Catawba Indian Nation

Advance Program Path Forward

June 2018

Ozone and $PM_{2.5}$ Advance Program

The Advance Program is a collaborative effort between EPA, states, tribes and local governments. The program encourages emission reductions in ozone and fine particulate matter ($PM_{2.5}$) attainment areas to continue to meet the National Ambient Air Quality Standards (NAAQS) and in order to participate in the programs, the respective jurisdiction must be in attainment for ozone and $PM_{2.5}$.

The current NAAQS standard for ozone is 70 ppm, and for $PM_{2.5}$ the standard is 12.0 $\mu g/m^3$ annual standard and a 35 $\mu g/m^3$ 24-hour standard, which became effective on December 14, 2012. Currently the Catawba Indian Nation (CIN) is in attainment of NAAQS both ozone and $PM_{2.5}$.

CIN initiated discussion with EPA and formally submitted a letter to participate in the Ozone and $PM_{2.5}$ Advance Program in 2016. Additional jurisdictions that participate in the program include Mecklenburg County NC and the State of South Carolina.

Background

In 2012 the CIN participated in consultation with EPA to request that the area within the exterior boundaries of the Reservation be classified to attainment/unclassifiable. This request was made because initial designations of the eastern part of York County was designated as nonattainment for the 2008 ozone standard. EPA upheld the request by the CIN to have the area within the jurisdictional boundaries to be designated as attainment/unclassifiable. Some of the contributing factors included the fact that there are no emission sources located on Tribal Trust land and additionally the closest air monitoring station to the Reservation was approximately 16 to 18 miles away.

Recognizing the lack of air monitoring on the Reservation and in eastern York County the CIN initiated an Air Quality Program with strong support financially and technically through EPA Region 4. The CIN Air Program has monitored ozone since 2016 and will soon be collecting $PM_{2.5}$ data after approval of the required Quality Assurance Project Plan (QAPP). This development along with the commitment from the CIN Executive Committee for protection of air quality and human health and the environment initiated the participation in the Ozone and $PM_{2.5}$ Advance Program and the "Path Forward."

Catawba Indian Nation Trust Lands

The United States holds lands in trust for the Catawba Indian Nation and its members in Eastern York County, South Carolina. This area is comprised of two parcels totaling 1007 acres. However, the service area for the Catawba Indian Nation is recognized as all of South Carolina and six counties in North Carolina. The widespread service area location of these lands reflects the location of the historic Catawba's that comprise the contemporary Catawba Nation. These trust lands, which are collectively referred to herein as the Catawba Nation Trust Lands, total approximately

1007 acres. Approximately 560 of the Catawba's members live on CIN Trust Lands, and the Catawba's principal governmental, commercial, educational, health care and other communal facilities are located on those lands. Maps of the CIN Trust parcels are shown in Appendix A**.**

Federal enforcement of the ozone NAAQS is based on a 3-year monitor "design value." The design value is obtained by averaging the annual fourth highest daily maximum 8-hour ozone value over three consecutive years. If a monitor's design value exceeds the NAAQS (.070 ppm) the monitor is in violation of the standard and thus non-attainment.

Overview of Catawba Indian Nation Air Quality

Table 1. Summary of Highest 8-Hour Ozone Values (ppm)

8-Hour Ozone Values	2016	2017
1st Highest	.072	.069
2nd Highest	.069	.064
3rd Highest	.069	.062
4th Highest	.066	.06

Ozone Health Effects and Sources

Overview of Ozone

Ozone (O_3) in the stratosphere or upper atmosphere occurs naturally and protects the earth surface from ultraviolet radiation. Ozone in the lower atmosphere, often referred to as "ground level ozone" or ozone pollution to distinguish it from ozone in the upper atmosphere. There is naturally occurring levels of ozone in the lower atmosphere, however, levels are low usually in the range of .030 ppm, well below the NAAQS of .070 ppm.

