Memorandum

CITY OF DALLAS

DATE October 22, 2010

TO Members of the Transportation and Environment Committee:
Linda Koop (Chair), Sheffie Kadane (Vice Chair), Jerry R. Allen, Tennell Atkins, Carolyn R. Davis, Angela Hunt, Delia Jasso, Pauline Medrano, Ron Natinsky, Vonciel Jones Hill

SUBJECT Three Pollutants of Concern: Ozone, Particulate Matter, and Mercury

On October 25, 2010 staff will present an informational briefing to the Committee on ozone, particulate matter, and mercury as part of air quality in the DFW area. Please find attached a copy of the presentation, and feel free to contact me if you need additional information.

Jill A. Jordan, P.E.
Assistant City Manager

c: The Honorable Mayor and Members of the City Council
Mary K. Suhm, City Manager
Thomas P. Perkins, Jr. City Attorney
Deborah Watkins, City Secretary
Craig Kinton, City Auditor
Judge C. Victor Lander, Administrative Judge
Ryan S. Evans, First Assistant City Manager
A.C. Gonzalez, Assistant City Manager
Forest Turner, Assistant City Manager
Jeanne Chipperfield, Chief Financial Officer
Edward Scott, Director, Controller's Office
Frank Librio, Public Information Office
Theresa O'Donnell, Director, Sustainable Development and Construction
Helena Stevens-Thompson, Assistant to the City Manager – Council Office

Three Pollutants of Concern: Ozone, Particulate Matter, and Mercury

Presented to the
Transportation and Environment Committee
October 25, 2010

Purpose of Presentation

- Provide information on the pollutant Ozone and the current and proposed Ozone standard
- Provide information on the pollutant Particulate Matter (PM)
- Provide information on the pollutant Mercury

Federal Air Quality Standards

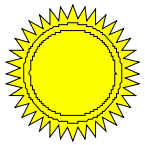
- Federal Clean Air Act**:** Passed in 1970; Amended in 1990
- Requires the Environmental Protection Agency (EPA) to establish health-based standards called National Ambient Air Quality Standards (NAAQS)
- Six Criteria Pollutants
  - Ground Level Ozone/Smog (03)
  - Particulate Matter (PM)
  - Nitrogen Dioxide (NO2)
  - Sulfur Dioxide (SO2)
  - Carbon Dioxide (CO)
  - Lead

Source: EPA

Ozone and Air Quality Standard

Ground-Level Ozone

Forms when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) mix in the presence of sunlight

NOx + VOC +  = Ozone

Sources of NOx and VOCs

- Primary sources of NOx:
  - Cars, trucks, and marine vessels
  - Construction equipment
  - Power generation
  - Industrial processes
  - Natural gas furnaces

- Primary sources of VOCs:
  - Gasoline stations
  - Motor vehicles, airplanes, trains, boats
  - Petroleum storage tanks
  - Oil refineries

Source: EPA

Health Effects

- Health effects can include:
  - Shortness of breath
  - Coughing or wheezing
  - Headaches
  - Nausea
  - Throat and lung irritation
- Particularly impacts:
  - Children
  - People with lung disease
  - Active adults

Source: EPA

DFW and Attainment of Ozone Standard

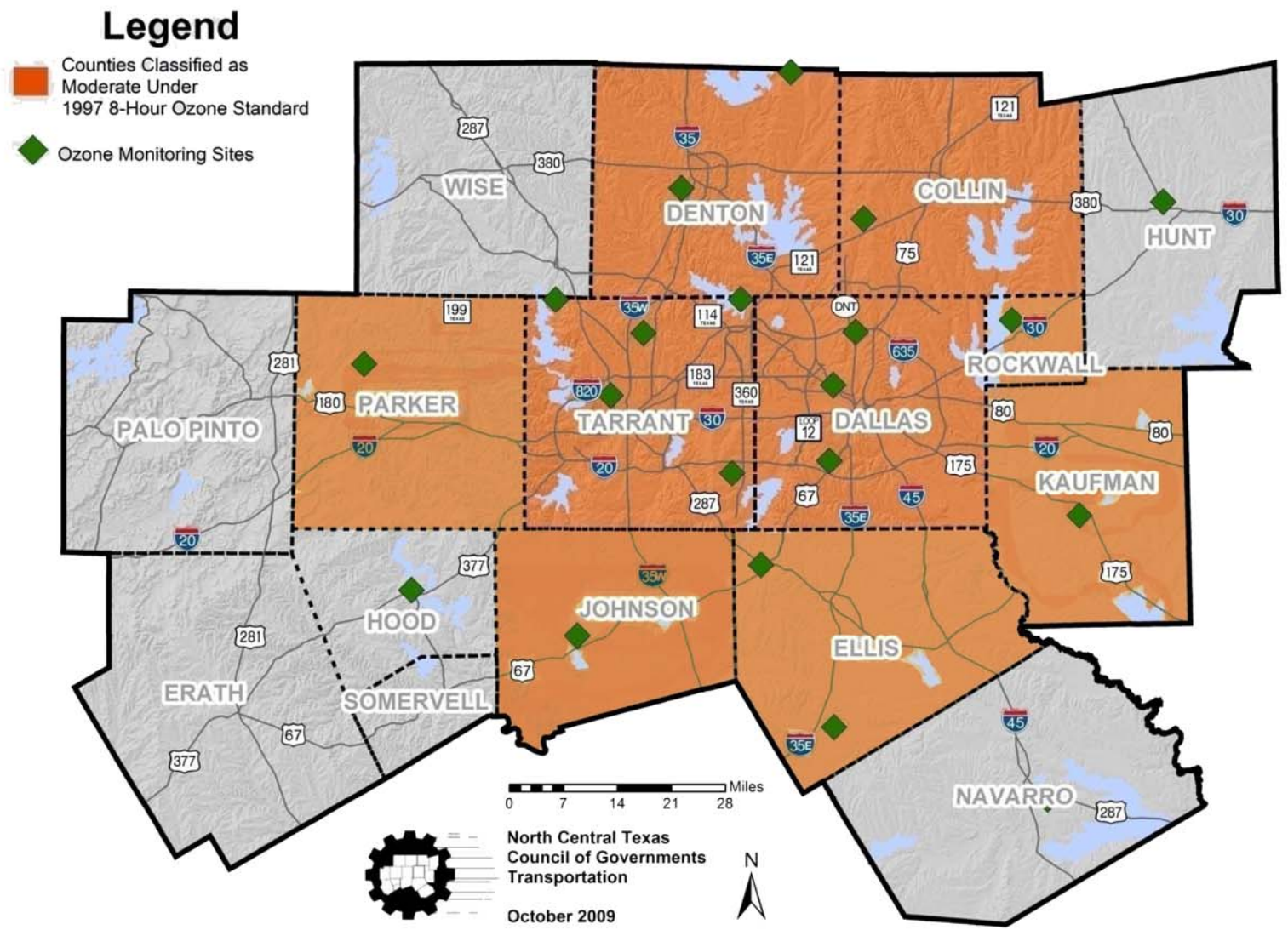
- **Eight-Hour Ozone Standard:**
  - Current ozone standard set by the EPA is 85 parts per billion (ppb)

