<td>Hancock Co. OH</td>
<td>191</td>
<td>0.6%</td>
</tr>
<tr>
<td>Fulton Co. OH</td>
<td>72</td>
<td>0.2%</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>59</td>
<td>0.2%</td>
</tr>
<tr>
<td>Monroe Co. MI</td>
<td>44</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

#### Commute In From

<table>
<thead>
<tr>
<th>Commute In From</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seneca Co. OH</td>
<td>2,735</td>
<td>9.7%</td>
</tr>
<tr>
<td>Ottawa Co. OH</td>
<td>1,299</td>
<td>4.6%</td>
</tr>
<tr>
<td>Huron Co. OH</td>
<td>1,025</td>
<td>3.6%</td>
</tr>
<tr>
<td>Erie Co. OH</td>
<td>768</td>
<td>2.7%</td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>587</td>
<td>2.1%</td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>418</td>
<td>1.5%</td>
</tr>
<tr>
<td>Hancock Co. OH</td>
<td>126</td>
<td>0.4%</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>71</td>
<td>0.3%</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>51</td>
<td>0.2%</td>
</tr>
<tr>
<td>Wyandot Co. OH</td>
<td>45</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Ottawa

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>Percent of workers that work outside the county</th>
<th>Average commute time in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>living in Ottawa County</td>
<td>19,434</td>
<td>43.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>Percent of workers that work outside the county</th>
<th>Average commute time in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>working in Ottawa County</td>
<td>15,208</td>
<td>43.8%</td>
</tr>
</tbody>
</table>

#### Commute Out To

<table>
<thead>
<tr>
<th>Commute Out To</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lucas Co. OH</td>
<td>3,418</td>
<td>17.6%</td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>1,652</td>
<td>8.5%</td>
</tr>
<tr>
<td>Sandusky Co. OH</td>
<td>1,299</td>
<td>6.7%</td>
</tr>
<tr>
<td>Erie Co. OH</td>
<td>1,107</td>
<td>5.7%</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>155</td>
<td>0.8%</td>
</tr>
<tr>
<td>Huron Co. OH</td>
<td>151</td>
<td>0.8%</td>
</tr>
<tr>
<td>Monroe Co. MI</td>
<td>90</td>
<td>0.5%</td>
</tr>
<tr>
<td>Seneca Co. OH</td>
<td>81</td>
<td>0.4%</td>
</tr>
<tr>
<td>Wayne Co. MI</td>
<td>75</td>
<td>0.4%</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>71</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

#### Commute In From

<table>
<thead>
<tr>
<th>Commute In From</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandusky Co. OH</td>
<td>1,426</td>
<td>9.4%</td>
</tr>
<tr>
<td>Wood Co. OH</td>
<td>760</td>
<td>5.0%</td>
</tr>
<tr>
<td>Lucas Co. OH</td>
<td>738</td>
<td>4.9%</td>
</tr>
<tr>
<td>Erie Co. OH</td>
<td>530</td>
<td>3.5%</td>
</tr>
<tr>
<td>Seneca Co. OH</td>
<td>177</td>
<td>1.2%</td>
</tr>
<tr>
<td>Huron Co. OH</td>
<td>111</td>
<td>0.7%</td>
</tr>
<tr>
<td>Monroe Co. MI</td>
<td>68</td>
<td>0.4%</td>
</tr>
<tr>
<td>Hancock Co. OH</td>
<td>50</td>
<td>0.3%</td>
</tr>
<tr>
<td>Lorain Co. OH</td>
<td>43</td>
<td>0.3%</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>32</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

### Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Toledo area.

### Factor 6: Topography/Land use/Land cover

Lucas County is in the glaciated Huron-Erie Lake Plains region (see Appendix F). The county is on a nearly level plain. The generally flat landscape is broken by low, rounded hills created by streams throughout the county. The average elevation is about 614 feet above sea level.
Wood County lies entirely within the Huron-Erie Lake Plains region. The county landscape is relatively uniform, and level with most of the county having a slope of six percent or less. The highest point is about 775 feet and the lowest point is about 575 feet above sea level.

Fulton County, like Lucas and Wood counties, is located in the Huron-Erie Lake Plains region. The county is made up of gently rolling terrain and nearly level plain. The landscape slopes eastward toward Lake Erie. The elevation ranges from about 680 feet to 806 feet above sea level.

