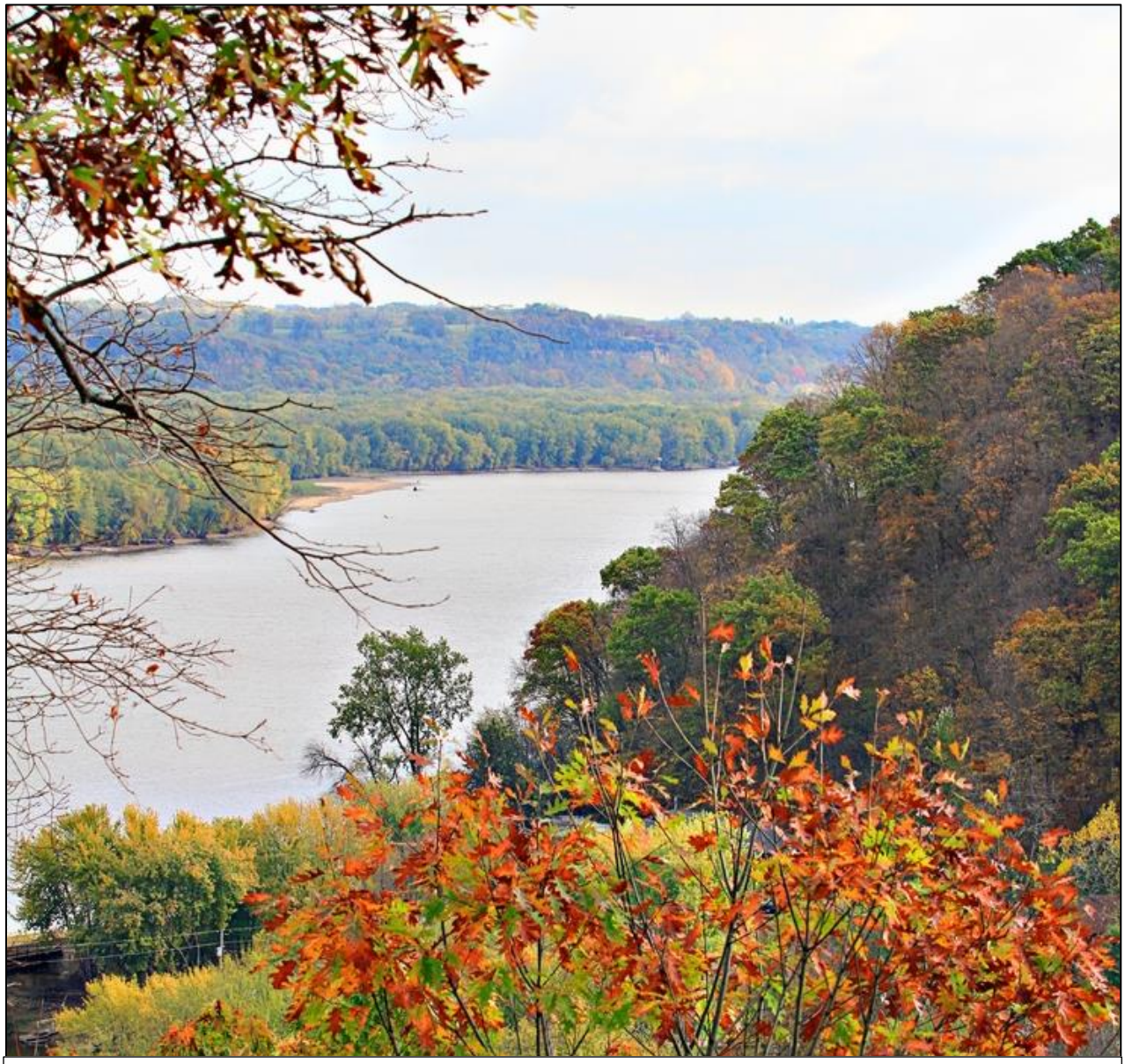
DUBUQUE'S PATH FORWARD TO IMPROVED AIR QUALITY 2017



Help reduce emissions in order to improve health protections and to remain in attainment

THE CITY OF DUBUQUE
Masterpiece on the Mississippi

ECIA

GreaterDubuque
Development Corporation

Contents

INTRODUCTION

Dubuque is the oldest incorporated community in Iowa, encompassing 30 square miles adjacent to the Mississippi River on the east side of the state. (see Figure 1 for map). Anchoring a region that encompasses portions of Iowa, Wisconsin, and Illinois, Dubuque serves as the hub for commerce, recreation, and population in the tri-states area. Long a center for manufacturing, early industry in Dubuque evolved from mining and fur-trading to button making, boat building, logging, millworking, meat packing, and other heavy industries in its first hundred years. In the latter half of the 20th century, the community's economy diversified from its manufacturing base and now includes finance and insurance, professional services, information technology, and more. In addition, Dubuque is now a major retail, medical, and higher education destination for the tri-states area and beyond.

More recently, the story of Dubuque has been about revival and revitalization. Dubuque was a city experiencing difficult times beginning in the early 1980s, suffering from double-digit unemployment, an exodus of residents from the community and the state, and struggling businesses. Dubuque was the hardest-hit community in what was then the worst recession since the Great Depression, and at one point had the highest unemployment rate of any metropolitan area in the nation. However, leadership from both the private and public sectors has turned the tide over the past three decades by focusing on redeveloping numerous parts of the community and expanding Dubuque's commercial and industrial base.

The Dubuque of today is Iowa's eleventh-largest city, with three percent of the state's population the Dubuque Metropolitan Statistical Area (MSA) is responsible for over eight percent of the net job gain in the state over the last four years, serving as a model for economic transformation in the Midwest.

Dubuque will bring this "can-do" spirit of public/private collaboration to the challenge of PM 2.5

DEMOGRAPHIC INFORMATION (DUBUQUE COUNTY)

Population (2016): 97,003

Population (2010): 93,653

Population under 18 (2016 percent): 23.0 percent

Population over 65 (2016 percent): 17.0 percent

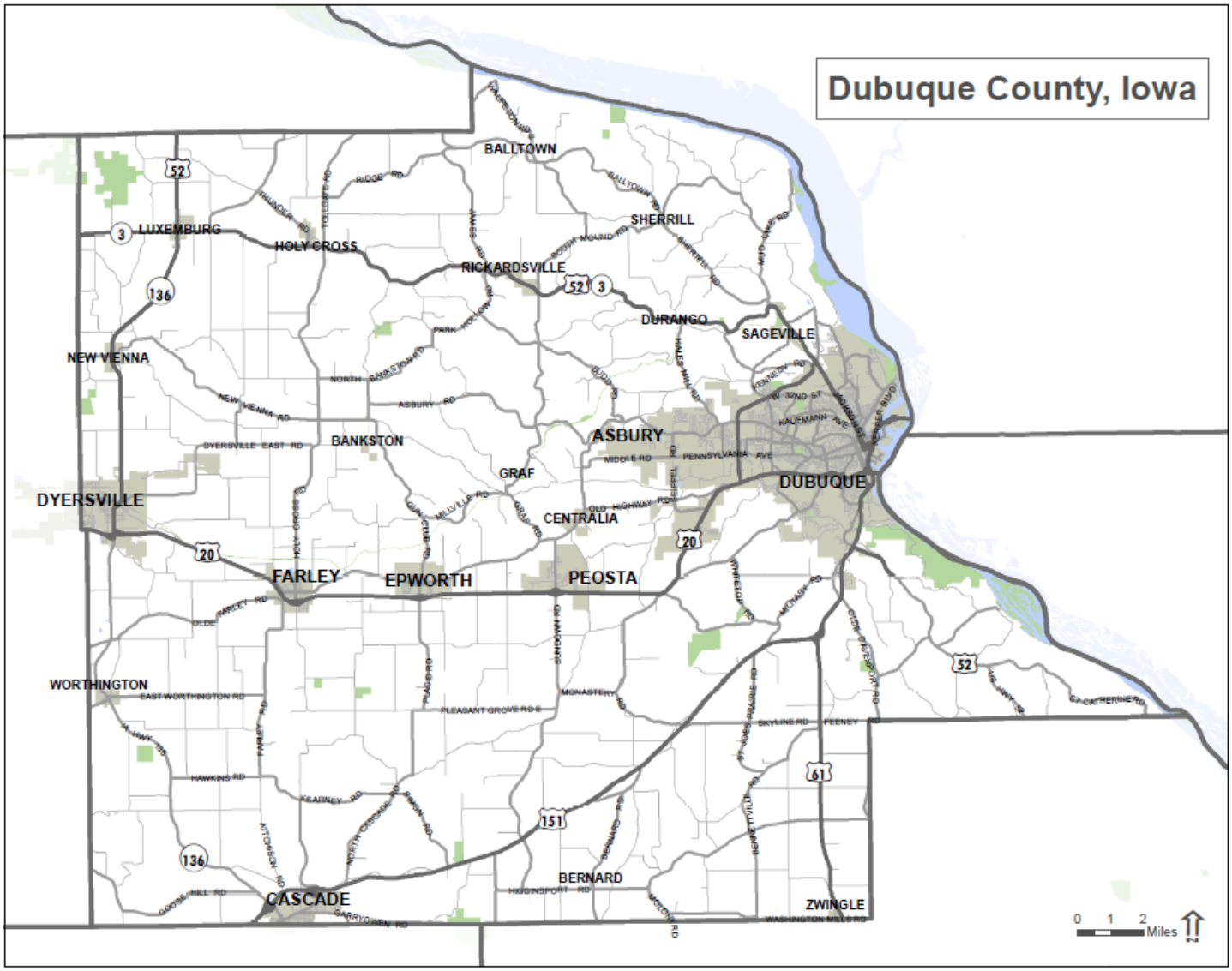
Median Household Income (2012): $54,605

Persons below Poverty Level (2016 percent): 12.0 percent

Unemployment Rate (2017): 2.7 percent

Average Hourly Wage (2014 Private Sector): $20.00

Figure 1. Dubuque County Map



PLAN DEVELOPMENT & STAKEHOLDER ENGAGEMENT

This Path Forward plan is a collaboration of a wide range of local and regional entities that formed a task force after the Dubuque City Council identified air quality as a priority in 2013. The Air Quality Task Force is comprised of the City of Dubuque, Dubuque Metropolitan Area Transportation Study (DMATS), East Central Intergovernmental Association (ECIA), and Greater Dubuque Development Corporation (GDDC).

The throughout plan development, the Air Quality Task Force worked to engage a wide group of stakeholders including Green Dubuque and the Environmental Stewardship Advisory Commission. The task force worked with the Iowa Department of Natural Resources to identify and implement an air quality education program, beginning with the topic of "local air monitoring". The stakeholder eduction program was followed by a community-wide educational session. Input from this wide stakeholder outreach process was incorporated into the annual updates to this Path Forward. Additionally, the Task force provides progress reports regarding the goals in this document to the engaged stakeholders and public on an regular basis. See Appendix 2 for more detailed information on partners.

GOAL OF THIS PATH FORWARD

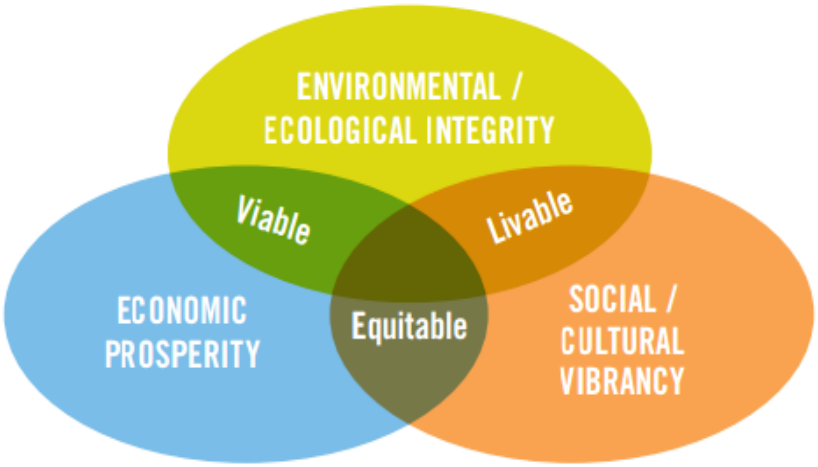
The Dubuque community's goal is to remain in attainment status and pursue projects and programs that will improve air quality and public health in the tri-state area while supporting a thriving local economy. Through this Path Forward, we will:

- Outline and recommit to immediate actions being taken to remain in attainment.
- Discuss and strategize additional actions under development.
- Assure additional citizen, stakeholder and expert input on future efforts beyond simple attainment.
- Assess if local action alone can maintain attainment standards.