- **DFW Violation of Ozone Standard:**
  - DFW 9-county region was a moderate non-attainment area for ozone and had until June 2010 to meet the standard
  - 2007-2009 ozone season data evaluated = 86ppb
    - (3-year average of each year's 4th highest reading at any area monitor equals or exceeds 85 ppb)
  - August 9, 2010: EPA issued a determination of non-attainment for the DFW area and proposed the area be bumped up from moderate to severe with a new attainment date of June 15, 2013
    - 2010-2012 ozone season data will be evaluated to determine attainment

Source: EPA and NCTCOG

CLASSIFICATION OF NONATTAINMENT AREA

8-Hour Ozone Counties



Significance of Moving from Moderate to Serious Non-Attainment Status

- Reclassification from Moderate to Serious results in more stringent strategies for reducing emissions:
  - Sources that emit more than 50 tons per year required to add more technology to reduce emissions
  - Additional Volatile Organic Compound reductions required
  - Emission standards required for fleet vehicles (defined as 10 or more vehicles) or State has option to implement a program resulting in equivalent emissions reductions
  - Advanced inspection and maintenance program for vehicles
  - Additional transportation control measures
  - More advanced monitoring

State Implementation Plan

Purpose:

- Plan to reduce pollution to meet health-based standards
- Sets control strategies for reducing emissions
- Applies to areas not meeting federal air quality standards
- Sets technical/regulatory process for demonstrating attainment

State Implementation Plan

Components:

- Monitoring Data
- Emissions Inventory
- Photochemical Modeling
- Control Strategies
  - Area – bakeries, paint shops, dry cleaners
  - Non-Road – construction, aircraft, locomotive, lawn & garden
  - On-Road – cars, trucks, and buses
  - Point – cement and power plants

Proposed Schedule for DFW Region Serious Non-Attainment Area

- **August 2010:** Proposed rulemaking for determination of non-attainment and bump up to serious
- **December 2010:** Final rulemaking
- **January 2012:** State Implementation Plans (SIPs) due
- **March 2012:** Implementation of all control measures in SIP
- **June 2013**: Serious Area Attainment Date (Data from Ozone Seasons 2010, 2011, and 2012 to be evaluated)

Source: EPA

Potential Consequences of Violation

- Loss of highway funds
- Loss of Community Development Block Grant funds
- Stricter permit limits
- Health impacts

Next Ozone Standard

- New ozone standard was published on January 6, 2010, for public comment
  - City of Dallas commented on standard
  - Final ozone standard will be issued in October 2010
- Primary Ozone Standard
  - Designed to protect health
  - EPA proposal to lower the primary ozone standard to between .06-.07 ppm (60 to 70 ppb)
- Secondary Ozone Standard
  - Designed to protect vegetation and ecosystems
  - EPA proposal to establish a distinct “secondary” standard at 7-15 ppm
    - Previously, primary and secondary standards were identical
  - Currently, Dallas County meets secondary ozone standard (14 ppm)
    - Other counties in DFW do not meet standard

Source: EPA

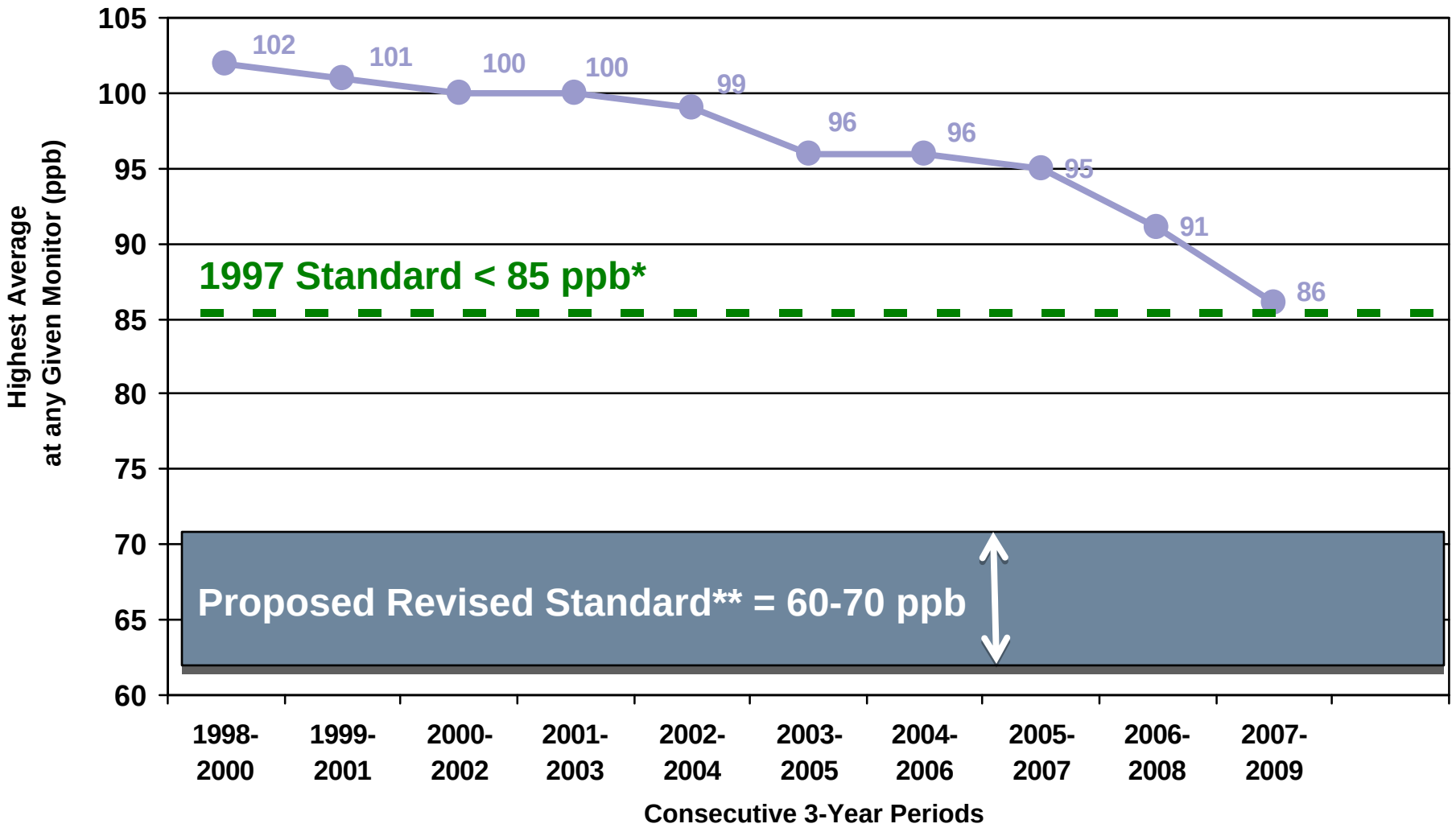
Proposed Schedule for New Ozone Standard Implementation