Henry County has large glaciated areas of level or nearly level topography. The elevation ranges from 625 feet to 750 feet above sea level.

Hancock County like most counties in the northwest section of Ohio has a relatively uniform, level topography. The highest point is 955 feet and the lowest is 715 feet above sea level. Most of the county has a slope of six percent or less.

Seneca County straddles the Lake Plain and Till Plain areas of the Central Lowlands region. Relief of the county is mainly nearly level to undulating. As expected, steeper areas are along streams.

Sandusky County is mainly in the broad lake plain section of the Central Lowlands Province. Exceptions to the nearly flat topography dominant throughout the county are the beach ridges in the southeastern and southwestern parts of the county. Elevation ranges from 575 feet to 810 feet above sea level.

Ottawa County lies entirely within the glaciated part of Ohio. The relief of the county is nearly level to sloping. West of Port Clinton the surface is flat and is a little elevated above Lake Erie. East of Port Clinton the relief is gently rolling.

As shown in the following pie charts, the land use/land cover in this area is cropland and more cropland. As expected Lucas County has the highest percentage of urban area with 36 percent.
Henry County Land Use/Land Cover

- Urban (Res/Comm/Ind/Trans/Grasses): 3%
- Cropland: 88%
- Pasture: 3%
- Forest: 5%
- Wetlands All Types: 1%

Hancock County Land Use/Land Cover

- Urban (Res/Comm/Ind/Trans/Grasses): 7%
- Cropland: 80%
- Pasture: 5%
- Forest: 7%
- Wetlands All Types: 1%

Seneca County Land Use/Land Cover

- Urban (Res/Comm/Ind/Trans/Grasses): 4%
- Cropland: 80%
- Pasture: 10%
- Forest: 1%
- Wetlands All Types: 5%
Factor 7:  Jurisdictional boundaries

The Toledo, OH Metropolitan Statistical Area includes: Fulton, Lucas, Ottawa and Wood counties. The principal city is Toledo.

The Toledo Metropolitan Area Council of Governments (TMACOG) is the planning agency designated as the Metropolitan Planning Organization for greater Toledo area. The TMACOG region is composed of three counties in two states: Lucas and Wood counties in Ohio and Monroe County in Michigan.
Factor 8:  Level of control of emission sources

In the Toledo area, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal) in this area. There have also been significant enforcement activities affecting sulfur emissions from the refineries in Toledo which will also contribute to improved air quality.
Wheeling, WV-OH:

Current county nonattainment: Belmont

Recommended county nonattainment: None

Source: Office of Strategic Research, Ohio Department of Development
Discussion:

There is one Ohio county and two West Virginia counties in this existing PM$_{2.5}$ nonattainment area, Belmont County in Ohio and Marshall and Ohio counties in West Virginia. The monitors used for this area are located in West Virginia. The American Electric Power Burge Plant is located in Belmont County. As part of the CAIR requirements, it is forecasted that significant reductions in emissions will occur. Belmont County has low population, little expected growth and insignificant commuting levels. Due to these factors, Ohio EPA recommends attainment for Belmont County. There are three adjacent counties to Belmont County included in this section; Guernsey, Noble and Monroe. These three counties have insignificant emissions, low population, little expected growth and low commuting levels and therefore are not considered contributing counties.

Factor 1: Air quality data

\[=\] Exceeds standard

AQS: 24-Hour Average – 98th Percentile (μg/m$^3$)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-051-1002</td>
<td>MARSHALL</td>
<td>34.8</td>
<td>32.0</td>
<td>34.7</td>
<td>34</td>
</tr>
<tr>
<td>54-069-0008</td>
<td>OHIO</td>
<td>33.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54-069-0010</td>
<td></td>
<td></td>
<td>31.3</td>
<td>27.5</td>
<td></td>
</tr>
</tbody>
</table>

AQS: Annual Average (μg/m$^3$)

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>54-051-1002</td>
<td>MARSHALL</td>
<td>14.4</td>
<td>16.2</td>
<td>14.5</td>
<td>15.0</td>
</tr>
<tr>
<td>54-069-0008</td>
<td>OHIO</td>
<td>14.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54-069-0010</td>
<td></td>
<td></td>
<td>15.4</td>
<td>13.1</td>
<td></td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
Wheeling WV-OH Area PM$_{2.5}$ Monitor Locations and Site ID Numbers

Factor 2: Emissions data (tons per day)

