

An Overview of Regional Air Quality Issues

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Presentation Roadmap

- Pollutants of Concern
- Pollution Sources
- Regulatory Issues
- Resources & References

Pollutants of Concern

- Ground Level Ozone (O_3)

- Produced by a reaction between nitrogen oxides (NO_x) and Volatile Organic Compounds (VOCs), in the presence of sunlight (photochemical reaction)

- Health Impacts

- Can cause irritation to the eyes, nose, and throat
- Cause/aggravate respiratory ailments (asthma, bronchitis, etc.)

- Environmental Impacts

- Crop/vegetation damage
- Corrosion of certain materials

Pollutants of Concern, Continued

- Particulate Matter (PM)
 - Tiny solid or liquid particles suspended in the air
 - Can be composed of any chemical substances
 - Classified by size: 2.5 microns, 10 microns
 - Health Impacts
 - Decreased lung function
 - Cardiovascular problems
 - Environmental Impacts
 - Reduced visibility
 - Deposition of chemicals, metals into water bodies, soils
 - Discoloration/staining of surface materials

Pollutants of Concern, Continued

- Air Toxics

- Defined as chemical substances in the air that “are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects.”
- Include benzene, 1,3-Butadiene, Formaldehyde

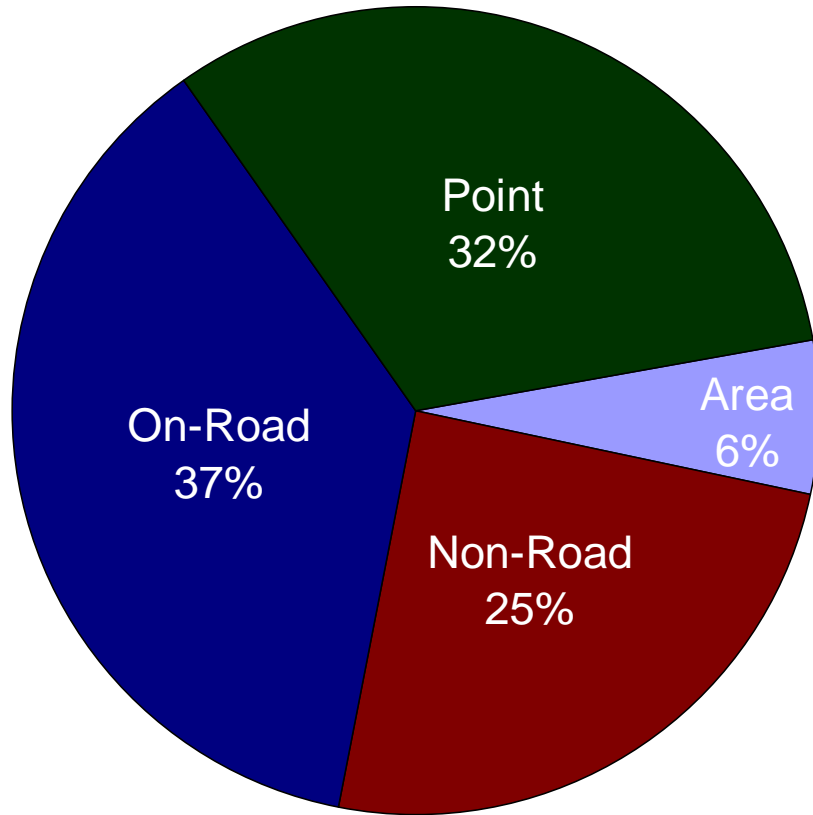
- Greenhouse Gases (GHGs)

- Gases which trap heat in the atmosphere and contribute to global climate change
- Include carbon dioxide, methane, and nitrous oxide

Pollution Sources

- On-Road Mobile Sources (busses, trucks, cars, etc.)
- Off-Road Mobile Sources (construction equipment, agricultural equipment, etc.)
- Area Sources (gas stations, dry cleaners, etc.)
- Point Sources (petrochemical plants, paper mills, etc.)

Pollution Sources, Continued



Source Type	NOx (tpd)
Area	36.18
Non-road	148.45
On-Road	221.65
Point	190.55
Total	596.73

Texas Commission on
Environmental Quality
2005 Emissions Inventory Data

Pollution Sources, Continued

- What are my emissions?
 - Two Schools of Thought:
 - Vehicle emissions (tailpipe, evaporative, etc.)
 - Life cycle (cradle-to-grave analysis including extraction, processing, combustion, and disposal)
 - Depends on vehicle, fuel, and weather conditions
 - Chemical content of fuels (impurities?)
 - Engine year & type of system (hybrid?, bi-fuel?)
 - vehicle weight
 - duty cycles
 - traffic conditions
 - Hot weather? Cold weather?
 - Diesel tends to emit higher levels of PM & NO_x
 - Gasoline tends to emit higher levels of VOCs

Regulatory Issues

- Clean Air Act Requirements
 - Federal standards for six “criteria” pollutants, including ozone and PM (aka: NAAQS)
 - Region in “non-attainment” for federal ozone standard (likely will be reclassified as “severe” in the near future)
 - Very close to being in “non-attainment” for federal PM standard
 - No NAAQS for air toxics
 - localized “hotspot” areas in region cause concern
- Greenhouse gas regulation coming?

Regulatory Issues, Continued

- Non-attainment = State Implementation Plan (SIP)
 - Overseen by EPA, administered by state environmental office (TCEQ in Texas)
 - Must describe and implement controls that show the area will come into “attainment” by deadline, based on modeling and measured data
 - Failure to attain by deadline can result in loss of federal highway funding, more stringent requirements for point sources
 - SIPs are legally binding

Regulatory Issues, Continued

- Region has made a legal commitment in the SIP to reduce NO_x through voluntary program such as Clean Vehicles & Clean School Bus
- State has made a legal commitment in the SIP to reduce NO_x through voluntary programs such as Texas Emission Reduction Program (TERP)

Resources & References

- Pollutant Concerns:
 - Criteria pollutants:
<http://www.epa.gov/air/urbanair/6poll.html>
 - Air Toxics:
<http://www.epa.gov/ttn/atw/allabout.html>
 - Greenhouse gases:
<http://www.epa.gov/climatechange/emissions/index.html>

Resources & References, Continued

- Pollutant Sources:
 - General source categories:
http://www.tceq.state.tx.us/implementation/air/areasource/Sources_of_Air_Pollution.html
 - Mobile source information:
 - Consumer Information:
<http://www.epa.gov/otaq/consumer.htm>
 - National Clean Diesel Campaign:
<http://www.epa.gov/cleandiesel/>

Resources & References, Continued

- The Plain English Guide to the Clean Air Act: <http://www.epa.gov/air/caa/peg/>
- The Texas State Implementation Plan: <http://www.tceq.state.tx.us/implementation/air/sip/sipintro.html>
- Regional SIP information: <http://www.tceq.state.tx.us/implementation/air/sip/hgb.html>