- **October 2010:** EPA will issue final standards for ozone
- **January 2011:** States make recommendations for areas to be designated attainment, non-attainment or unclassifiable
- **July 2011:** EPA makes final area designations
- **August 2011:** Designations become effective
- **December 2013:** State Implementation Plans, outlining how states will reduce pollution to meet the standards, are due to EPA
- **2014 to 2031:** States are required to meet the primary standard, with deadlines depending on the severity of the problem

Source: EPA

2010 OZONE SEASON UPDATE

8-Hour Ozone Historical Trends



* 2010 Attainment Goal - According to the US EPA National Ambient Air Quality Standards, attainment is reached when, at each monitor, the three-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than 85 parts per billion (ppb).

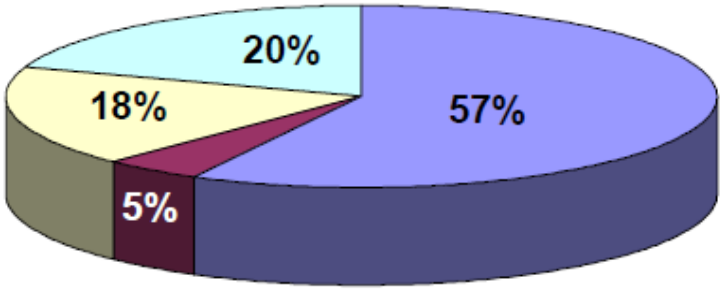
** Primary Ozone Standard is currently under reconsideration by the EPA and will likely be final in October 2010 to between 60 and 70 ppb.