<table>
<thead>
<tr>
<th>County</th>
<th>SO$_2$</th>
<th>NO$_x$</th>
<th>PM$_{2.5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>BELMONT</td>
<td>120.91</td>
<td>22.02</td>
<td>1.41</td>
</tr>
<tr>
<td>Monroe</td>
<td>0.31</td>
<td>2.76</td>
<td>0.35</td>
</tr>
<tr>
<td>Noble</td>
<td>0.12</td>
<td>3.90</td>
<td>0.26</td>
</tr>
<tr>
<td>Guernsey</td>
<td>2.08</td>
<td>13.73</td>
<td>0.68</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>County</th>
<th>SO$_2$</th>
<th>NO$_x$</th>
<th>PM$_{2.5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>BELMONT</td>
<td>58.11</td>
<td>20.78</td>
<td>3.69</td>
</tr>
<tr>
<td>Monroe</td>
<td>0.26</td>
<td>3.25</td>
<td>0.35</td>
</tr>
<tr>
<td>Noble</td>
<td>0.04</td>
<td>2.20</td>
<td>0.21</td>
</tr>
<tr>
<td>Guernsey</td>
<td>1.84</td>
<td>10.88</td>
<td>0.57</td>
</tr>
</tbody>
</table>
West Virginia and Pennsylvania

### 2005

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marshall, WV</td>
<td>23.26</td>
<td>9.73</td>
<td>2.44</td>
</tr>
<tr>
<td>Ohio, WV</td>
<td>0.61</td>
<td>9.63</td>
<td>0.60</td>
</tr>
<tr>
<td>Wetzel, WV</td>
<td>1.38</td>
<td>11.35</td>
<td>0.46</td>
</tr>
<tr>
<td>Greene, PA</td>
<td>2.98</td>
<td>8.43</td>
<td>1.73</td>
</tr>
</tbody>
</table>

### 2009

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marshall, WV</td>
<td>223.92</td>
<td>32.11</td>
<td>11.29</td>
</tr>
<tr>
<td>Ohio, WV</td>
<td>0.40</td>
<td>6.16</td>
<td>0.42</td>
</tr>
<tr>
<td>Wetzel, WV</td>
<td>1.32</td>
<td>7.39</td>
<td>0.34</td>
</tr>
<tr>
<td>Greene, PA*</td>
<td>59.88</td>
<td>16.5</td>
<td>6.08</td>
</tr>
</tbody>
</table>

* Does not include on-road emissions

### Major Employers:
Source: Ohio Department of Development 2007

Most of the major employers in the Wheeling area are in the categories of government, government and service as shown below.

#### Belmont County

- Barnesville Hospital Assn: Service
- Belmont Community Hospital: Service
- Belmont County Government: Government
- Belmont County Technical College: Government
- Commercial Vehicle Group/Mayflower: Manufacturing
- East Ohio regional Hospital: Service
- Kroger Co: Trade
- Ohio Valley Coal Co: Mining
- State of Ohio: Government
- Wal-Mart Stores Inc: Trade
- Wheeling-Pittsburgh Steel Corp: Manufacturing

#### Monroe County

- Extendicare/Woodsfield Nursing Center: Service
- Monroe County Government: Government
- Ormet Corp: Manufacturing
- Riesbeck Food Markets: Trade
- Safe Auto Insurance Group: Service
- Slay Transportation Co Inc: Transportation
- Switzerland of Ohio Local Bd of Ed: Government
Noble County

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caldwell Exempted Village Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>MAHLE International</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Noble County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Noble Local Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Packaging Dynamics/Intl Converter</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
<tr>
<td>Summit Acres</td>
<td>Service</td>
</tr>
</tbody>
</table>

Guernsey County

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge City Bd of Ed</td>
<td>Government</td>
</tr>
<tr>
<td>Daimler AG/Detroit Diesel</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Colgate-Palmolive Co</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Federal-Mogul Corp</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Guernsey County Government</td>
<td>Government</td>
</tr>
<tr>
<td>Plastech Engineered Products</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Southeastern Ohio regional Medical Center</td>
<td>Service</td>
</tr>
<tr>
<td>State of Ohio</td>
<td>Government</td>
</tr>
<tr>
<td>Wal-Mart Stories Inc</td>
<td>Trade</td>
</tr>
</tbody>
</table>

Factor 3:  Population and Projected Growth

U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in Belmont County are St. Clairsville and Martins Ferry; in Monroe County, Woodsfield and Graysville; in Noble County, Caldwell; in Guernsey County, Cambridge.