On those hot summer days, we often notice "smog" which is a term for ozone pollution. Ozone is just one component of smog and generally there is also particulate matter in the smog.

In the lower atmosphere, ozone is formed when airborne chemicals, primarily nitrogen oxides (NO_x) and volatile organic compounds (VOCs), combine in a chemical reaction driven by heat and sunlight. Man-made NO_x and VOC precursors contribute to ozone contributions above the natural background levels. For the CIN Air Program ozone monitoring begins March 1st and runs through October 31st of each year in an effort to quantitate the ozone levels through the hottest and brightest summer days.

Ozone Health Effects

When we breath in ozone, it can act as an irritant to our lungs. Short term, infrequent exposure to ozone can result in throat and eye irritation, difficulty drawing a deep breath and coughing. Long

term exposure and repeated exposure above the NAAQS (.070 ppm) can lead result in reduction of lung function as the cells lining the lungs are damaged. Repeated exposures can also aggravate chronic lung diseases such as COPD, bronchitis and asthma. Children and elders can be most at risk and adults who frequently exercise outdoors are vulnerable to ozone's negative health effects.

$PM_{2.5}$ Health Effects

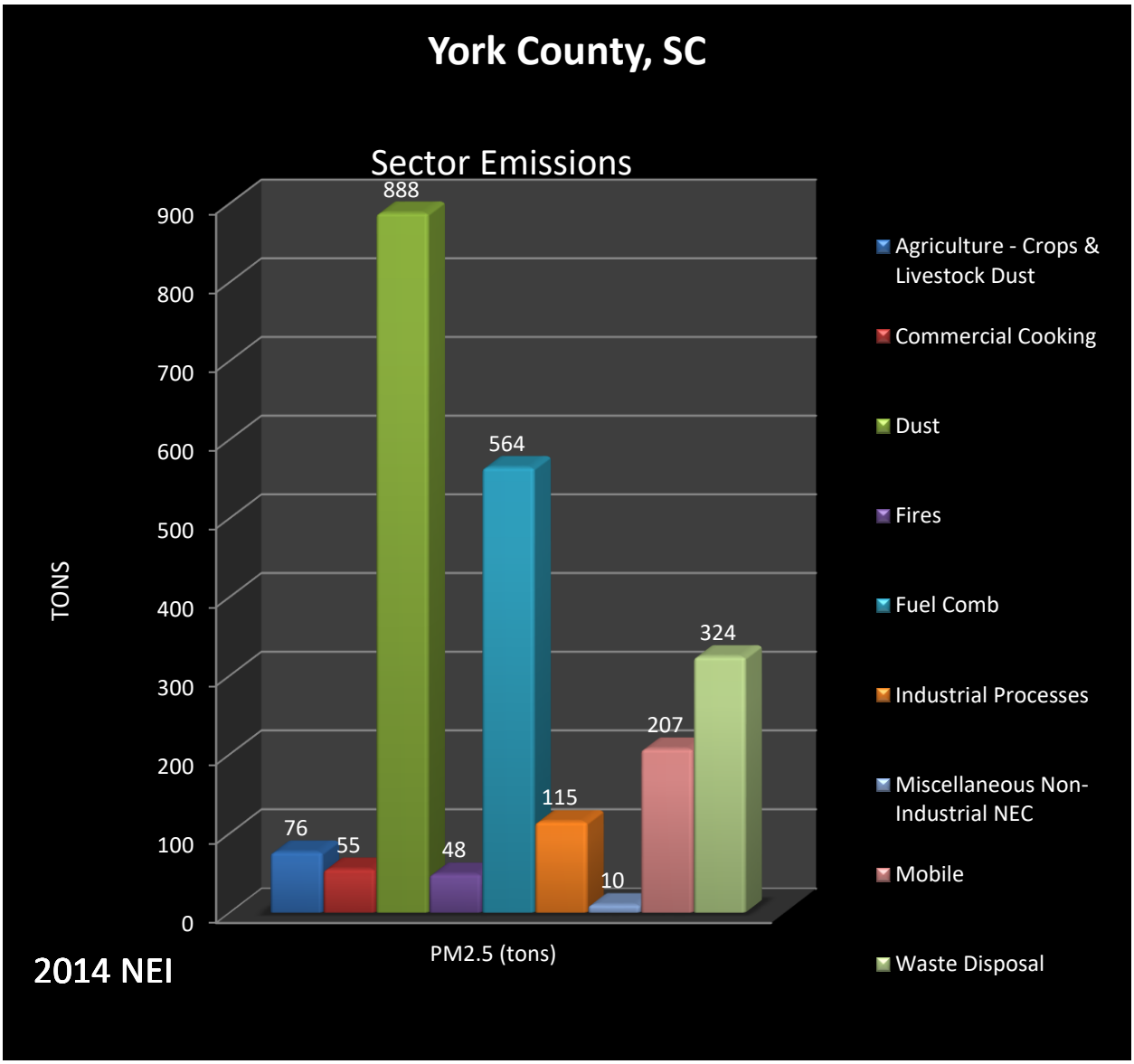
Particle pollution is a complex mixture of extremely small particles. This type of pollution is generally referred to as particulate matter or PM. Components of PM include particles or liquids such as dust, fly ash, soot, smoke, aerosols, fumes, and mists as well as condensed vapors that can be suspended in the air. EPA groups particle pollution into two categories: Inhalable coarse particles (PM_{10}) and fine particles ($PM_{2.5}$). The size of particles is directly linked to their potential for causing health problems. Particles that are smaller than 10 micrometers in diameter (PM_{10} and $PM_{2.5}$) are able to pass through the throat and deep
into the lungs where they can cause serious health effects. Fine particulate matter ($PM_{2.5}$) generally consists of soot, which is generally made up of elemental organic carbon from sources including soil and sources of sulfates, nitrates as well as other ionic species formed in the atmosphere.