Source: NCTCOG TR Dept

NORTH CENTRAL TEXAS AIR QUALITY

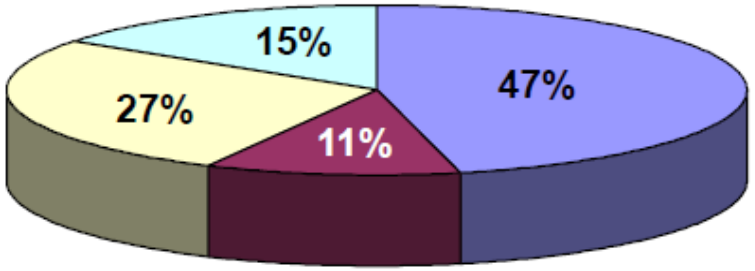
Past, Present, Future NOx Projections

1999

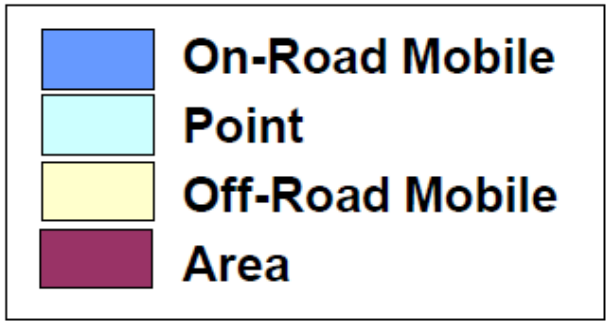


Source: TCEQ; DFW SIP, pg. B-5

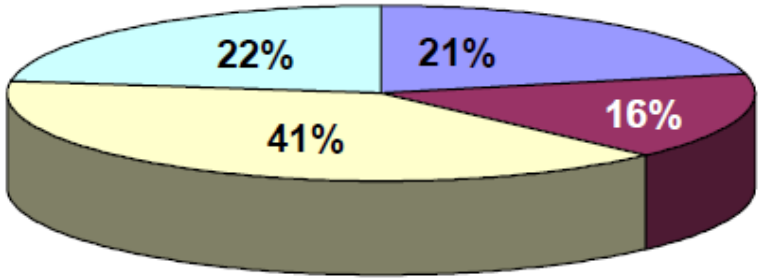
2009



Source: TCEQ; DFW SIP, pg. B-7

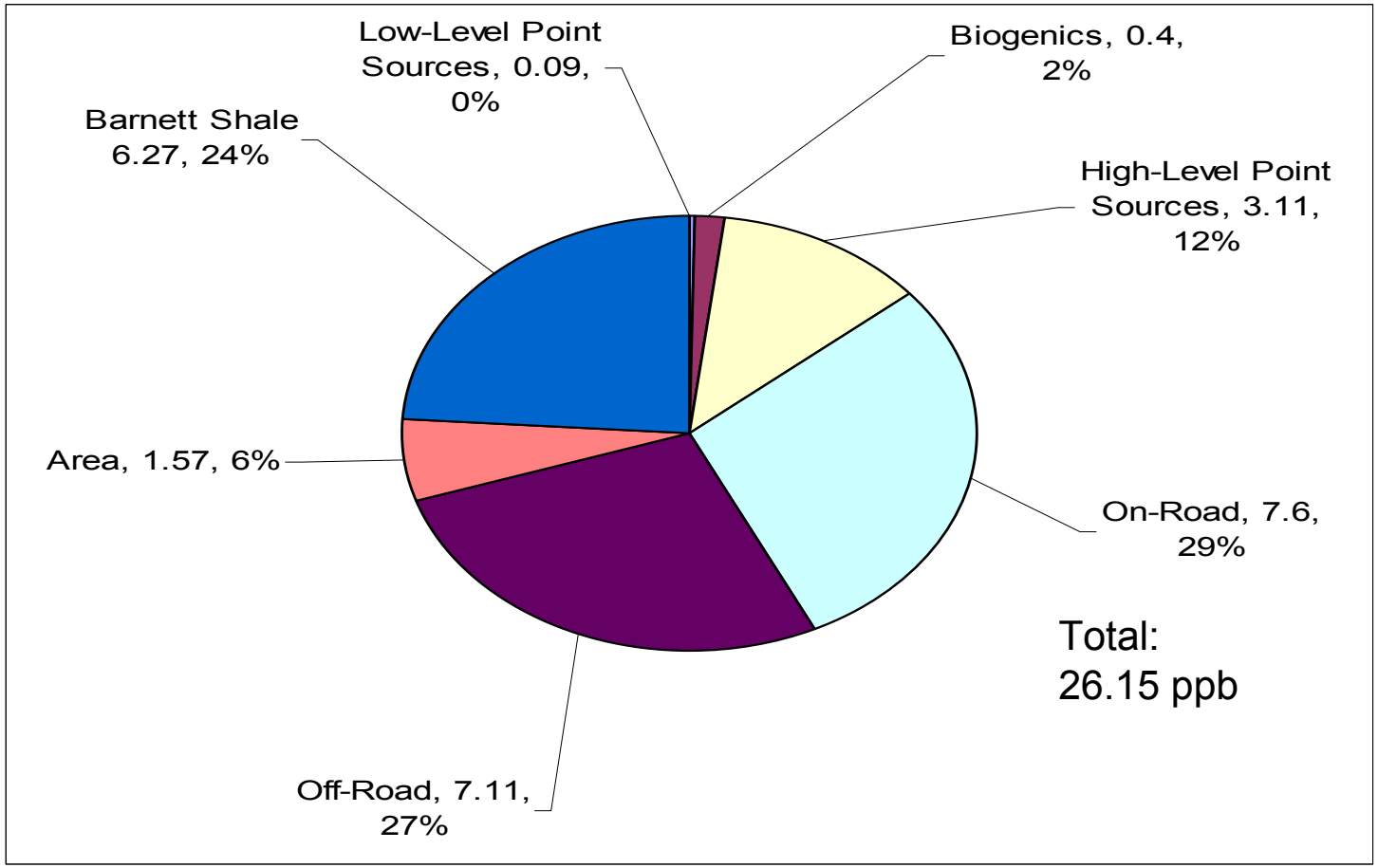


2019



Source: NCTCOG Forecast

2012 9-County NOx Emissions Inventory: Source Category Estimates



Source: TCEQ

City Initiatives to Reduce Emissions Contributing to Ozone

Alternative fuels/engines:

- 38% percent (approximately 1,900 vehicles) of City of Dallas fleet running on alternative or cleaner fuels, including compressed natural gas, biodiesel or hybrid
- City operates two public access compressed natural gas (CNG) vehicle fueling facilities
- City also uses biodiesel with an additive to reduce emissions of Nitrogen Oxide (NOx)
- Early user of Texas Low Emission Diesel (TxLED) and biodiesel

City Initiatives to Reduce Emissions Contributing to Ozone

Energy:

- All new City facilities built over 10,000 square feet are LEED silver certified buildings
- City has met the goal of 5% energy reduction per year for the past five years
- For the past three years, the City has purchased 40% of the City's power needs from renewable sources
- City Council voted in June 2010 to continue purchasing 40% of the City's power needs from renewable sources
- City Council passed a green building policy for residential and commercial construction
  - Phase I began October 2009
  - Phase II begins October 2011

City Initiatives to Reduce Emissions Contributing to Ozone

Air Quality:

- Idling ordinance for vehicles over 14,000 pounds during ozone season
- Cement purchasing policy
- Texas Clean Air Cities Coalition
- US Mayor's Climate Change Agreement signatory
- TERP/Air Check Texas staff member
- Dallas Sustainable Skylines Initiative (DSSI) – Partnership with EPA and Council of Governments
    - Green taxis (Grants will be awarded to fund 285 green taxi's)
    - Green affordable homes
    - Renewable energy
    - Urban heat island
    - Lawn mower exchange program
- City of Dallas ordinance provides a "head of the line" incentive for taxicabs at Dallas Love Field Airport that run on compressed natural gas (cng) (~80 CNG cabs at Airport)

Particulate Matter

Particulate Matter (PM)

- Defined as a mixture of solid particles and liquid droplets found in the air

- Two Main types:
  - *Primary Particles*: emitted directly from sources such as construction sites, unpaved roads, fields, smokestacks or fires
  - *Secondary Particles*: forms in complicated reactions in the atmosphere of chemicals such as sulfur dioxides and nitrogen oxides that are emitted from power plants, automobiles, and industries
  - Particulate matter is measured by size of the suspended particles: 10 microns or less is referred to as PM_{10}; 2.5 microns or less is referred to as $PM_{2.5}$

(Source: Environmental Protection Agency (EPA))

Health and Environmental Effects of Particulate Matter

- Health Effects
  - Irritation of the airways, coughing, or difficulty breathing
  - Decreased lung function
  - Aggravated asthma
  - Development of chronic bronchitis
  - Irregular heartbeat
  - Nonfatal heart attacks
  - Some cancers
- Environmental Effects
  - Visibility reduction
  - Increased acidity of lakes and streams
  - Nutrient balance changes in coastal waters and river basins
  - Decreased levels of nutrients in soil
  - Damage to forests and crops
  - Decreased diversity in ecosystems
  - Damage to stone and other materials

Source: Environmental Protection Agency (EPA)

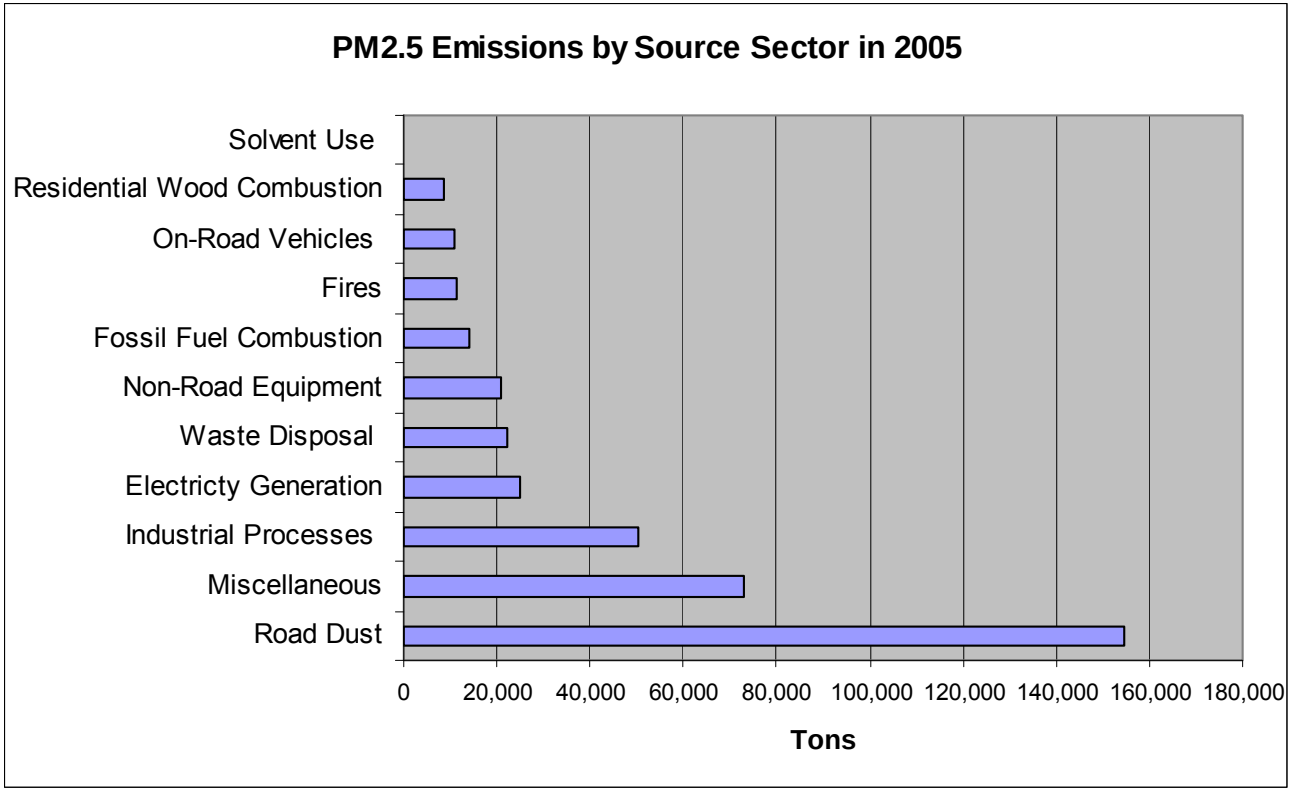
Federal Standards for Particulate Matter