As indicated in the following table and graphs, Belmont County has the highest population in this area and it is projected to steadily decrease. The population in the surrounding counties is projected to remain generally constant with only minor changes in the future.

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belmont</td>
<td>69,444</td>
<td>69,089</td>
<td>68,771</td>
<td>68,030</td>
<td>66,810</td>
<td>65,340</td>
</tr>
<tr>
<td>Monroe</td>
<td>14,927</td>
<td>14,736</td>
<td>14,606</td>
<td>14,800</td>
<td>14,280</td>
<td>13,490</td>
</tr>
<tr>
<td>Noble</td>
<td>14,172</td>
<td>14,097</td>
<td>14,165</td>
<td>15,370</td>
<td>16,230</td>
<td>16,690</td>
</tr>
<tr>
<td>Guernsey</td>
<td>41,185</td>
<td>41,007</td>
<td>40,876</td>
<td>41,400</td>
<td>42,480</td>
<td>43,360</td>
</tr>
</tbody>
</table>
Factor 4: Traffic and commuting patterns

Belmont and Guernsey counties have the highest kDVMT in this area. Between 2004 and 2006, Belmont and Monroe counties had a very slight increase in kDVMT while Noble and Guernsey counties experienced very slight decreases in kDVMT as shown in the graphs below.

Estimated Vehicle Miles Traveled (kDVMT = in thousands)
Source: Ohio Department of Transportation, Office of Technical Services
**Commuter Patterns**  
**Source:** Office of Strategic Research, Ohio Department of Development  
U.S. Census Bureau, 2000

Commuting in the Wheeling area is minimal as shown in the tables below. The largest number of commuters is from Belmont County traveling into Ohio County, WV. Each of the adjacent counties has commuters traveling into Belmont County but the number is insignificant.

---

**Belmont**

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Belmont County</th>
<th>27,889</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Ohio Co. WV</td>
<td>4,603</td>
</tr>
<tr>
<td>Jefferson Co. OH</td>
<td>1,129</td>
</tr>
<tr>
<td>Marshall Co. WV</td>
<td>1,064</td>
</tr>
<tr>
<td>Monroe Co. OH</td>
<td>626</td>
</tr>
<tr>
<td>Guernsey Co. OH</td>
<td>466</td>
</tr>
<tr>
<td>Harrison Co. OH</td>
<td>280</td>
</tr>
<tr>
<td>Wetzel Co. WV</td>
<td>227</td>
</tr>
<tr>
<td>Allegheny Co. PA</td>
<td>206</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>141</td>
</tr>
<tr>
<td>Washington Co. PA</td>
<td>138</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Belmont County</th>
<th>23,944</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Ohio Co. WV</td>
<td>1,876</td>
</tr>
<tr>
<td>Jefferson Co. OH</td>
<td>1,236</td>
</tr>
<tr>
<td>Marshall Co. WV</td>
<td>858</td>
</tr>
<tr>
<td>Monroe Co. OH</td>
<td>596</td>
</tr>
<tr>
<td>Harrison Co. OH</td>
<td>361</td>
</tr>
<tr>
<td>Guernsey Co. OH</td>
<td>318</td>
</tr>
<tr>
<td>Brooke Co. WV</td>
<td>155</td>
</tr>
<tr>
<td>Noble Co. OH</td>
<td>103</td>
</tr>
<tr>
<td>Washington Co. PA</td>
<td>75</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>38</td>
</tr>
</tbody>
</table>

Percent is of workers living in county.  
Percent is of workers working in county.
## Guernsey

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>Number of workers 16+ years of age working in Guernsey County</th>
</tr>
</thead>
<tbody>
<tr>
<td>living in Guernsey County 16,644</td>
<td>15,528</td>
</tr>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>1,815</td>
</tr>
<tr>
<td>Noble Co. OH</td>
<td>438</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>396</td>
</tr>
<tr>
<td>Belmont Co. OH</td>
<td>318</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>249</td>
</tr>
<tr>
<td>Coshocton Co. OH</td>
<td>210</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>127</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>88</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>81</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commute In From</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noble Co. OH</td>
<td>1,069</td>
<td>6.9%</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>793</td>
<td>5.1%</td>
</tr>
<tr>
<td>Belmont Co. OH</td>
<td>466</td>
<td>3.0%</td>
</tr>
<tr>
<td>Tuscarawas Co. OH</td>
<td>153</td>
<td>1.0%</td>
</tr>
<tr>
<td>Coshocton Co. OH</td>
<td>94</td>
<td>0.6%</td>
</tr>
<tr>
<td>Monroe Co. OH</td>
<td>84</td>
<td>0.5%</td>
</tr>
<tr>
<td>Washington Co. OH</td>
<td>83</td>
<td>0.5%</td>
</tr>
<tr>
<td>Morgan Co. OH</td>
<td>80</td>
<td>0.5%</td>
</tr>
<tr>
<td>Perry Co. OH</td>
<td>56</td>
<td>0.4%</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>39</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