PM 2.5 & AIR QUALITY IMPORTANCE IN DUBUQUE

Fine particulate matter, or PM 2.5, is one of several air pollutants that can affect air quality and public health. PM 2.5 refers to the size of the particles – 2.5 micrometers or smaller. The size of particles is directly linked to their potential for causing health problems. Small particles less than10 micrometers in diameter pose the greatest problems, because they can get deep into your lungs, and affect your health. The Clean Air Act requires EPA to set air quality standards to protect both public health and the public welfare. Particle pollution affects both, and can also impair visibility by producing haze, impact ground and water quality, and impact crops and vegetation.

Sustainable Dubuque is a City Council adopted, community created, and a citizen-led initiative whose story officially began in 2006. A City Council priority each year since, we are continually working to expand awareness, create partnerships, and encourage initiatives involving all sectors of our community. Dubuque became an early leader on the sustainability front.



Embodied as one of the 12 principles within the Sustainable Dubuque Vision was a vision for Healthy Air "Fresh, clean air, reduced greenhouse gas emissions and minimized health risks" as well as a vision for a Strong Regional Economy . Assuring both Healthy Air and a Strong Regional Economy is a priority for the city of Dubuque and its Sustainable Dubuque Vision .

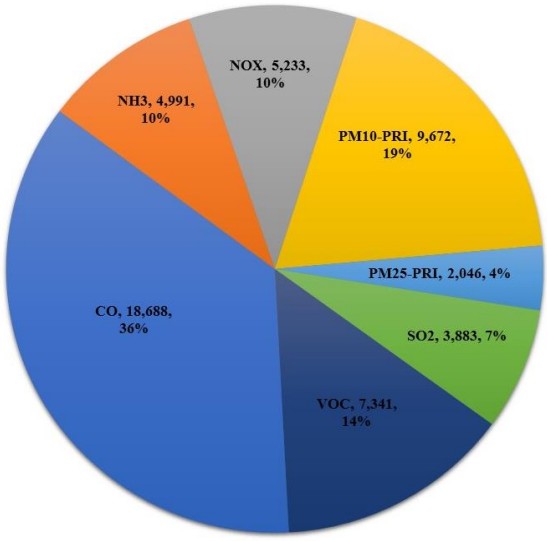
In the recent past the area's PM 2.5 emissions have been higher than anticipated. The PM Advance program is a collaborative effort led by the EPA. The program helps local governments achieve emission reductions in ozone and PM 2.5 in order to protect public health and efficiently direct available resources toward actions to proactively address problems quickly. The program assists governments who are proactively trying to avoid becoming non-attainment communities. The PM Advance program became a key avenue for Dubuque to address the Sustainable Dubuque goals of Healthy Air and a strong Regional Economy, minimizing health risks without threatening economic growth and opportunity.

2008 BASELINE EMISSIONS INVENTORY

The task force established a basline of the selected emissions, using EPA 2008 National Emissions Inventory a base year and data from Potosi monitor. Figure 2 shows emissions by pollutants. Graph 3 shows emissions by contributors in 2008. Figure 4 shows the Annual PM 2.5 design value for Potosi monitor and Figure 5 shows PM 2.5 24-Hour design value. The total emissions of 51,855 tons and the data from Potosi are used as baselines for future comparsion.

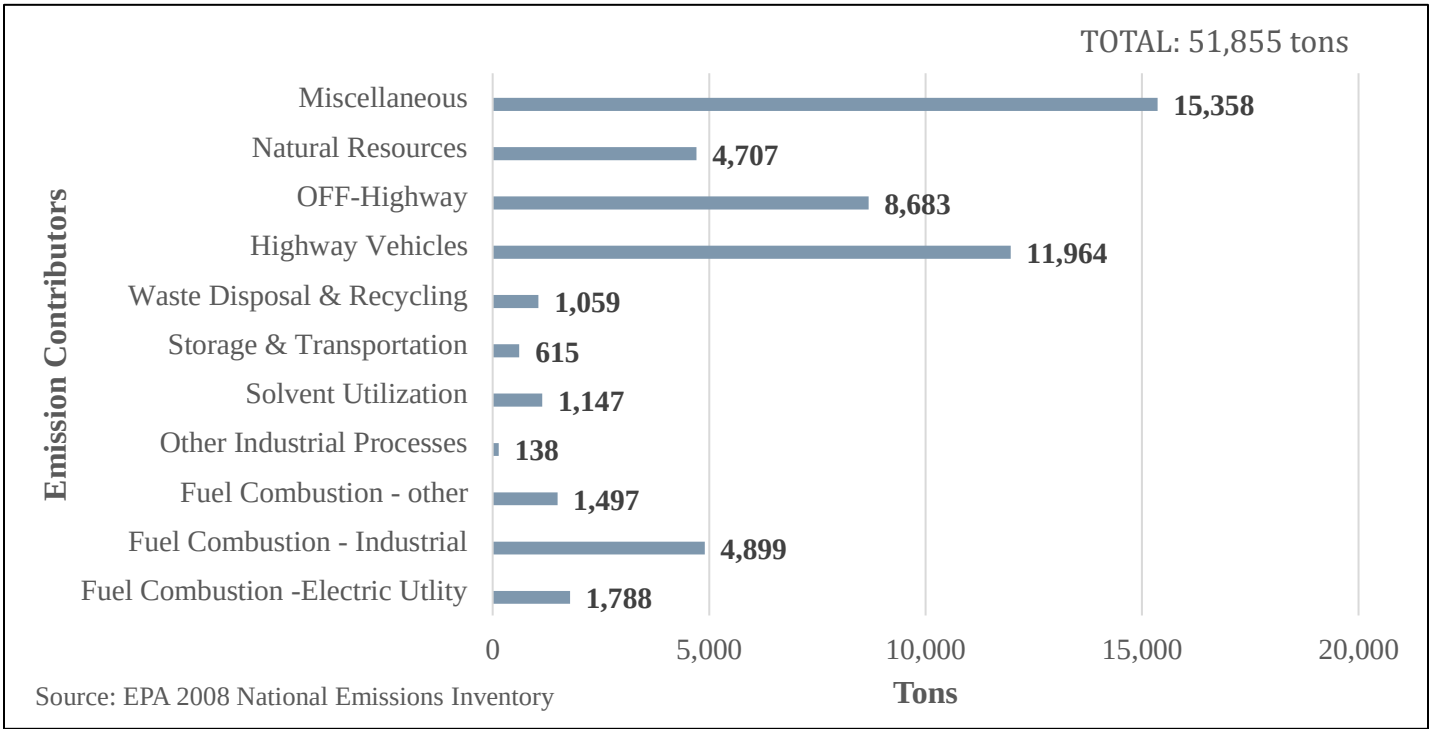
Figure 2. Emissions Baseline Inventory 2008

Total 51,855 Tons



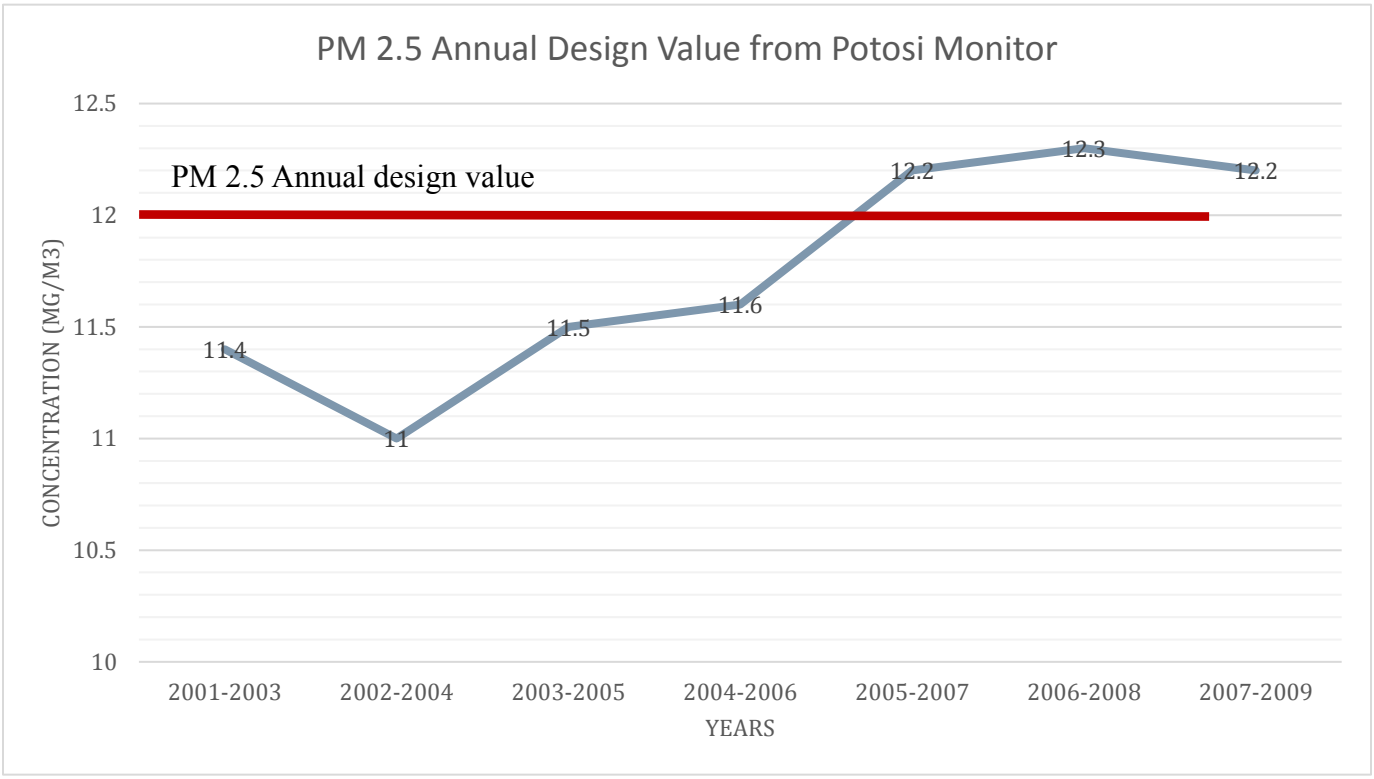
Source: EPA 2008 National Emissions Inventory

Figure 3. Emissions Contributors 2008



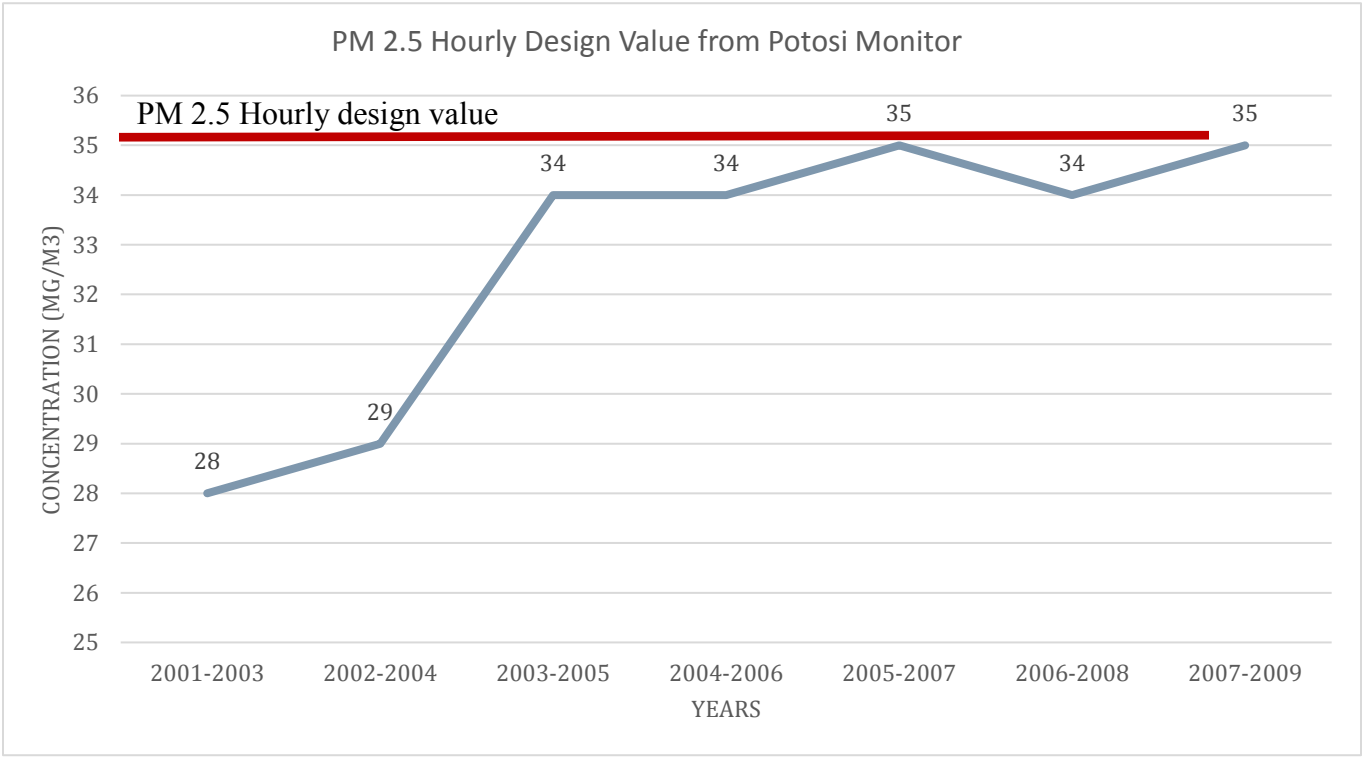
Source: EPA 2008 National Emissions Inventory

Figure 4. PM 2.5 Annual Design Value from 2001 to 2009



Source: Wisconsin DNR Design Values for Potosi Monitor

Figure 5. Annual PM 2.5 Hourly Design Value from 2001 to 2009



Source: Wisconsin DNR Design Values for Potosi Monitor

PROGRAMS AND PROJECTS IMPLEMENTED FROM 2008 TO 2016

The task force working with the City, dubuque MPO, GDDC and private sector implemented couple of programs between 2008 to 2016 to reduce emission in the region. The programs are divided into four categories, Transportation which inludes all modes, Water treatment , Public Outreach and Private sector improvements.