- National standards for particulate matter were first set in 1971
- Most recent revision of standard was in 2006; standard was strengthened for 24-hour fine particle (PM2.5) standard
- Current federal standard for particulate matter is:
  - 24-hour inhalable course particle (PM_{10}) standard is 150 micrograms per cubic meter (µg/m3)
  - 24-hour fine particle ($PM_{2.5}$)standard is 35 µg/m3
  - Annual fine particle standard ($PM_{2.5}$) is 15 µg/m3
- Dallas-Fort Worth area currently meets the national particulate matter standard:
  - 24-hour PM_{10} design value for Dallas County (2006-2008): No Exceedances[1]
  - 24-hour $PM_{2.5}$ design value for Dallas County (2006-2008): 23 µg/m3
  - Annual $PM_{2.5}$ Design value for Dallas County (2006-2008): 10.9 µg/m3

Source: EPA

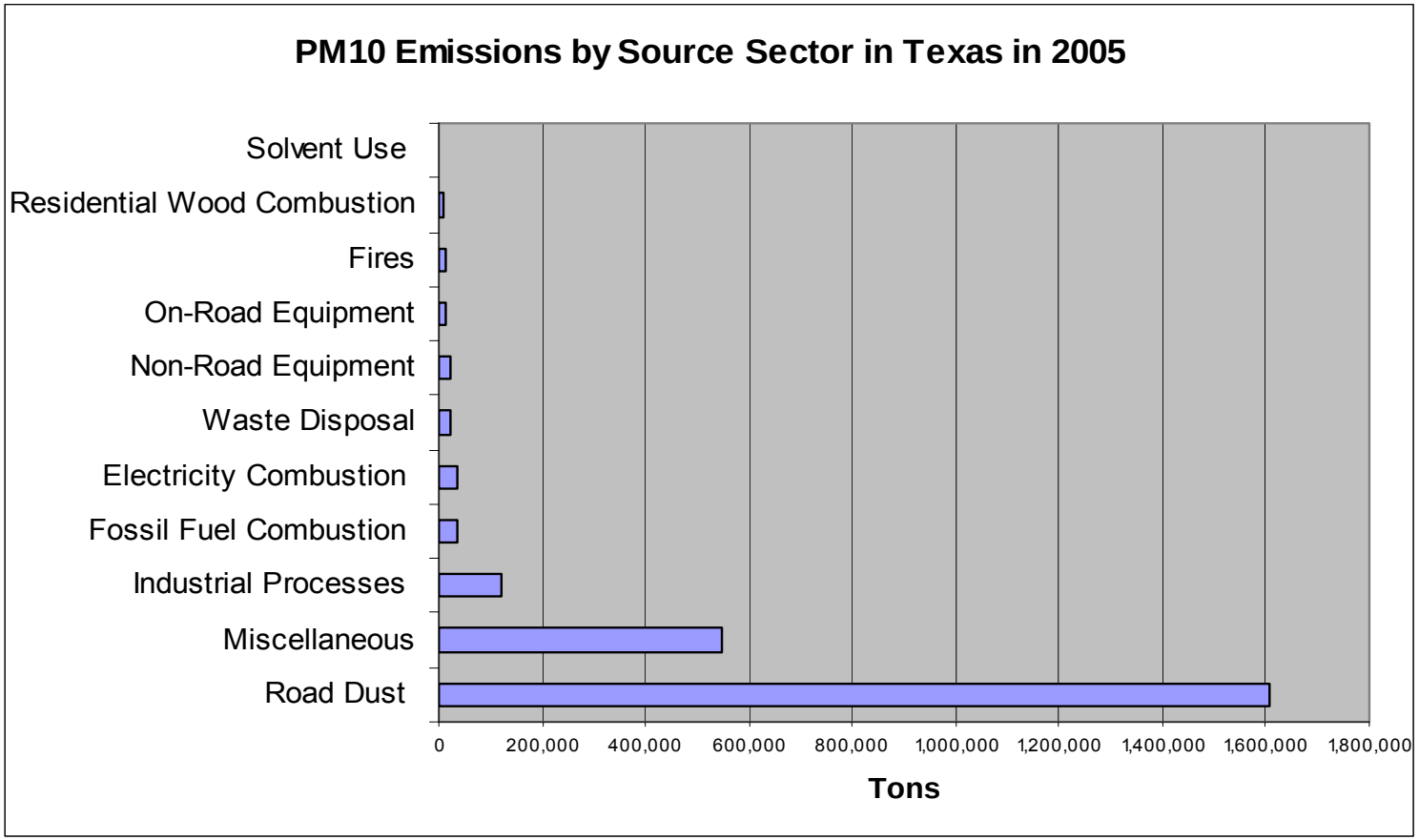
[1] EPA calculates design value for PM10 based on exceedances. A county cannot exceed more than once in 3 years. According to TCEQ, which submits monitoring data to EPA, Dallas County has not exceeded the federal design value of 150 (µg/m3)

$PM_{2.5}$ Emissions by Source for Texas



Source: EPA

PM_{10} Emissions by Source for Texas



Source: EPA

Do EPA Standards for Particulate Matter Protect Public Health?