## Noble

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age</th>
<th>Number of workers 16+ years of age working in Noble County</th>
</tr>
</thead>
<tbody>
<tr>
<td>living in Noble County 5,028</td>
<td>3,796</td>
</tr>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Guernsey Co. OH</td>
<td>1,069</td>
</tr>
<tr>
<td>Washington Co. OH</td>
<td>453</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>274</td>
</tr>
<tr>
<td>Belmont Co. OH</td>
<td>103</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>79</td>
</tr>
<tr>
<td>Monroe Co. OH</td>
<td>67</td>
</tr>
<tr>
<td>Wood Co. WV</td>
<td>27</td>
</tr>
<tr>
<td>Licking Co. OH</td>
<td>24</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>21</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commute In From</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guernsey Co. OH</td>
<td>438</td>
<td>11.5%</td>
</tr>
<tr>
<td>Washington Co. OH</td>
<td>197</td>
<td>5.2%</td>
</tr>
<tr>
<td>Monroe Co. OH</td>
<td>132</td>
<td>3.5%</td>
</tr>
<tr>
<td>Muskingum Co. OH</td>
<td>76</td>
<td>2.0%</td>
</tr>
<tr>
<td>Belmont Co. OH</td>
<td>70</td>
<td>1.8%</td>
</tr>
<tr>
<td>Morgan Co. OH</td>
<td>25</td>
<td>0.7%</td>
</tr>
<tr>
<td>Wood Co. WV</td>
<td>21</td>
<td>0.6%</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>19</td>
<td>0.5%</td>
</tr>
<tr>
<td>Franklin Co. OH</td>
<td>15</td>
<td>0.4%</td>
</tr>
<tr>
<td>Logan Co. OH</td>
<td>10</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.
Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Wheeling area.

Factor 6: Topography/Land use/Land cover

Belmont County is in the unglaciated Allegheny Plateau region (see Appendix F). The area has been extensively dissected by drainageways. The topography is varied with rugged, steep to very steep slopes in the eastern part of the county to more gently rolling in the western portion of the county. The highest elevation is 1,397 feet and the lowest is about 625 feet above sea level.

Monroe County is located entirely within the unglaciated Allegheny Plateau region. The county is thoroughly dissected and many of the slopes are steep to very steep. The elevation ranges from about 595 feet to 1,340 feet above sea level.

Noble County is also located in the unglaciated Allegheny Plateau region. The relief is mainly steep hills, ridges and many intervening valleys. The highest point is about 1,340 feet and the lowest is 675 feet above sea level.

Guernsey County lies in the Central and Western Allegheny Plateau areas. The county is extensively dissected by drainageways and is characterized by moderately steep to very steep hillsides and relatively narrow valleys that were produced by stream erosion. The elevation ranges from 1,310 feet to 770 feet above sea level.
As shown in the following pie charts, the land use/land cover in this area is predominantly characterized as forest area.
Factor 7: Jurisdictional boundaries

The Wheeling, WV-OH Metropolitan Statistical Area includes: Marshall and Ohio counties in West Virginia and Belmont County in Ohio. The principal city is Wheeling, WV.