PUBLIC OUTREACH:

CLE4R (2015-2016)

CLE4R was a collaborative effort between the University of Iowa, the City of Dubuque, and Dubuque-area partners to improve air quality in Dubuque and the surrounding Upper Mississippi River Valley communities. The “CLEAR” in CLE4R stands for CLEan Air in the River Valley. The “4” in CLE4R stands for Environmental Education, Technology, Partnerships, and Planning. CLE4R was started in October 2015.

Under CLE4R, the City of Dubuque and its partners used technology and education to improve air quality, which makes for healthier living and can attract businesses to the area. CLE4R was funded by the U.S. Environmental Protection Agency’s Environmental Education Program.

CLE4R was built on existing programs in Dubuque, including the air quality improvement plan accepted by the EPA under the voluntary Particulate Matter Advance Program, a program for communities making sure they maintain their good air quality as they grow and improve their infrastructure.

TRANSPORTATION INFRASTRUCTURE PROJECTS

MILLWORK DISTRICT TIGER I PROJECT (2010)

The project provided an opportunity to transform this former industrial area into a model for sustainable redevelopment. The innovative and progressive sustainable design strategies include the reuse of historic brick pavers, permeable pavement in the alleys and parking areas, and the incorporation of design elements by local artists and craftspeople. The award-winning design set the stage for future redevelopment, including a dynamic public square in the heart of the District and workforce housing for citizens of Dubuque. So while the complete streets of the Millwork District are literally paved with history, they also provide a new route forward for the city. This development helped people to walk and bike to work place in Downtown Dubue rather than driving to the location. The Tiger I project helped to created walk/bike ways between the district and job centers in Downtown.

SAFE ROUTES TO SCHOOLS PROJECTS (2010-2015)

The the goal of Dubuque's Safe Routes to School program is to provide safe and adequate routes to Dubuque schools, so that more students are able to safely walk or bike to school.

A Safe Routes to School Plan for Dubuque's public and private elementary and middle schools was was completed in 2010, and several safe routes to school projects have been completed across the community. By encouraging children to walk and bike to school, the the Safe Routes to School plan seeks to improve safety, air quality, and physical health.

http://www.eastiowasaferoutes.org/about_safe_routes/.

US 52 TRAIL PROJECT (2014-2017)

DMATS in collaboration with the Iowa DOT, Regional Planning Affiliation (RPA) 8, Dubuque County, Jackson County, the City of Dubuque, the City of Bellevue, and other cities within these counties to secure funding to the development of an 18-mile trail connection between the City of Dubuque and the City of Bellevue. The trail is a paved shoulder on either side of existing US Highway 52. The project aims to improve reduce vehicle emissions by encouraging more people to chosse bicycling over personal vehicles.

EAST/WEST CORRIDOR IMPROVEMENTS (2016)

The U.S. 20 corridor in Dubuque is the primary east-west route in the City of Dubuque. Future traffic projections indicate that U.S. 20 alone will not provide sufficient capacity for east-west travel in the City. Capacity along alternate east-west corridors will need to be improved to provide connectivity between the western growth areas and downtown.

In 2010, the City of Dubuque, City of Asbury, Dubuque County, and ECIA commissioned a study to analyze east-west traffic flow in the City and identify corridor improvements or modifications needed to support growing traffic demands. Additionally, consideration was given to transit needs, pedestrian needs and sustainability. The stuey's reccomended design concept included several roundabouts along the corridor to improve traffic flow and safety and to reduce vehicle emissions. Roundabouts allow continuous vehicular flow, vehicle emissions are lower for roundabouts compared to signalized intersections

In the first phaes of the project, the City constructed a roundabout at the intersection of Grandview Ave and Delhi St. This roundabout significantly reduced delay and wait time at this intersection. The next phases of project include roundabouts at Pennsylvania Ave and University Ave, Asbury Rd and University Ave, Loras Blvd and University Ave, and University Ave and Grandview Ave intersections.

TRANSIT PROJECTS

TRANSIT BUS REPLACEMENT (2011):

The City and Dubuque and DMATS staff secureed State of good Repair and Clean Fuel grants in FY 2010. These grants helped the Jule replace the old transit fleetwith clean, fuel-efficient buses and helped implement modern transit technology. This process helped in reducer emsissions from the City's transit vehciles

INTERMODAL FACILITY (2013):

The City and DMATS staff secured a $10 million State of Good Repare grant to replace the 100 year-old transit facility with new Intermodal Facility. This project helped the Jule redesign their route system and improve coordination with other other modes of transportation.

BUS STORAGE FACILITY (2016):

The City and DMATS secured $6.5 million in MPO funds, State of Good Repar and Iowa Department of Transportation Funds (IADOT) to build a Bus storage facility adjacent to the Intermodal Center. This project will help improve transit fleet access to the highway system and reduce dealys through the downtown area.

DERA (DIESEL EMISSION REDUCTION ACT) PROGRAMMING (2015)

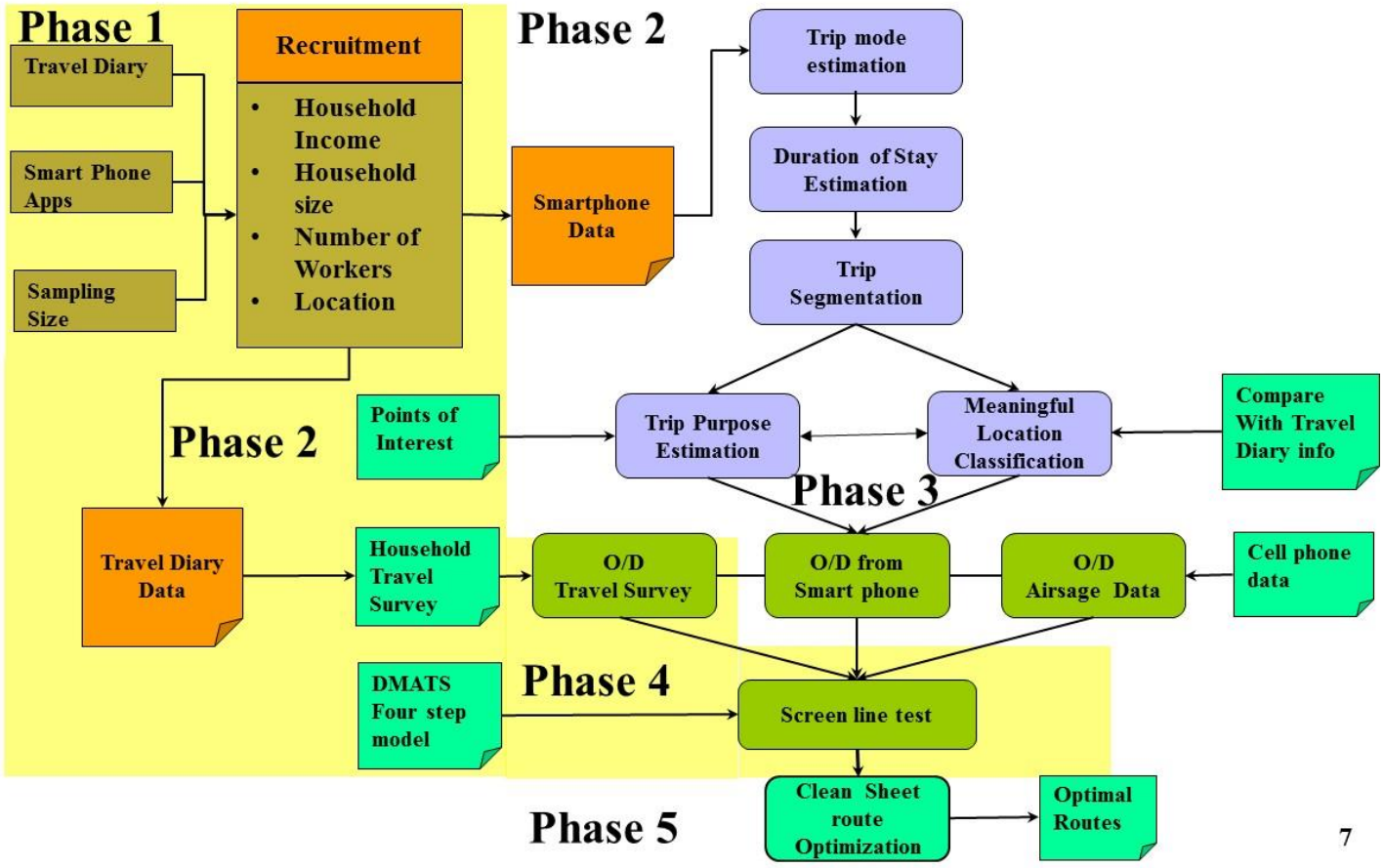
In 2005, the U.S. Congress passed the Diesel Emission Reduction Act (DERA) as an amendment to the Energy Policy Act. DERA was designed to reduce diesel emissions from existing diesel fleets that did not meet recently adopted federal emission standards. Through the State Allocated DERA Funding to Iowa, the Dubuque Metropolitan Area Transportation Study (DMATS) received an $80,000 grant in 2014 to convert City of Dubuque Public Works vehicles to utilize clean diesel technology. Emission reductions for this project is provided to Iowa Department of Natural Resources (IADNR)

SMARTER TRAVEL (2012-2017):

Changing the fleet and building new Intermodal Facilty improved systems operation but did not improve transit ridership because of outdated routes and long headways. To correct this problem City of Dubuque partnered with IBM and DMATS to create the Smart Travel Study. The Smarter Travel Study uses systems developed by IBM to collect data through GPS-enabled smartphones technology on how, when and where study participants traveled in and around Dubuque and generate regional origin/destination matrices and use this data to create optimized bus routes. The process was designed to anonymously gather movement data and analyze it to extract trip analytics such as meaningful location identification and classification, trip purpose classification, origin destination matrix estimation, corridor speed and trip mode classification.

The Smarter Travel Study recruited iPhone or Android smartphone users who commute and travel in the Dubuque area on a daily basis; who were interested in improving transit and the travel patterns in Dubuque; and who met diverse demographic and socioeconomic parameters. The data has been used to generate optimized public transit routes for Jule Transit. The optimization algorithm minimizes average travel time for bus routes, while keeping the operating costs constant and providing routes based on demand during peak and off-peak times. This project helped the transit system increase its ridership by 40%. This project was designed to be replicated in metro areas with population less than 200,000.

Figure 6. Smarter Travel Project Flowchart



WATER TREATMENT:

WATER AND RESOURCE RECOVERY CENTER (2013)

Dubuque has committed significant resources to the goal of upgrading City facilities, services and operations to increase efficiency, reduce costs, and improve environmental outcomes, including the reduction of PM 2.5 in the community. As an example, on October 3, 2013 the City of Dubuque held a ribbon-cutting to celebrate the completion of a $65 million upgrade to the Water and Resource Recovery Center (formerly known as the Water Pollution Control Plant), the single largest capital investment in the community's history.