$PM_{2.5}$ Emission Sources

Emission Sources in York County, South Carolina

In York County, $PM_{2.5}$ emission sources consist of:

1. Agriculture – Crops and Livestock dust
2. Commercial Cooking
3. Dust
4. Fires
5. Fuel Combustion
6. Industrial Processes
7. Miscellaneous Non-Industrial NEC
8. Mobile
9. Waste Disposal



$PM_{2.5}$ Emission Sources (Tons per year)

Ozone Sources

Ozone-forming pollutants, or precursors, are volatile organic compounds (VOCs) and nitrogen oxides (NO_x).

VOC

In South Carolina and certainly within the forested lands of the Catawba Nation a large portion of the VOC's are produced by natural, or biogenic sources which are primarily trees. Sources of man-made VOC's that we really try to manage through regulation or voluntarily include

unburned gasoline fumes evaporating from gas stations and cars, industrial emissions and consumer products such as paints, solvents, and fragrances in personal care products.

NOx

Nitrogen oxides (NO_x) are produced when fuels are burned, and result from the reaction of atmospheric nitrogen at high temperatures produced by burning fuels. Power plants, highway motor vehicles are the major contributors in urban areas and off-road mobile source equipment, such as construction equipment, lawn care equipment, trains, boats etc. are major sources. Other NO_x "area" sources such as fires (forest fires, backyard burning, house fires) and natural gas hot water heaters.

Emission Sources in York County, South Carolina

Generally, York County including the Catawba Nation is considered "NO_x-limited" because an abundance of VOC emissions from natural sources such as trees. Therefore, current ozone strategies focus on reducing NO_x. However, VOC reduction strategies, such as control of evaporative emissions from gas stations and vehicles, could reduce ozone in urban areas where natural VOC emissions are high.