The Belomar regional Council (Belomar) is the planning agency designated as the Metropolitan Planning Organization for the greater Wheeling, WV area. The Belomar region is composed of three counties: Marshall and Ohio counties in WV and Belmont County, OH.
Factor 8:  Level of control of emission sources

In the Wheeling area, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- NOx trading program
- Clean Air Interstate Rule (CAIR)
- enforcement activities at major facilities

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal) in the Wheeling area. The recent consent decree with American Electric Power assured that the Burge Plant will experience significant emission reductions.
**Youngstown-Warren-Sharon, PA-OH:**

**Current** county nonattainment:  none

- Current nonattainment counties
- Current partial nonattainment

**Recommended** county nonattainment:  Mahoning, Trumbull

Source: Office of Strategic Research, Ohio Department of Development
Discussion:

There are two counties in this recommended PM$_{2.5}$ nonattainment area, Mahoning and Trumbull counties. Ohio EPA recommends that these counties be added as nonattainment for PM$_{2.5}$ due to monitor violations for the 24-hour revised standard. Only one adjacent county is included with this area, Columbiana. Due to low emissions, population and commuting levels, Columbiana County is not considered a contributing county.

As shown in the following tables, the three-year average of the 98$^{th}$ percentile concentration at site 39-099-0014 in Mahoning County and 39-155-0007 in Trumbull County are not attaining the 24-hour revised standard.

Factor 1: Air quality data

= Exceeds standard

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24-Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-099-0005</td>
<td>Mahoning</td>
<td>34.4</td>
<td>41.6</td>
<td>28.6</td>
<td>35</td>
</tr>
<tr>
<td>39-099-0014</td>
<td>Mahoning</td>
<td>36.0</td>
<td>42.6</td>
<td>31.1</td>
<td>37</td>
</tr>
<tr>
<td>39-155-0007</td>
<td>Trumbull</td>
<td>33.5</td>
<td>45.1</td>
<td>28.7</td>
<td>36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>39-099-0005</td>
<td>Mahoning</td>
<td>14.2</td>
<td>16.4</td>
<td>13.0</td>
<td>14.5</td>
</tr>
<tr>
<td>39-099-0014</td>
<td>Mahoning</td>
<td>14.7</td>
<td>16.9</td>
<td>13.5</td>
<td>15.0</td>
</tr>
<tr>
<td>39-155-0007</td>
<td>Trumbull</td>
<td>13.8</td>
<td>16.4</td>
<td>12.9</td>
<td>14.4</td>
</tr>
</tbody>
</table>

Pennsylvania

= Exceeds standard

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>24- Hour Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>45-085-0100</td>
<td>Mercer</td>
<td>34.5</td>
<td>39.0</td>
<td>30.7</td>
<td>35</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>45-085-0100</td>
<td>Mercer</td>
<td>13.4</td>
<td>14.1</td>
<td>11.8</td>
<td>13.1</td>
</tr>
</tbody>
</table>

Sites with less than 75% capture
**Youngstown-Warren-Sharon Area PM$_{2.5}$ Monitor Locations and Site ID Numbers**

**Factor 2: Emissions data**
(tons per day)

<table>
<thead>
<tr>
<th></th>
<th>County</th>
<th>SO$_2$</th>
<th>NO$_x$</th>
<th>PM$_{2.5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>MAHONING</td>
<td>3.70</td>
<td>27.18</td>
<td>1.37</td>
</tr>
<tr>
<td></td>
<td>TRUMBULL</td>
<td>96.81</td>
<td>37.31</td>
<td>2.60</td>
</tr>
<tr>
<td></td>
<td>Columbiana</td>
<td>0.86</td>
<td>10.88</td>
<td>1.10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>County</th>
<th>SO$_2$</th>
<th>NO$_x$</th>
<th>PM$_{2.5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>MAHONING</td>
<td>3.06</td>
<td>22.52</td>
<td>1.29</td>
</tr>
<tr>
<td></td>
<td>TRUMBULL</td>
<td>55.89</td>
<td>27.30</td>
<td>3.84</td>
</tr>
<tr>
<td></td>
<td>Columbiana</td>
<td>0.65</td>
<td>12.24</td>
<td>1.10</td>
</tr>
</tbody>
</table>
Pennsylvania

### 2005

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercer, PA</td>
<td>2.76</td>
<td>18.72</td>
<td>1.77</td>
</tr>
<tr>
<td>Lawrence, PA</td>
<td>11.31</td>
<td>17.44</td>
<td>2.50</td>
</tr>
</tbody>
</table>

### 2009

<table>
<thead>
<tr>
<th>County</th>
<th>SO₂</th>
<th>NOₓ</th>
<th>PM₂.₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercer, PA*</td>
<td>1.77</td>
<td>6.74</td>
<td>1.25</td>
</tr>
<tr>
<td>Lawrence, PA*</td>
<td>64.90</td>
<td>21.47</td>
<td>4.52</td>
</tr>
</tbody>
</table>

*Does not include on-road data

### Major Employers:

Source: Ohio Department of Development 2007

Most of the major employers in the Youngstown-Warren area are in the categories of government, service and manufacturing as shown in the tables below.