Initially approved by the City Council in 2008, the update included replacement of 40 year old incinerators and construction of four high-capacity anaerobic digesters to treat wastewater and high-strength waste from commercial and industrial sources. This process, often called "codigestion", generates biosolids that can be used as soil fertilizer on local farmland and also produces biogas (largely methane) that is used to heat the digestion process and buildings at the facility and generate electricity to operate the plant and sell back to the local utility. A study is underway to consider converting the facility to produce renewable natural gas for transportation fuel. City projects such as this contribute both directly and indirectly to PM 2.5 emission reductions in the community.

PRIVATE SECTOR IMPROVEMNTS

JELD-WEN (2013)

Jeld-Wen, one of the world's largest manufacturers of wood doors and windows, operated a manufacturing plant in down-town Dubuque since 1978. This plant, which manufactured door skins using wood fibers, was the single-largest point source emitter of PM 2.5 emissions in Dubuque County. For example, as of 2012 Jeld-Wen released 25.62 tons of PM 2.5 annually, which is more than double the next-highest PM 2.5 emissions contributor in the community. The community worked with Jeld-Wen in 2011 on a plan to actively manage PM 2.5 and precursor emissions. In 2013, Jeld-Wen ceased operation of the plant in Dubuque completely, as the plant is outdated and the site is located adjacent to the Millwork District (a fast growing urban-revitalization and housing area).

ALLIANT POWER PLANT (2016)

The community receives its electrical power from Alliant Energy, a regulated private utility operating in Iowa, Wisconsin and Minnesota. Alliant has historically provided power to the community by operation of the Interstate Power and Light Dubuque Generating Facility, a 61-MW coal fired power plant located on the Dubuque riverfront. That plant was the largest CO2e generator in the community, as well as one of the five largest PM 2.5 emitters. On Septmeber 24th, 2011 Alliant switched the generation fuel source from coal to natural gas, significantly reducing emissions. In addition, the hours of operation for the facility since 2011 have been significantly reduced, also curtailing emissions. Lastly, Alliant filed notice that it will cease operation completely of the Dubuque Generating Facility in mid 2016, removing the remaining emissions from this source. The data table below provides the dropdown values for the energy plant from 2010 to 2014.

Figure 7 Aliant Power Plant Emissions 2010 -2014

	CO TOTAL TONS (ANNUAL)	NOX TOTAL TONS (ANNUAL)	PM TOTAL TONS (ANNUAL)	PM10 TOTAL TONS (ANNUAL)	PM2.5 COAL TONS (ANNUAL)	PM2.5 N GAS TONS (ANNUAL)	SO2 TONS (ANNUAL)	VOC TOTAL TONS (ANNUAL)
	Data Value	Data Value	Data Value	Data Value	Data Value	Data Value	Data Value	Data Value
IPL Dubuque Boiler DB1 Unit 1								
11/30/2010 12:00 AM	139.97	489.34	50.128	39.644	39.6508	0.1350	503.74	2.419
11/30/2011 12:00 AM	106.83	350.79	37.509	29.682	29.6620	0.0197	468.10	2.045
11/30/2012 12:00 AM	28.73	46.18	2.599	2.599	0.0000	2.5992	0.03	1.881
11/30/2013 12:00 AM	15.33	32.30	1.387	1.387	0.0000	1.3897	0.85	1.004
11/30/2014 12:00 AM	5.85	11.99	0.529	0.529	0.0000	0.5292	0.31	0.383
11/31/2014 12:00 AM								
IPL Dubuque Boiler DB5 Unit 5								
12/31/2010 12:00 AM	140.56	305.83	45.715	39.421	39.4100	0.0077	267.55	1.379
12/31/2011 12:00 AM	74.53	191.68	23.093	19.916	19.9000	0.0200	156.64	0.969
12/31/2012 12:00 AM	20.30	65.60	1.837	1.837	0.0000	1.8367	0.62	1.329
12/31/2013 12:00 AM	7.94	28.98	0.719	0.719	0.0000	0.7187	0.51	0.520
12/31/2014 12:00 AM	2.41	9.23	0.218	0.218	0.0000	0.2177	0.21	0.158
IPL Dubuque Boiler DB5 Unit 6								
12/31/2010 12:00 AM	1.57	23.90	1.200	39.660	1.1900	0.0054	11.34	0.123
12/31/2011 12:00 AM	2.91	65.43	3.100	29.680	3.0700	0.0076	41.94	0.257
12/31/2012 12:00 AM	3.32	10.37	0.300	2.600	0.0000	0.3006	0.28	0.218
12/31/2013 12:00 AM	0.19	0.66	0.020	1.390	0.0000	0.0169	0.09	0.012
12/31/2014 12:00 AM	1.08	1.70	0.100	0.530	0.0000	0.0974	0.06	0.071
Source: Alliant Energy								

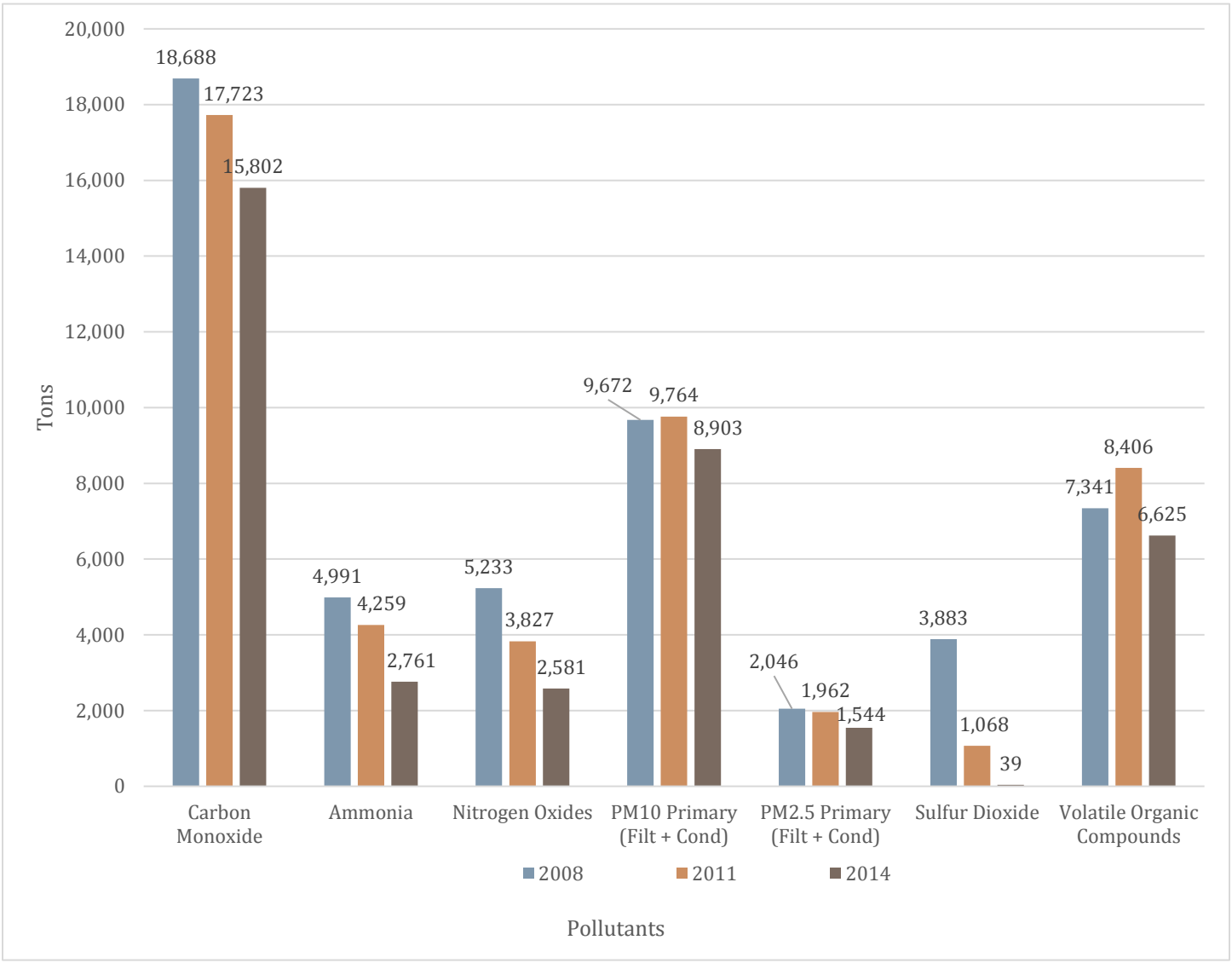
JOHN DEERE DUBUQUE WORKS (2011):

The largest employer in Dubuque is the John Deere Dubuque Works. A manufacturer of farm, forestry and construction equipment has also historically been one of the top five PM 2.5 emission sources in the community. It has recently announced that it would cease coal fired energy production at its Dubuque facility. In its initial filing with the Iowa Utilities Board on December 22, 2011 (John Deere will be providing additional on when the coal fired energy ceased which we will be added to the plan when it arrives), John Deere stated it has ceased the "use of coal-fired generation for several reasons including implications of the proposed Maximum Achievable Control Technology (MACT) standards" that are to control the release of mercury and other hazardous pollutants. The Iowa Utilities Board had stated that the plant's annual net generation was 31,496 MWh prior to conversion.

COMPARING 2011 & 2014 DATA TO BASELINE EMISSIONS INVENTORY

To date, Dubuque County been in compliance with the federal standards for PM 2.5. Projects and programs implemented in Dubuque County have had a postive impact on the emissions in the reason. EPA data shows a steady decrease in pollutants form 2008 to 2014. Figure 8 demonstrates how pollutants have declined over the past eight years.

Figure 8. Comparisoin of Pollutants from 2008-2014

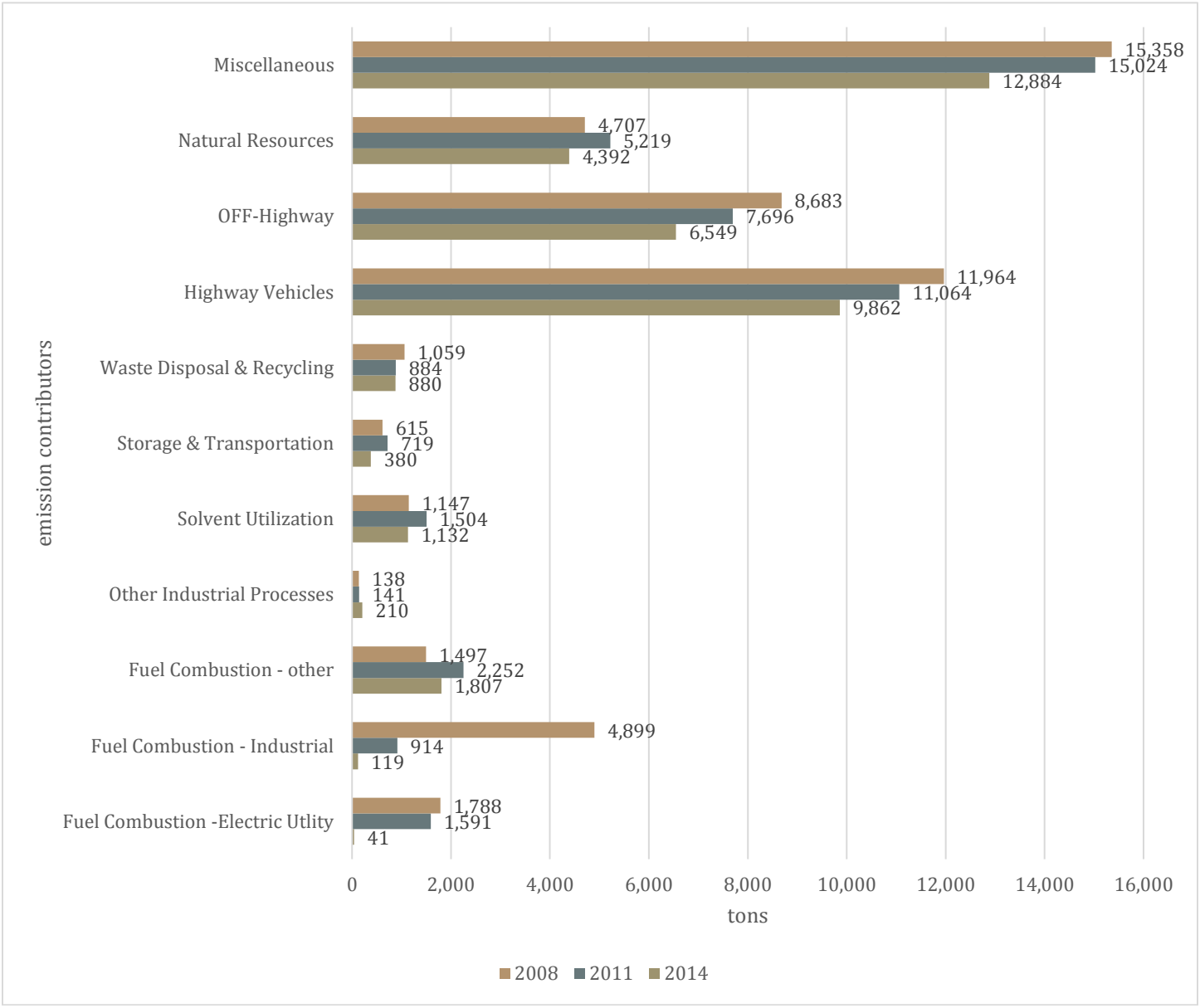


Source: EPA 2008, 2011 & 2014 National Emissions Inventory

Carbon Monoxide, Ammonia, Nitogen Oxides, and Sulfur Disoxide fell steadily wihle , PM 2.5 decreased more between 2011 to 2014 when compared to the decrease between 2008 and 2011. PM 10 and Volatile Organic Compounds did have slight increase between 2008 and 2011 but fell in 2014.