- In September 2006, EPA announced new air quality standards for particulate matter:
  - PM2.5: strengthened daily standard by almost 50% (from 65 µg/m3 to 35µg/m3); retained previous annual standard of 15 µg/m3
  - PM10: retained daily standard; revoked annual standard
- American Medical Association, American Lung Association, pediatricians, environmentalists, had recommended annual PM2.5 standard of between 12 to 14 µg/m3
- The Clean Air Scientific Advisory Committee (CASAC) provides scientific advice to the EPA before the agency revises standards; CASAC recommended annual PM2.5 standard of either 13 or 14 µg/m3 based on study showing that a reduction in the annual PM2.5 annual could prevent as many as 30,000 premature deaths
- Environmental Community legally challenged EPA on standards:
  - February 2009, U.S. Court of Appeals for the D.C. Circuit held that
    - Scientific evidence did not support EPA's PM standards, which violated the Clean Air Act
    - Proper reasoning was not provided for rejection of CASAC recommendations
  - Court did not annul standards

Next Steps for PM Standards

- EPA must review Clean Air Act Standards every 5 years
- EPA has initiated review process of PM standards
- Next standard expected to be published in Fall 2011

City of Dallas Initiatives for Reducing Particulate Matter

- Alternative Fuels: 38% of the City's fleet is alternative-fueled or hybrid

- Idling Ordinance: City Ordinance prohibiting vehicle operators with a gross weight over 14,000 pounds to idle for more than 5 minutes during ozone season

Mercury

Mercury

- Naturally occurring element found in air, water, and soil
- Largest source of mercury emissions is from coal burning power plants
- Health Effects
  - Can harm the brain, heart, kidney, lungs and immune system
  - Can damage central nervous system of babies and young children

Source: EPA

Mercury-Specific Laws and Regulations

- Mercury Export Ban of 2008 – establishes provisions for mercury exports and long-term mercury management and storage

- Mercury-Containing and Rechargeable Battery Act of 1996 – phases out the use of mercury in batteries

Source: EPA

Mercury-Specific Laws and Regulations

- Clean Air Act - includes mercury standards for sources that emit toxics
  - These sources must obtain permits and comply with emissions standards set by EPA
- To date there is no national regulation to limit mercury pollution like there is for Ozone and PM (which are criteria pollutants)
- The EPA is working on a mercury reduction rule for power plants
  - Has agreed in a court settlement to complete rule by November 2011
- The EPA is also working on regulations for mercury and other toxic air emissions from other sources, such as cement plants and industrial boilers
- In 2005, the EPA adopted a cap-and-trade scheme of tradable mercury emission allowances but a federal court ruled that it did not comply with the Clean Air Act and threw it out in 2008

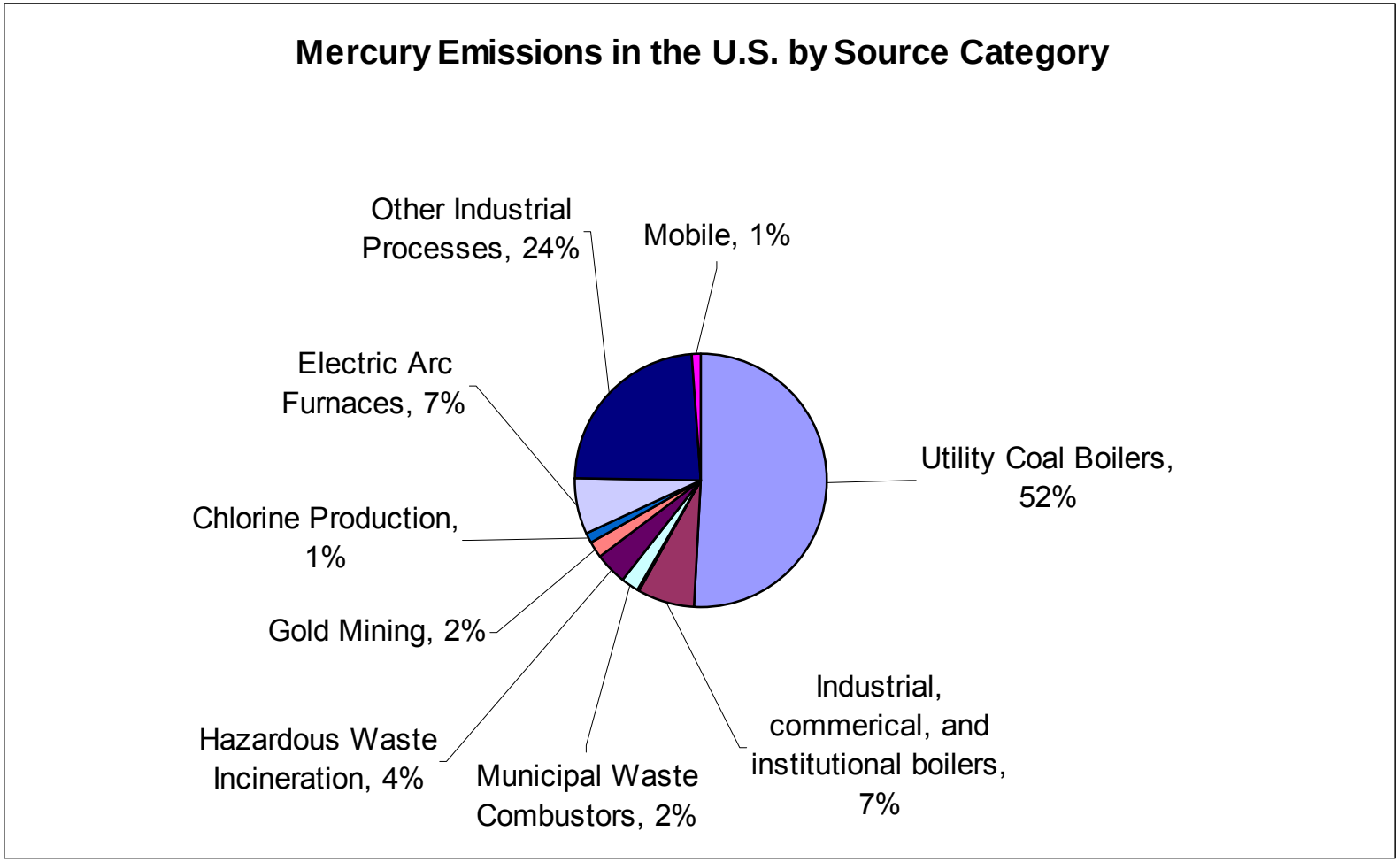
Source: McClatchey Newspapers Most power plants still spewing toxic mercury, report says 2010
http://www.mcclatchydc.com/2010/03/17/90576/report-mercury-pollution-from.html

Permitting in Texas

- Sources in Texas must obtain permits from the TCEQ and comply with emissions standards set by EPA
  - Entities report estimated emissions in the permit to TCEQ for criteria pollutants (NOx and PM) as well as for Mercury on a lb/hr basis and/or yearly basis depending on source
- June 2010: EPA announced final disapproval of TCEQ's flexible permit program citing that it does not meet Clean Air Act requirements to protect health and environment
  - Flexible permitting allows companies to avoid certain federal Clean Air Act requirements by lumping emissions from multiple units under a single "cap" vs. setting specific emission limits for individual sources at plants

Source: "EPA Disapproves Texas Flexible Air Permit Programs, Law and the Environment