#### Mahoning County

- Austintown Local Bd of Ed: Government
- Boardman Local Bd of Ed: Government
- Forum Health: Service
- HM Health Partners: Service
- Mahoning County Government: Government
- UCFC/Home Savings & Loan Co: Finance
- Wal-Mart Stores Inc: Trade
- Youngstown City Bd of Ed: Government
- Youngstown State University: Government

#### Trumbull County

- Delphi Corp: Manufacturing
- Forum Health: Service
- General Motors Corp: Manufacturing
- Giant Eagle Inc: Trade
- HM Health Services: Service
- Sears Holdings/Kmart Corp: Trade
- Trumbull County Government: Government
- Warren City Bd of Ed: Government
- West Corp: Service
- WCI Steel Inc: Manufacturing
Columbiana County

Bain Capital/American Standard Inc  Manufacturing
Blackhawk Automotive Plastics Inc  Manufacturing
Columbiana County Government  Government
East Liverpool City Bd of Ed  Government
East Liverpool City Hospital  Service
Fresh Mark Inc  Manufacturing
Salem City Bd of Ed  Government
Salem Community Hospital  Service
Wal-Mart Stores Inc  Trade

Factor 3: Population and Projected Growth
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in Trumbull County are Warren and Niles; in Mahoning County, Youngstown; in Columbiana County, E. Liverpool.

As indicated in the following table and graphs, Mahoning County has the highest population in this area and it is projected to steadily decrease. The population in Trumbull County is also projected to decrease. The population in Columbiana County remains generally constant with a projected slight increase.

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahoning</td>
<td>255,538</td>
<td>253,181</td>
<td>251,026</td>
<td>245,760</td>
<td>235,350</td>
<td>226,800</td>
</tr>
<tr>
<td>Trumbull</td>
<td>220,184</td>
<td>218,672</td>
<td>217,362</td>
<td>218,730</td>
<td>211,100</td>
<td>200,990</td>
</tr>
<tr>
<td>Columbiana</td>
<td>111,287</td>
<td>110,636</td>
<td>110,542</td>
<td>111,950</td>
<td>112,520</td>
<td>112,000</td>
</tr>
</tbody>
</table>

Mahoning County
Factor 4: Traffic and commuting patterns

The kDVMT in Mahoning and Trumbull counties have had an upward trend, Columbiana has experienced a very steady downward trend in kDVMT between 2004 and 2006, as shown in the graphs below.
Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

Source: Ohio Department of Transportation, Office of Technical Services

Mahoning County: Total County kDVMT 1990-2006

Trumbull County: Total County kDVMT 1990-2006

Commuter Patterns
Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Trumbull and Columbiana combined have about 20,000 workers commuting to Mahoning County. The largest portion of Mahoning County workers commuting outside the county, travel to Trumbull County.

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age living in Mahoning County</th>
<th>109,102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute Out To</td>
<td>Number</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>19,210</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>3,684</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>2,548</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>1,171</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>1,117</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>1,096</td>
</tr>
<tr>
<td>Lawrence Co. PA</td>
<td>718</td>
</tr>
<tr>
<td>Mercer Co. PA</td>
<td>624</td>
</tr>
<tr>
<td>Allegheny Co. PA</td>
<td>508</td>
</tr>
<tr>
<td>Beaver Co. PA</td>
<td>224</td>
</tr>
</tbody>
</table>

Percent is of workers living in county.

<table>
<thead>
<tr>
<th>Number of workers 16+ years of age working in Mahoning County</th>
<th>102,992</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute In From</td>
<td>Number</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>12,003</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>7,371</td>
</tr>
<tr>
<td>Lawrence Co. PA</td>
<td>1,620</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>1,158</td>
</tr>
<tr>
<td>Mercer Co. PA</td>
<td>1,083</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>603</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>460</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>268</td>
</tr>
<tr>
<td>Beaver Co. PA</td>
<td>172</td>
</tr>
<tr>
<td>Allegheny Co. PA</td>
<td>159</td>
</tr>
</tbody>
</table>

Percent is of workers working in county.
Trumbull

Percent of workers that work outside the county: 27.1%
Average commute time in minutes: 21.0