Figure 9 shows a comparison of Emission Contributors from 2008-2014. All Emisison Contributiors decreased except for Fuel Combustions-other. Fuel Combustion – Industrial and Fuel Combustion – Electric Utlity had a drastic decrease.

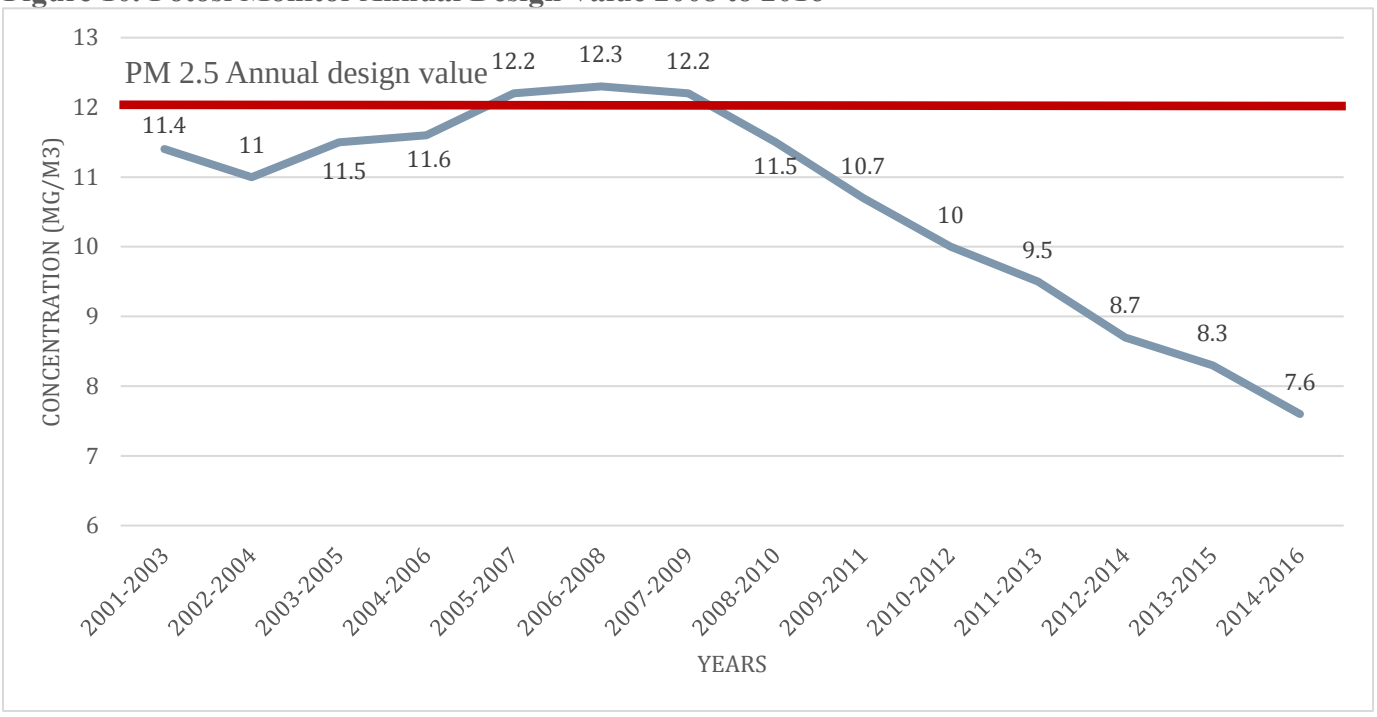
Figure 9. Comparison of Emission Contributors 2008-2014



Source: EPA 2008, 2011 & 2014 National Emissions Inventory

The data from the Potosi monitor matched with the trend shown in National Emissions Inventory data for Dubuque County. Figure 10 provides meausrements from Potosi monitor from 2008 to 2016. Expect from 2006 to 2010, the Potosi monitor is below the EPA Annual Design values. Measuremetns form the Potosi monitor are falling steadily each year. Figure 11 provides hourly design from Potosi monitor from 2008 to 2016. The hourly design values follows the same trend as annual design stablising at 21micrograms per cube meter of air from 2012-2016.

Figure 10. Potosi Monitor Annual Design Value 2008 to 2016



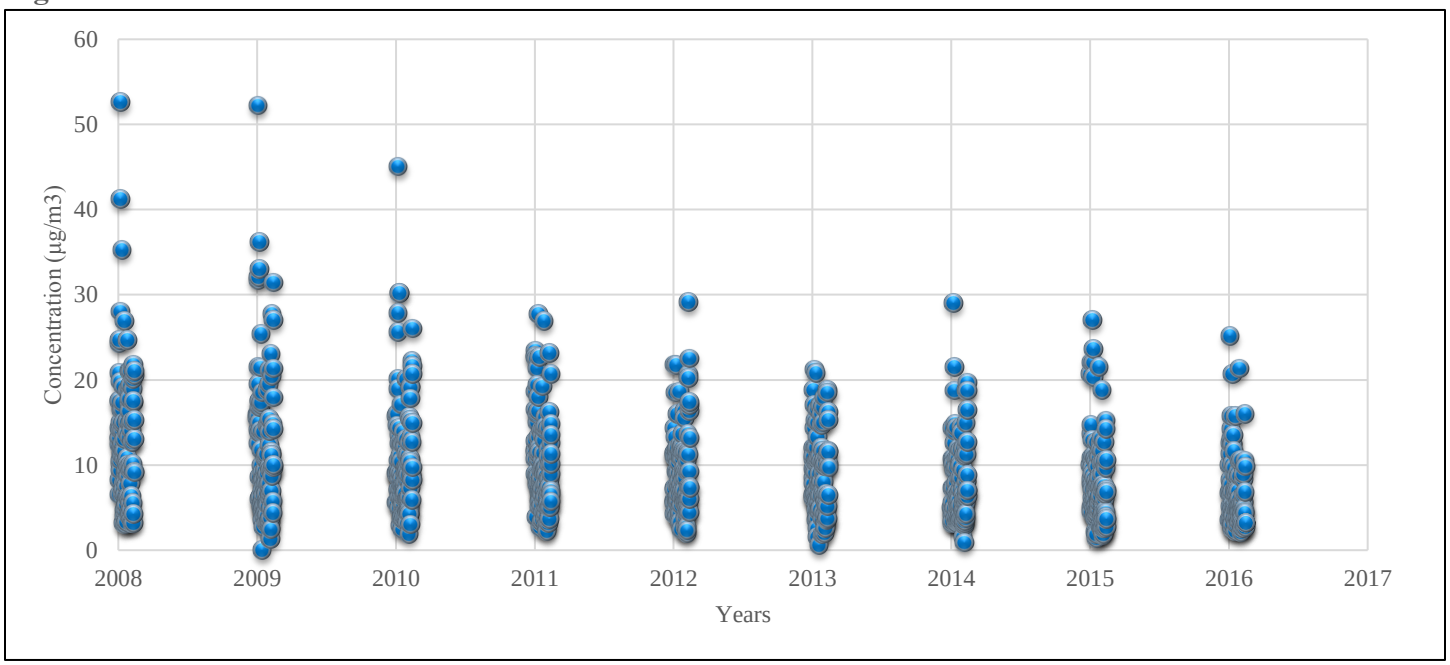
Source: Wisconsin DNR

Figure 11. Potosi Hourly Design Value 2008 to 2016

Source: Wisconsin DNR

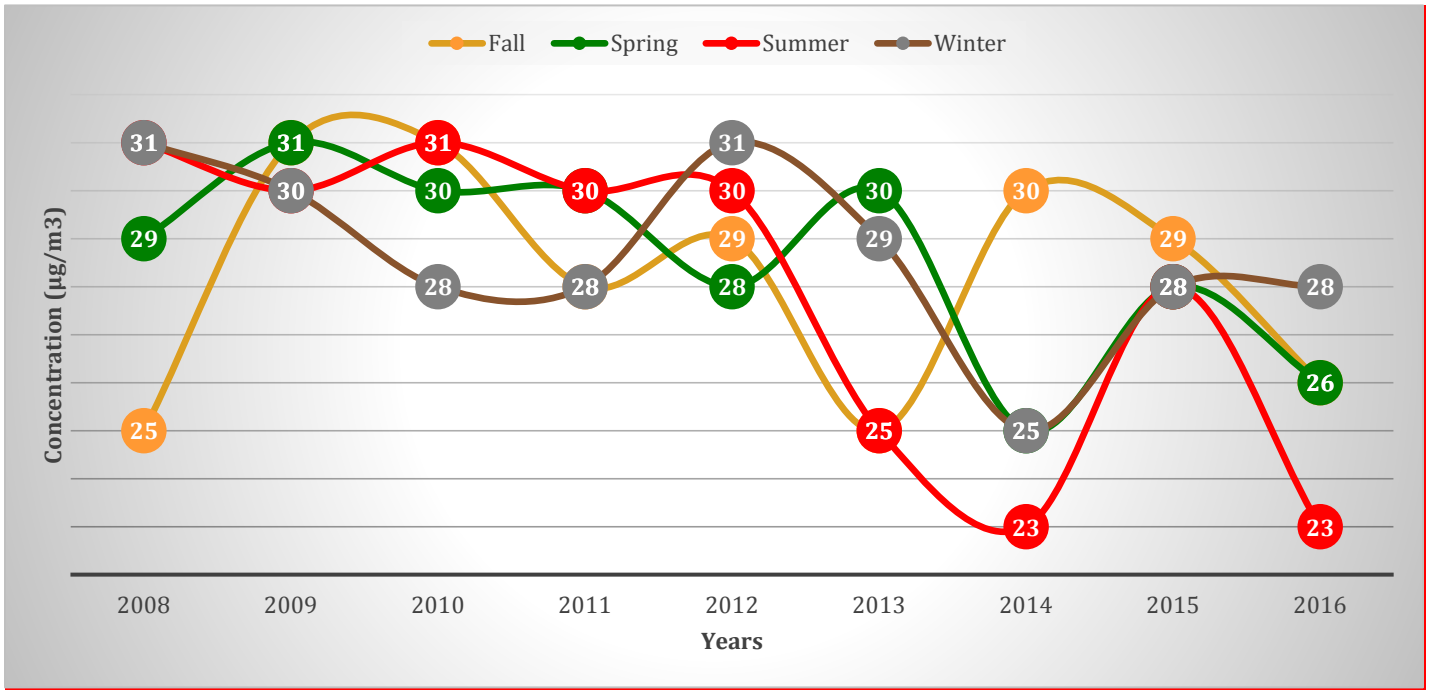
The raw data from the Potosi monitor shows several measurements above 30 micrograms per cube meter of air between 2008 and 2010. Since 2010, all measurements have been below 30 micrograms per cube meter of air. The data also shows that most higher mesuremetns occur in winter followed by spring and fall. Figure 12 provides the raw measurements from the Potosi monitor from 2008 to 2016. Figure 13 rovides average measurements by seasons from 2008 to 2016.