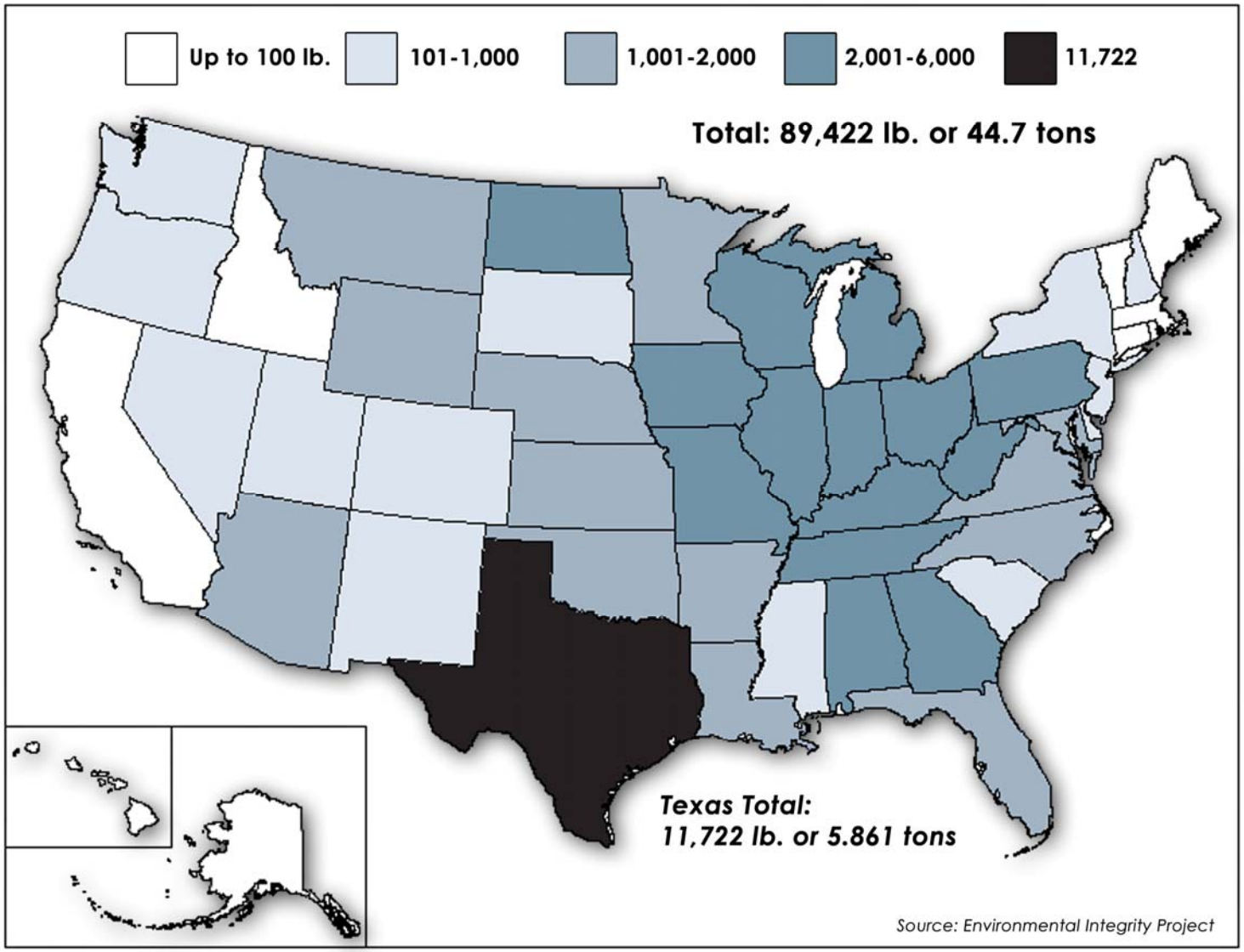
Emission Sources of Mercury in the U.S.



Source: EPA, 2005 data

Mercury Pollution

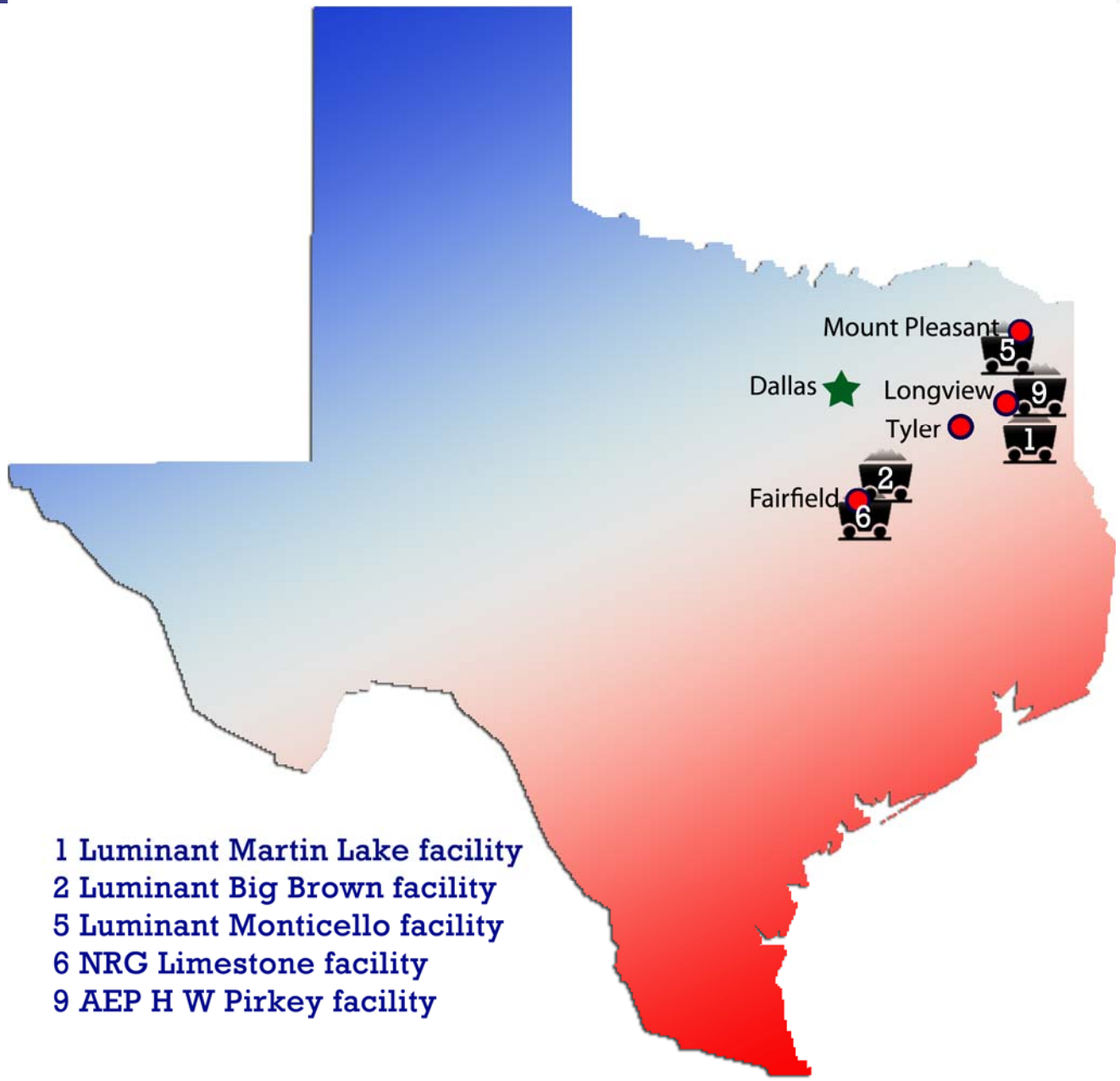
Emissions of mercury, a toxic metal, by state, in pounds, 2008:



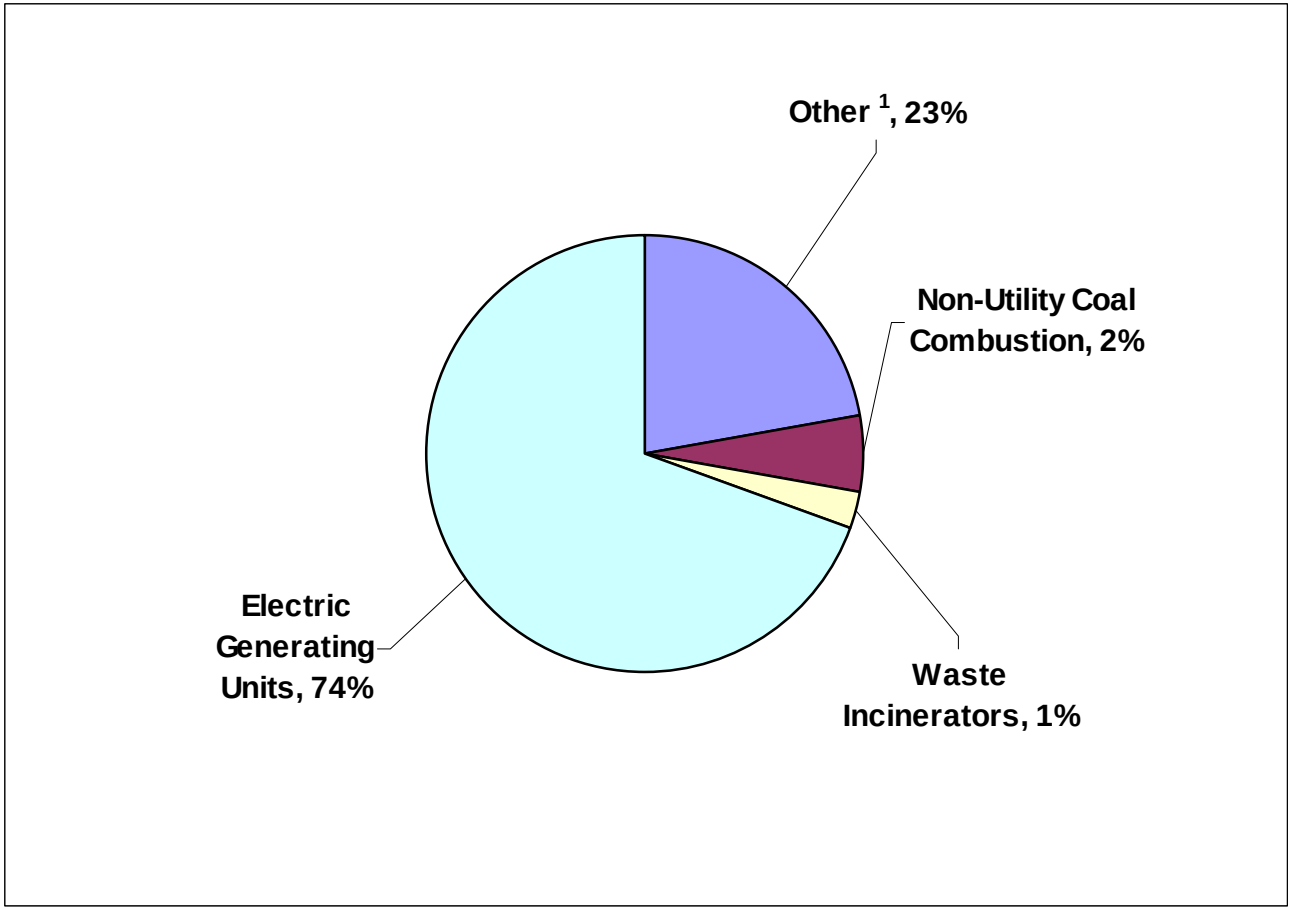
Texas and Mercury Emissions

- The largest mercury emitter among power plants in the U.S. is the Luminant Martin Lake facility located in Rusk County, Texas
- Five of the ten largest power plant mercury air pollution sites in the nation are located in Texas

Source: Environmental Integrity Project, based on 2008 emissions data from EPA


Mount Pleasant
5
Dallas
Longview
9
Tyler
1
2
Fairfield
6
1 Luminant Martin Lake facility
2 Luminant Big Brown facility
5 Luminant Monticello facility
6 NRG Limestone facility
9 AEP H W Pirkey facility

Man-Made Emission Sources of Mercury in Texas



[1] According to the TCEQ, other includes mobile, iron/steel, cement plants and other organic plant sources

Source: TCEQ 2006

City of Dallas Initiatives for Reducing Mercury

- Texas Clean Air Cities Coalition (TCACC)
  - 37 Member Cities, Counties, and School Districts
  - Concerned about impacts of proposed power plants in their communities, the Mayors of Dallas and Houston formed a coalition to participate in permitting process
  - Successes of Coalition
    - Formation of state's first united coalition of local governmental entities and elected officials concerned with state's air quality issues
    - National attention brought to environmental and health effects of pulverized coal fired power plants
    - First large scale cumulative ozone air modeling effort in Texas
    - Climate change and carbon dioxide allowed to be considered in permitting process
    - Milestone agreement with NRG resulting in commitments related to emissions of greenhouse gas carbon dioxide, nitrogen oxide, sulfur dioxide, and mercury as well as reductions in water usage

Future Initiatives to Address Pollutants

- Ozone:
  - City participates in Regional Air Quality Management Committee to work on SIP issues (North Texas Clean Air Steering Committee)
- Particulate Matter and Ozone: City of Dallas is currently participating in the North Central Texas Council of Governments pilot program to test a clean construction policy in City bids
- Mercury: City of Dallas to remain a leader of Texas Clean Air Cities Coalition (TCACC)

Questions?