<table>
<thead>
<tr>
<th>Commute Out To</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahoning Co. OH</td>
<td>12,003</td>
<td>12.3%</td>
</tr>
<tr>
<td>Geauga Co. OH</td>
<td>3,900</td>
<td>4.0%</td>
</tr>
<tr>
<td>Mercer Co. PA</td>
<td>2,457</td>
<td>2.5%</td>
</tr>
<tr>
<td>Cuyahoga Co. OH</td>
<td>1,976</td>
<td>2.0%</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>1,863</td>
<td>1.9%</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>1,038</td>
<td>1.1%</td>
</tr>
<tr>
<td>Ashtabula Co. OH</td>
<td>892</td>
<td>0.9%</td>
</tr>
<tr>
<td>Columbiana Co. OH</td>
<td>344</td>
<td>0.4%</td>
</tr>
<tr>
<td>Lawrence Co. PA</td>
<td>251</td>
<td>0.3%</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>202</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

Columbiana

Percent of workers that work outside the county: 39.5%
Average commute time in minutes: 22.7

<table>
<thead>
<tr>
<th>Commute Out To</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mahoning Co. OH</td>
<td>7,371</td>
<td>14.9%</td>
</tr>
<tr>
<td>Stark Co. OH</td>
<td>3,306</td>
<td>6.7%</td>
</tr>
<tr>
<td>Beaver Co. PA</td>
<td>1,889</td>
<td>3.8%</td>
</tr>
<tr>
<td>Trumbull Co. OH</td>
<td>1,719</td>
<td>3.5%</td>
</tr>
<tr>
<td>Hancock Co. WV</td>
<td>1,488</td>
<td>3.0%</td>
</tr>
<tr>
<td>Allegheny Co. PA</td>
<td>735</td>
<td>1.5%</td>
</tr>
<tr>
<td>Jefferson Co. OH</td>
<td>517</td>
<td>1.0%</td>
</tr>
<tr>
<td>Summit Co. OH</td>
<td>464</td>
<td>0.9%</td>
</tr>
<tr>
<td>Carroll Co. OH</td>
<td>453</td>
<td>0.9%</td>
</tr>
<tr>
<td>Portage Co. OH</td>
<td>316</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

Percent is of workers living in county. Percent is of workers working in county.

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Youngstown-Warren area.

Factor 6: Topography/Land use/Land cover

Mahoning County is in the glaciated part of the Allegheny Plateau region (see Appendix F). The northeastern part of the county contains some sloping to steep areas, mainly along the Mahoning River. The central and northern parts are mostly a nearly level plateau, where the average elevation is about 1,150 feet.
The highest point in the county is 1,320 feet and the lowest point is 800 feet above sea level.

Trumbull County is in the glaciated Appalachian Plateau region. The northern, western and south-central parts of the county generally are nearly level and gently sloping. The lowest elevation is 795 feet and the highest is 1,280 feet above sea level.

Columbiana County, like Trumbull and Mahoning counties, lies within the glaciated Allegheny Plateau Province, with the southern third of the county on the edge of the unglaciated Allegheny Plateau Province. Topography varies from rolling uplands in the northern part of the county to higher relief and steep uplands in the central area and a more rugged landscape in the unglaciated portion in the southern part of the county.

As shown in the following pie charts, the land use/land cover in these counties is predominately characterized as forest and cropland. Mahoning County has the highest percentage of urban area at 23 percent.
Factor 7: Jurisdictional boundaries

The Youngstown-Warren-Boardman, OH-PA Metropolitan Statistical Area includes: Mahoning and Trumbull counties in Ohio and Mercer County in Pennsylvania. The principal cities are Youngstown, Warren and Boardman in Ohio.

The Eastgate regional Council of Governments (Eastgate) is the planning agency designated as the Metropolitan Planning Organization for the greater Youngstown area. The Eastgate region is composed of three counties in two states: Mahoning and Trumbull counties in Ohio and Mercer County in Pennsylvania.
Factor 8: Level of control of emission sources

In the Youngstown-Warren area, the emission reduction programs which have had or will have the greatest potential impact on PM$_{2.5}$ concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO$_x$ trading program
- Clean Air Interstate Rule (CAIR)
- reductions in industrial activity

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM$_{2.5}$ species (sulfates, nitrates, organic carbon, elemental carbon and crustal) in this area, although the area also continues to experiences industrial and economic down turn.