Figure 12. Potosi Monitor Raw Data 2008 to 2016



Source: Wisconsin DNR

Figure 13 Potosi Monitor Raw Data by Season 2008 to 2016



Source: Wisconsin DNR

ADDITIONAL DATA

In addition to publicly-available PM 2.5 emissions data provided by the U.S. Environmental Protection Agency (EPA) and the Iowa Department of Natural Resources (DNR), Greater Dubuque Development Corporation financed a study in 2011 to examine the external sources of PM 2.5 emissions. While Dubuque is making significant progress in reducing its emissions, the study (conducted by climate researchers at the University of Wisconsin and the University of Northern Iowa) found that a substantial level of PM 2.5 emissions in Dubuque County are generated from sources many miles south of Dubuque and carried northward by persistent winds, often resulting in high PM 2.5 measurements. PM 2.5 levels in Dubuque are exacerbated by the atmosphere's inability to mix air vertically, especially in colder months.

there may be a unique set of characteristics, caused by Mississippi River Valley wind patterns, that make PM2.5 measurements seem artificially high compared to the diminishing production of point-source PM2.5 emissions in the community. Additionally, cold weather thermodynamics can make these measurements seem even higher in the coldest months (although this characteristic may not be limited to Dubuque).

"While there is variability between cases within the high and low sets examined in this project, it is still possible to make some summary statements. The average virtual potential temperature profiles for the high PM2.5 cases consistently depict a stably stratified atmosphere that would resist vertical mixing of air pollution by turbulent processes. On the other hand, the average profiles for the low cases consistently depict a mixed layer where turbulence would act to reduce the concentration of particulates at the surface. Both HYSPLIT back trajectory calculations and surface wind roses indicate that winds at and near the surface most commonly have a southerly component in the high cases, and a northwesterly component in the low cases. However, southerly surface winds at Dubuque are not necessarily a good predictor of PM2.5 concentration at Potosi. South winds are common at Dubuque every month of the year, yet high PM2.5 episodes are more strongly associated with cold than warm months. The suggestion is that the atmosphere's ability to mix air vertically is a dominant process in explaining high PM2.5 measurements. As seen in this study, the thermodynamic structure of the lower atmosphere is notably and quantifiably different when PM2.5 measurements are high."

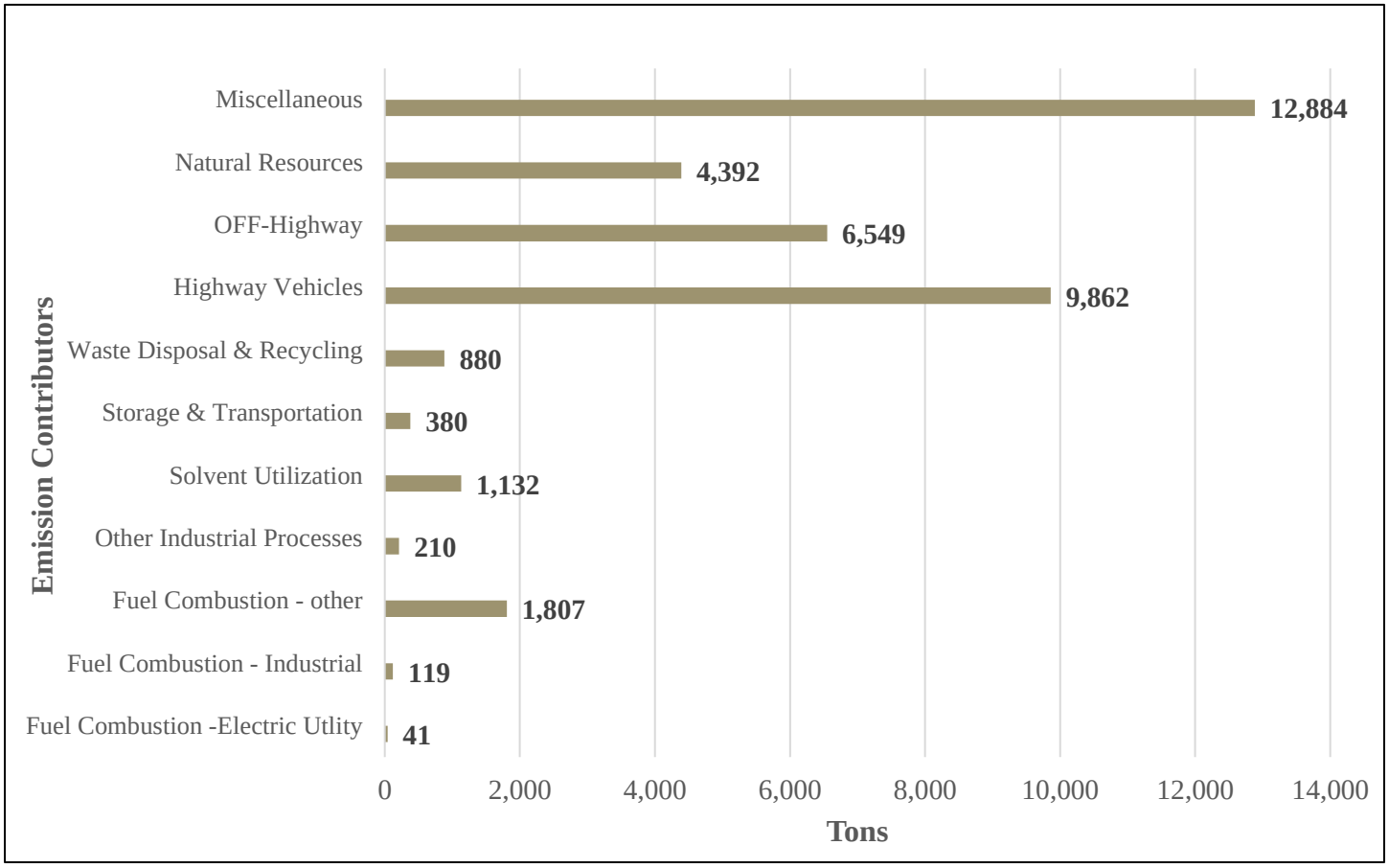
FUTURE INITIATIVES

The region's future projects are targed towards reducing emissions from the area's major emission producers such as fuel combustion, wate disposal and recycling, and off highway sources.

EMISSIONS DATA 2014

EPA emissions data from 2014 shows miscellaneous sources as the highest contributor to Dubuque County's PM 2.5 emissions. However, it will be very difficult to identify and address specific contirbutors in category . Fuel Combustion is the next highest contributor. Specifically, the large a large percentage of these emissions are generated by heavy-duty diesel vehicles, light-duty gasoline vehicles, and off-road diesel and gasoline equipment. Waste Disposal & Recycling and Off-Highway sources such as all terrrian vehciles, utlity vehicles, ATVs, Dirt bikes etc are the next two highest PM 2.5 emission sources. Further down the list are point-source emissions, with the bulk of these emissions being produced by Other Indistrial Processes and other identified sources (Source). Figure 14 provides the percentage breakdown of emission source for the region for year 2014.

Figure 14. Dubuque County Emmissions by Source 2014



Source: EPA 2014 National Emissions Inventory

PROGRAMS AND PROJECTS FROM 2016 - 2020

As significant efforts are already underway in the community on point-source emissions with additional efforts under active development. Innovative efforts are also being undertaken on mobile sources as well. These

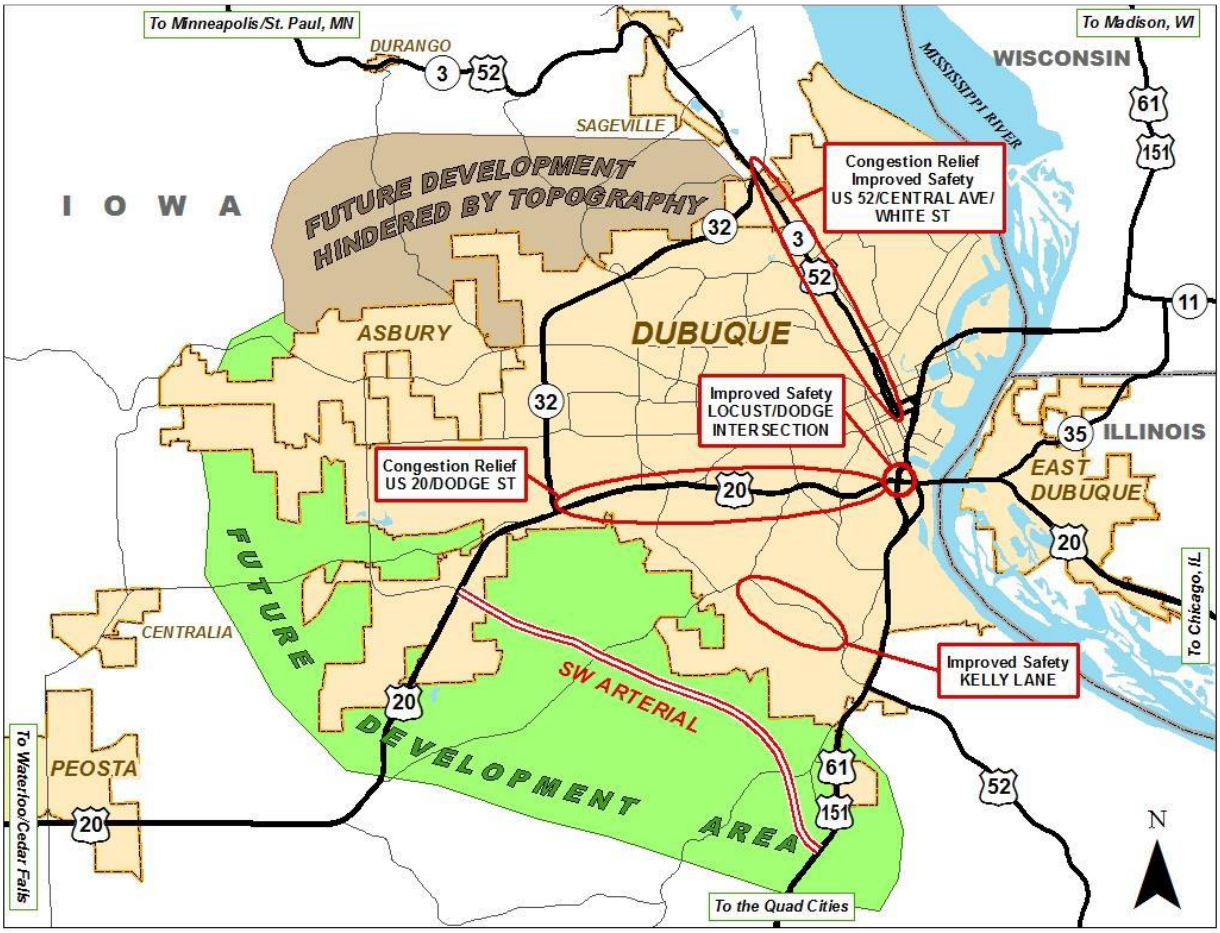
efforts did drastically reduce the level of PM 2.5 emissions in Dubuque County. The future project are following the same trend as projects done prior to 2014 focousing on addressing Fuel Combustion, Waste Disposal & Recycling and Off Highway resources.

TRANSPORTATION INFRASTRUCTURE PROJECTS

US 52 / SW ARTERIAL PROJECT (WILL BE COMPLETED BY 2020)

The Southwest Arterial will be a 6.1-mile, four-lane, divided freeway with priority-one access control that will provide an alternative route for traffic through southwestern Dubuque. It will connect the Dubuque Technology Park on U.S. 61/151 with the new Dubuque Industrial Center West and the existing Dubuque Industrial Center near U.S. Highway 20.