Listed below are emission sources for York County, which give us a good picture of the sources potentially that could impact the Catawba Nation airshed. General categories of NO_x sources include:

1. Fuel Combustion
2. Industrial Precursors
3. Mobile
4. Waste Disposal

Sources for VOCs include:

1. Bulk Gasoline Terminals
2. Fires
3. Fuel Combustion
4. Gas Stations
5. Miscellaneous Non-Industrial NEC
6. Mobile

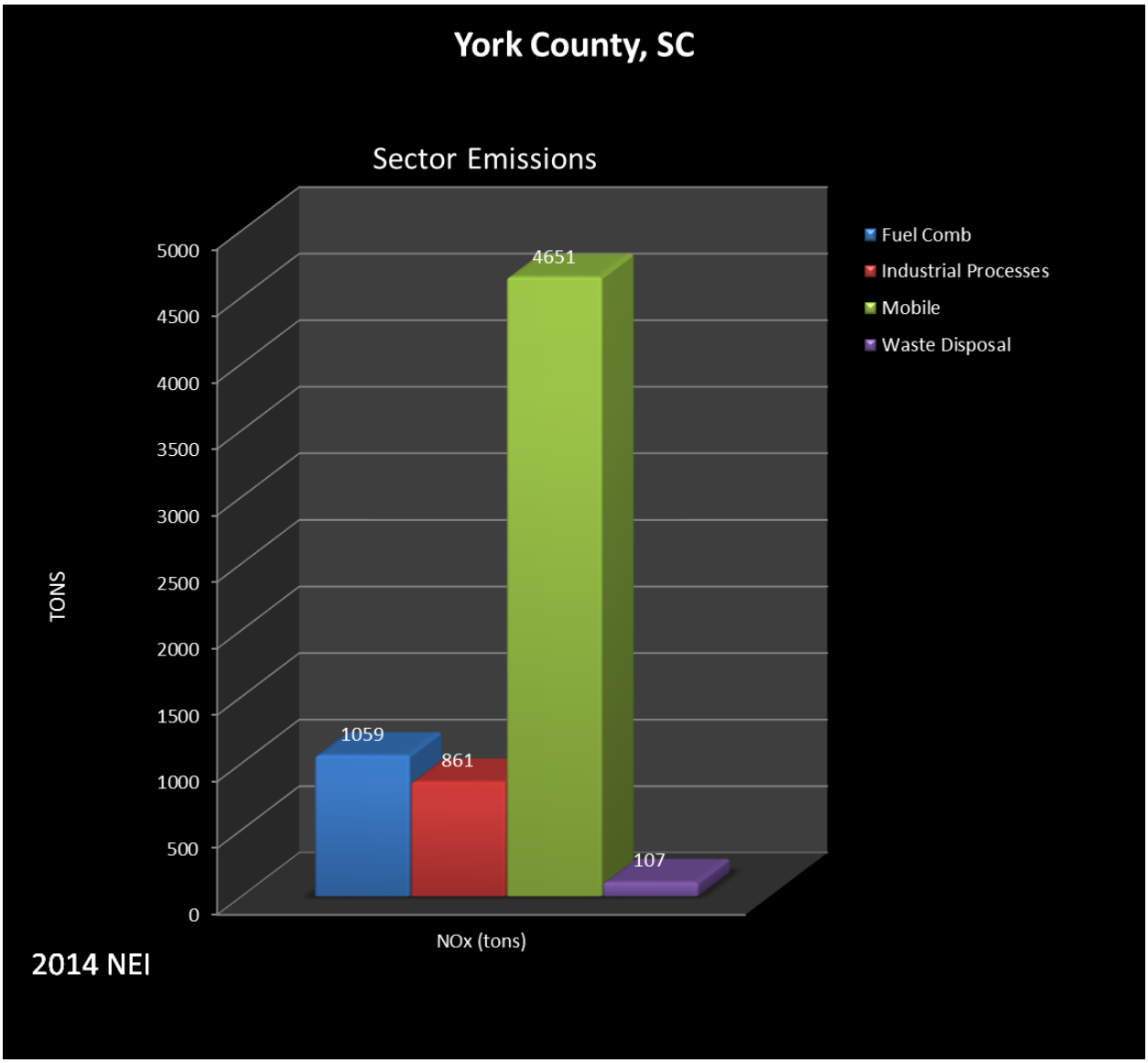


Table 2 NO_x Emission Sources

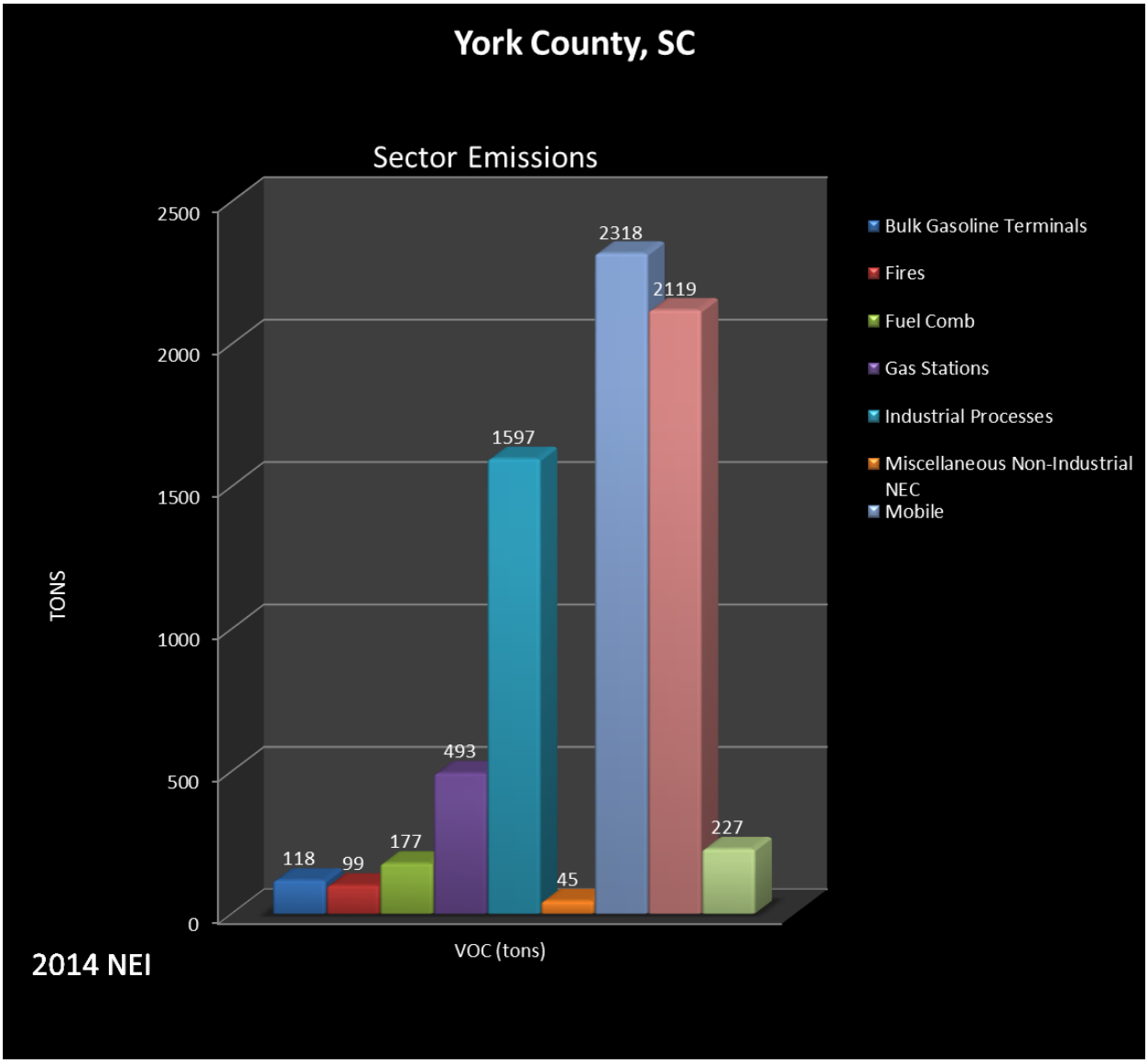


Table 3 VOC Emission Sources

Catawba Indian Nation Control Measures

Some control measures are in place and being implemented by the Tribal members and governmental departments. Examples of those include: newer diesel-powered equipment in the Roads Department, Catawba Transit system, recycling efforts (residential and tribal government) and an energy efficient upgrade of the Senior Center building.

Proposed Control Measures

Selected ozone and $PM_{2.5}$ control strategies and implementation schedule

Outreach

Strategy	Strategy Description/Impact	Implementation Date	Lead Department
Promote Transit Ridership (Catawba Transit)	Implement outreach campaign. This strategy impacts tribal and nontribal residents in the service area	June 2018	CIN Transit Dept.+
Air Quality Poster Contest	Promote art contest with air quality theme at CIN Headstart (80 students)	Earth Day Annual	Headstart and Catawba Boys and Girls Club