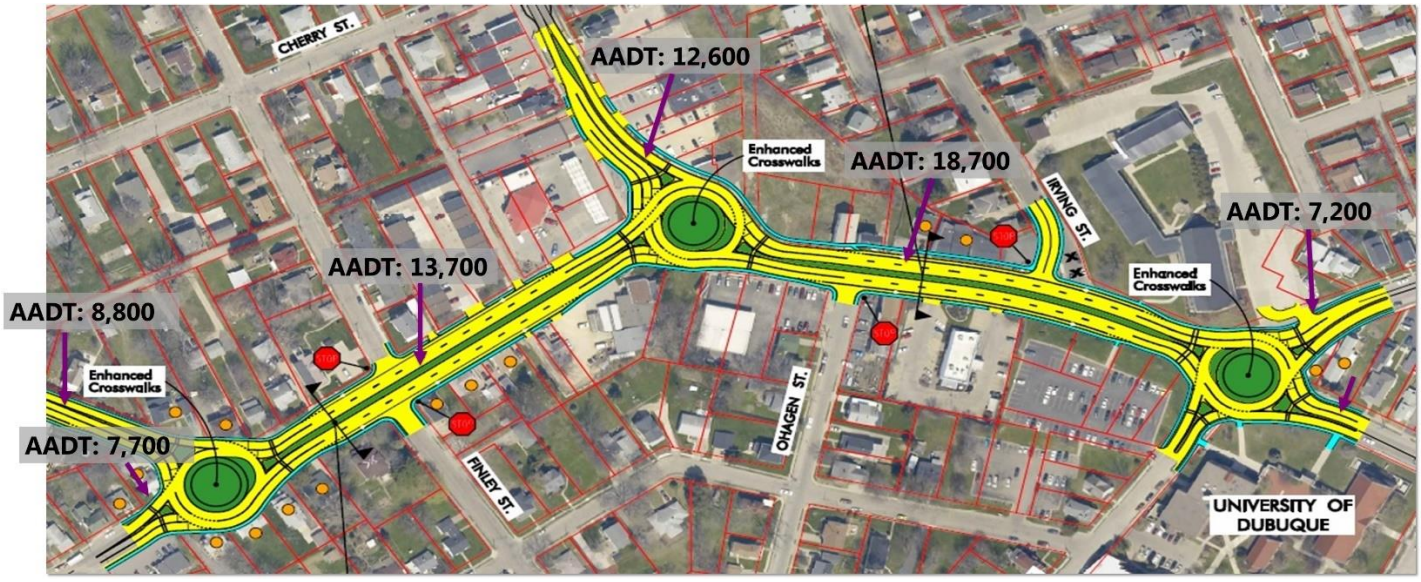
This project is designed to provide congestion relief on US Highway 20/Dodge Street and the Locust/Dodge Street intersection and provides direct transportation, connectivity and continuity for freight traffic throughout the region. The project will reduce overall VMT and reduce wait time on US 20.



EAST-WEST CORRIDOR IMPROVEMENTS (WILL BE COMPLETED BY 2020)

The East-West corridor roundabouts are designed to provide sufficient capacity along key east-west corridors in the region. The East-West Corridor Connectivity study identified the roundabouts and thirty-two other capacity improvement projects for Asbury Road, University Avenue, Pennsylvania Avenue, and Loras Boulevard.

The East-West Corridor Roundabouts reducing congestion and improving the overall efficiency of the transportation system in the DMATS region. The roundabouts at Asbury/University, Pennsylvania/ University and Loras/University intersections will address capacity and safety issues at key non-signalized intersections and reduce wait time on major corridors.

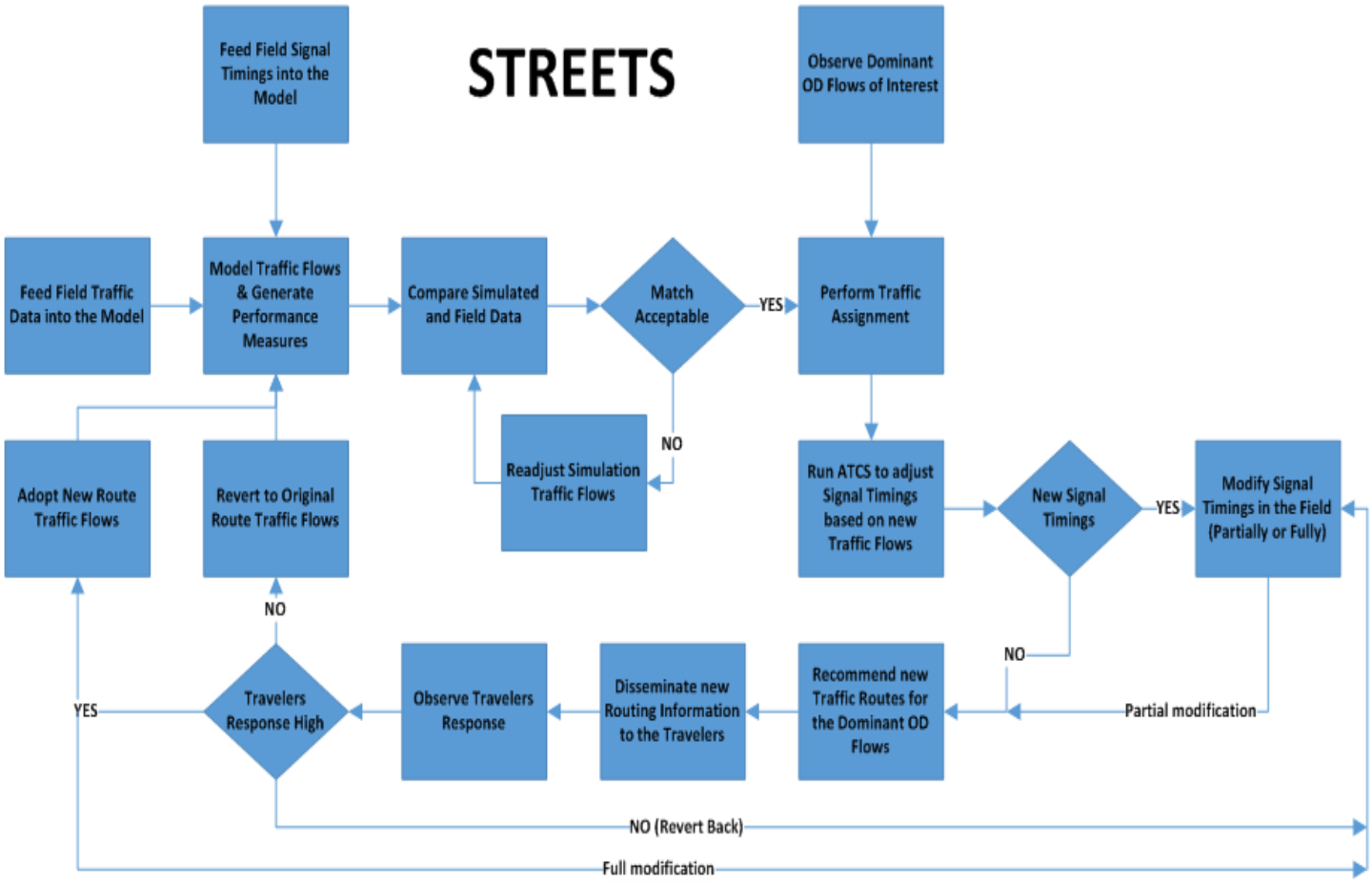


STREETS PROJECT (WILL BE COMPLETED BY 2019)

The goal of the Smart Traffic Routing with Efficient and Effective Traffic Signals (STREETS) project is to develop a smart, next-generation, traffic management and control system. This system will use traffic control strategies to enable dynamic traffic routing on ten corridors to maximize the use of existing roadway capacities in the Dubuque metro area.

The STREETS project intends to deliver an automatic system that gives the City staff the ability to monitor traffic operations and intervene as necessary, but does not require constant or significant manual operations. Ideally, if no significant traffic disturbance events occur, STREETS will run 24/7 without requiring operators to interfere manually with traffic operations.

The project will enable more equalized utilization of the available infrastructure. Currently drivers are unaware if an alternate route could reduce their travel time. This system, first of its kind, will the city's operators the ability to help drivers to reduce their commuting time by efficiently utilizing existing road capacity.



COMMUNITY AIR QUALITY EDUCATION THROUGH CLE4R PROJECT

To assure citizen, stakeholder and community engagment, along with partner involvement, and continue to address the Healthy Air principle in Sustainable Dubuque, air quality education was a priority

The University of Iowa collaborated with the City of Dubuque and was awarded an EPA Environmental Education grant for CLE4R (Clean Air in the River Valley through educational education, technology, partnerships and planning) CLE4R is an effort to improve air quality in the Dubuuqe and surrounding communities with the following aims:

Aim 1: increased awareness, knowledge, decision-making skills, and commitments to action by local stakeholders

Aim 2: See if low-cost air quality sensors are a good training tool

Aim 3: Assess outcomes

Partners: U of IA, City of Dubuque,Green Vision Education Program/Green vision schools/ Dubuque Community School District, Petal Project (Green Business Certification Program of East Central

Intergovernmental Associates (ECIA) , Green Dubuque, University of Dubuque, Green Iowa Americorps, Iowa Clean Cities Coalition, Keystone Area Education Agency

Accomplishments include: Website with blogs, current air quality conditions and events, social media (Facebook, Twitter) , Community education day long workshop for educators and CLE4R partners, booth and presentation at 2016 Growing Sustainable Communities Conference, presentations and use of low cost air monitor trainings to school and community groups,. The City revised it's Open Burning Permitting process, expanding Fire Department approval requirements to include public health and sustainability staff review and input.

Through May, 2016 1566 people participated in air quality education activities, including students, citizens and staff working on the CLE4R project .

CNG PROJECT (WATING FOR CITY TO PROVIDE INFORMATION)

METHAN FROM SOLID WASTE AND WATER TREATMENT PLANT (WATING FOR CITY TO PROVIDE INFORMATION)

LONG TERM PROJECTS FROM (2020 ONWARDS)

EMISSION REDUCTION THROUGH INCORPORATION OF AIR QUALITY INTO COUNTY HEALTH GOALS

As part of Dubuque County's Community Health Needs Assessment and Health Improvement Plans(CHNA-HIP) for 2011 and 2015, each contained goals to reduce PM emissions. Specifically: *By 2016 the air quality in Dubuque County will be in compliance with the Clean Air Act standards by the number of days of moderately unhealthy and unhealthy air days being reduced by maintaining attainment standards for PM 2.5.* There are numerous sub-goals, such as prohibiting open burning on bad air days and minimizing it overall, providing public education to increase awareness of air quality problems, publicizing the current Air Quality Index, and partnering with other organizations to reduce PM 2.5 emissions. These goals were addressed and met. A new CHNA-HIP will be drafted during 2017-2018 and will include community input and assessing available air quality data. with an expected completion date ofAugust 2018Community health stakeholders, citizens and policy makers will determine if air quality continues to be identified as a need.

EMISSION REDUCTION THROUGH PUBLIC/PRIVATE PARTNERSHIPS.

One reason that economic recovery and revitalization have occurred so dramatically in Dubuque has been its use of unique public/private partnerships. As it relates to PM 2.5 emission reduction, an example is the Smarter Travel pilots with IBM. The City of Dubuque, along with national and local partners, collaborated with IBM on its City-In-Motion project to conduct the Smarter Travel pilot studies. The Smarter Travel pilot studies are part of *Smarter Sustainable Dubuque*, the City's partnership with IBM Research and the research component of the Sustainable Dubuque initiative. Collaborators include the City of Dubuque, IBM Research, The Jule, East Central Intergovernmental Association, and local private businesses.

Dubuque's initial Smarter Travel pilot study used a smartphone application developed by IBM Research and RFID technology to collect anonymous data on how, when and where volunteer participants travel within the community. The anonymous, aggregate data collected was analyzed by IBM and the findings used by the City of Dubuque and its transit partners to implement practices and policies that incorporate lower-cost and lower-impact travel options within Dubuque (such as the redesign of transit routes). Like other *Smarter Sustainable Dubuque* projects, this research was designed to give residents the information they need to do what they want (reduce costs, save resources, and decrease their environmental impact). Possible outcomes from the on-going pilots include, but are not limited to: reduced travel times, increased fuel efficiency, increased traffic safety, reduced vehicle miles traveled (VMT), and reduced carbon monoxide emissions.

EMISSION REDUCTION VIA INNOVATIVE INFRASTRUCTURE

Earlier this year Dubuque broke ground on its sixteen million dollar intermodal transportation hub, which will centralize innovative infrastructure for transportation conversions. First to be implemented is Vehicle-to-Transit followed by Vehicle-to-Bike, Vehicle-to-Walk and even Vehicle-to-Rail. Innovative infrastructures such as the intermodal facility, coupled with improved data from the *Smarter Travel* pilots, will also allow acceleration of car-pool, van-pool and other shared ride systems.

EMISSION REDUCTION VIA BUSINESS INNOVATION

The Dubuque business community is a leader in sustainability innovation and implementation. The business community, coordinated by the Greater Dubuque Development Corporation (GDDC) through its Innovation Consortium, develops and hosts specific business programming on sustainability. A recent example impacting PM 2.5 is the Consortium's work on compressed Natural Gas Vehicles and infrastructure. With leadership from

Black Hills Energy and private fuel providers, the private sector has embraced compressed natural gas as a more environmentally friendly vehicle fuel and private NG fleets and fueling stations can now be found in Dubuque. The City of Dubuque is currently piloting the use of two CNG pickup trucks and will explore the opportunity to convert additional vehicles to CNG in the future, with potential fueling sources including methane from the Water and Resource Recovery Center, and Dubuque Area Metropolitan Solid Waste Agency. On November 13, 2013 GDDC brought together a natural gas supplier, distributors and end users to discuss benefits (including return on investment) of expansion of NG fueling.

EMISSION REDUCTION VIA REGULATION

While Dubuque is a community where positive change is most often achieved through discussion, consensus and accommodation there are instances where direct regulation is considered and occurs. While not a primary contributor to PM 2.5, in densely-populated areas, a large number of residents can be adversely impacted by the air quality resulting from recreational fires and burning. To mitigate this, the City of Dubuque has adopted the International Fire Code (IFC), which contains regulations and guidelines regarding recreational fires.

EMISSION REDUCTION VIA NON-POINT SOURCE COLLABORATIONS

While point-source reduction efforts are proceeding well within the community, the Dubuque Air Quality Task Force will work to identify remaining point-source emitters and develop an engagement process/campaign to identify additional individual improvements that can be made. In addition, as the majority of the direct PM 2.5 in the region relates to non-point sources of emissions, the Dubuque Air Quality Task Force will reach out to the relevant state agencies and associations to determine if there are collaborative efforts which could be undertaken regionally between Dubuque and identified non-point source groups. Progress in these areas can be added at the annual update of the Path Forward.

ACTION PLAN - ASSURING CITIZEN, STAKEHOLDER AND ENGAGEMENT

ENGAGING CITIZENS THROUGH EFFORTS LIKE SUSTAINABLE DUBUQUE'S WORK ON AIR QUALITY.

"Dubuque is a viable, livable, and equitable community that embraces economic prosperity, environmental integrity, and social/cultural vibrancy to create a sustainable legacy for generations to come" became the vision. In order to implement that vision, a citizen-based task force defined 12 key principles to guide the community's path to a more sustainable future. These include: Regional Economy, Smart Energy Use, Resource Management, Community Design, Green Buildings, Healthy Local Foods, Community Knowledge, Reasonable Mobility, Healthy Air, Clean Water, Native Plants and Animals and Community Health and Safety.

With the support of technical and education assistance through Advance PM, Dubuque will continue its focus on Air Quality within its Sustainable Dubuque model. Education efforts will continue through the CLE4R project to increase the general public's understanding of the causes and effects of PM 2.5. Through an extension of the CLE4R EPA Environmental Education grant, the Air Quality Task Force and University of Iowa will continue to partner with K-12 schools, colleges, non-profits, and citizen groups . Specifice plans include the following: Re assess K-12 air qualilty curriculum, teacher trainings and outreach in the schools, continue local University science education partnerships, implement further distribution and usage of Airbeams, finalize Airbeam "check out materials" and promote air quality education and information about low cost sensor use through the CLE4R website, the city of Dubuque's website and social media platforms etc.

The Air Quality Task Force will annually update community partners and policy makers, including the Dubuque Area Metropolitan Transportation Study Board (DMATS,) on current air quality data and attainment status through reports, presentations and posting of data on websites and social media.

ENGAGING THE ENTIRE BUSINESSES COMMUNITY THROUGH COLLABORATIONS LIKE THE PETAL PROJECT.

The Petal Project is a regional green business certification program designed to help businesses in the Dubuque area adopt more environmentally-friendly business practices. The program provides businesses with a simple framework for saving money and resources while establishing a community-wide definition of a green business for consumers wishing to shop based on their values. Currently, 30 businesses in the Dubuque area are participating in the Petal Project, with 15 certified. These organizations span across a range of sectors including retail, education, non-profit, manufacturing, finance, printing, and medical. Together these companies employ over 4,000 people. For additional information on the Petal Project, see Attachment 8. The Air Quality Task Force will explore opportunities to add air quality outreach to existing business program such as the Petal Project.

ENGAGING EXPERTS THROUGH GOVERNMENTAL COLLABORATIONS SUCH AS ADVANCE PM.

Dubuque has continually sought the input of state, national and international experts as it works toward its Sustainable Dubuque vision. Advance PM is a perfect example of proactively engaging experts on a key environmental issue. The areas and opportunities for technical assistance are many, with four specific areas of interest to Dubuque at this time:

- Assistance in measuring progress from existing efforts and extrapolating into the future.

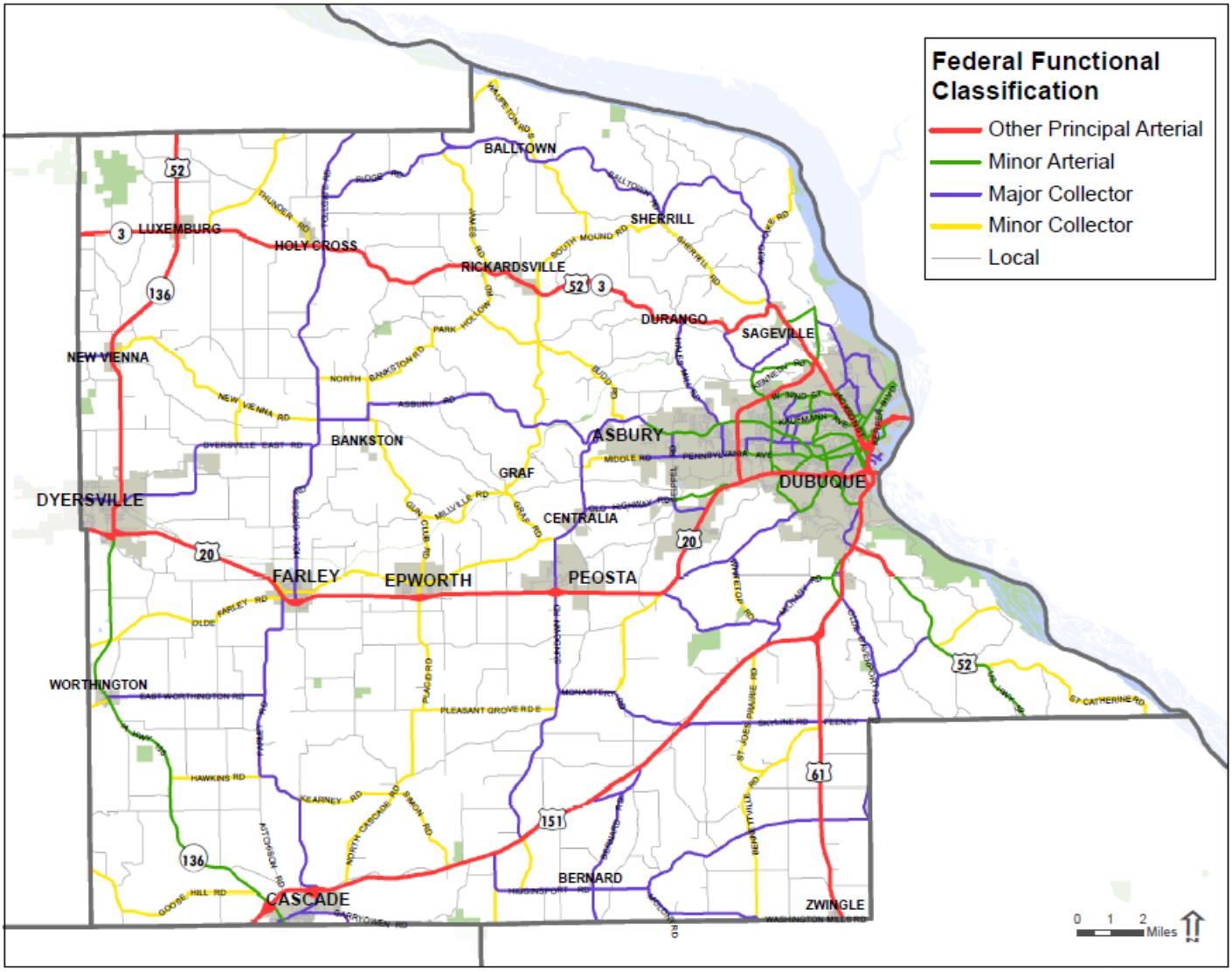
- Assessing the ability to improve capacity for change through scientific, educational and engagement efforts in the community.
- Assessing whether local action alone can be sufficient to maintain attainment status.
- Assistance with community education, outreach and engagement

APPENDICES

Appendix 1 – Dubuque County and City Map

Appendix 2 – Path Forward Partners Information

APPENDIX 1- DUBUQUE COUNTY AND CITY MAP WITH ROAD NETWORK



APPENDIX 2 – PATH FORWARD PARTNERS INFORMATION

Dubuque Metropolitan Area Transportation Study (DMATS)

The Dubuque Metropolitan Area Transportation Study (DMATS) is a tri-state Metropolitan Planning Organization (MPO) located at the boundary intersections of the states of Iowa, Illinois and Wisconsin.

The committee is responsible for approving goals and plans for the development of a seamless transportation system for the safe and efficient movement of people and goods within and between modes of transportation (roads, bicycle and pedestrian facilities, transit, rail, water and air) in Dubuque County. DMATS encourages and fosters cooperation between local, regional, state and federal agencies to discuss transportation issues and plans. Examples of DMATS projects include the U.S. Highway 20 Corridor Study, Julien Dubuque Bridge Capacity Improvements Study, and the Southwest Arterial planning and programming.

Greater Dubuque Development Corporation (GDDC)

Greater Dubuque Development is a regional economic development organization serving the Greater Dubuque area. Greater Dubuque Development focuses on business retention and expansion, workforce solutions, new business recruitment, and sustainable innovation.

Business retention and expansion: Local employers are the source of more than 85 percent of the area's job growth. They are key to Dubuque's success. Recognized as the number-one program in North America by Business Retention and Expansion International, Greater Dubuque's InfoAction aims to continually identify and assess the needs of the area's existing employers, then takes the necessary actions to address both challenges and opportunities.

Workforce solutions: Greater Dubuque Development takes a unique, proactive approach to workforce solutions in the Greater Dubuque area. Greater Dubuque provides incoming and existing businesses exceptional workforce assistance and services. Greater Dubuque Development offers the tools that employers need for recruiting talented workforce.

New business recruitment: Greater Dubuque Development is committed to the highest level of service to businesses or site-locators considering a location in the Greater Dubuque area. From project conception to reality, Greater Dubuque partners with businesses every step of the way, helping them navigate the course with valuable resources, information, and services.

Sustainable innovation: Greater Dubuque Development is helping to create innovation in the Dubuque region. Focusing on sustainability, analytics, and entrepreneurial development, Greater Dubuque provides support and solutions to our existing business base, entrepreneurs, and region.

City of Dubuque

Dubuque operates under the council-manager form of local government, which combines the political leadership of elected officials in the form of a city council, with the managerial experience of an appointed local government manager. The current City Manager is Michael C. Van Milligen, who has served in this capacity since 1993. The council-manager form of government was adopted by citizen referendum in 1920. Mayor Roy D. Buol and the Dubuque City Council members are the leaders and policy makers elected to represent the community and to concentrate on policy issues that are responsive to citizens' needs and wishes. The city manager is appointed by the city council to carry out policy. The city council also appoints the city attorney and city clerk. The council is the legislative body; its members are the community's decision makers. Power is centralized in the elected council, which approves the budget and determines the city portion of the tax rate, for

example. The council also focuses on the community's goals, major projects, and such long-term considerations as community growth, land use development, capital improvement plans, capital financing, and strategic planning. The council hires a professional manager to carry out the administrative responsibilities and supervises the manager's performance.

The Dubuque City Council consists of seven elected representatives: a mayor and two council members elected at large, and one council member elected from each of Dubuque's four wards. The mayor and other council members serve four-year staggered terms. City council positions are considered part-time positions. The mayor is a member of the city council and may vote on all matters before the council. The Dubuque City Council meets on the first and third Monday of each month in the Council Chambers on the second floor of the Historic Federal Building at 350 West 6th Street. City council agenda items are due in the city clerk's office in City Hall by noon on the Wednesday preceding the council meeting. Copies of the agenda are available after 9:00 a.m. on the Friday preceding the meeting.

East Central Intergovernmental Association (ECIA)

East Central Intergovernmental Association is committed to working with member governments, their citizens, and others to empower eastern Iowa communities and enhance the quality of life in Cedar, Clinton, Delaware, Dubuque and Jackson Counties. ECIA exists because of the need for local governments facing similar problems to cooperate in finding solutions. Through ECIA membership, local governments share resources they could not afford individually. The services and programs provided by ECIA cover six broad categories: Community Development, Economic Development, Housing Assistance, Employment and Training, Transit, and Transportation and Planning. The mission of ECIA is to work with member governments, their citizens, and others to empower communities and enhance the quality of life throughout the region.