Direct Community Outreach	Display Air Quality Information in Newsletter and Health Fair	Ongoing	CIN Environmental Services
Tree Power	Implement program to inform and promote the benefit of trees to the environment, air quality. 200 (estimated) seedlings will be provided community events. Trees reduce/absorb air pollution and help reduce energy consumption	Ongoing (focused on spring plant date)	CIN Environmental Services
Utility Consumption Report	Monthly energy consumption will be posted in each building that participates to	Ongoing	CIN Environmental Services

	create awareness of energy use in the building		
Air Quality Flag Program	Three Tribal facilities participate: Head start, Little Peoples and Catawba Health Clinic. Promote awareness to air quality (specifically ozone and $PM_{2.5}$) forecasts and human health protection.	Ozone season (March through October) and year-round for $PM_{2.5}$	Head start, Little People Academy and Catawba Health Clinic
CIN Earth Day	Promote air quality outreach and protection, appreciation strategies	Earth Day	Primarily Head start and Tribal Community

Selected ozone and $PM_{2.5}$ control strategies and implementation schedule

Energy Reduction

Strategy	Strategy Description/Impact	Implementation Date	Lead Department
Develop alternative energy production opportunities that are financially viable for CIN	Photovoltaic solar farms, biomass to energy and others; Clean energy sources reduce the volume of fossil fuel burning required for power generation	Ongoing	Economic Development/ Environmental Services
Green Building Review	Evaluate and recommend feasible opportunities for energy, water and solid waste consumption in new and retrofit of tribal buildings. This activity reduces electricity consumption, water usage and solid waste production	Ongoing	CIN Environmental Services and other Tribal Departments
Local Food Access Program	Inform community on benefit of sourcing food locally, reducing	Ongoing	Wellness Program

	miles traveled by food and consumers		
Purchase ENERGY STAR Equipment	Energy efficient products are procured and installed. This strategy reduces energy consumption.	Ongoing	All Departments
Green and energy efficiency initiatives	Evaluate CIN government departmental recycling practices in place and evaluate opportunities to improve/expand. This strategy reduces solid waste and operating costs.	Annually	All Departments

Selected ozone and $PM_{2.5}$ control strategies and implementation schedule

Transportation

Strategy	Strategy Description/Impact	Implementation Date	Lead Department
Fleet Management	Implement efforts to minimize unnecessary idling of vehicles. This strategy reduces NO_x emissions	On going	All Departments
Alternate Fuel/Hybrid Vehicle Equipment	When feasible and decisions for vehicle replacement are considered. Evaluate alternate fuel/hybrid vehicle replacement. This strategy reduces NO_x emissions.	On going	All Departments