4 Keys to Understanding

1. What is Pollution?
2. What is the Law?
3. Who is Involved?
4. What is Conformity?
1st Key to Understanding: What is Pollution?
1st Key: What Is Pollution?

3 Sources of Pollution

♦ Stationary

♦ Area

♦ Mobile
  – On-Road
  – Off-Road
1st Key: What Is Pollution?

Stationary Sources

Fixed facilities such as:
- Factories
- Power Plants
- Chemical Process Industries
- Petroleum Refineries
1st Key: What Is Pollution?

Area Sources
Small Stationary, Non-transportation Sources such as:

- Dry Cleaners
- Bakeries
- Surface Coating Operations
- Home Furnaces
- Crop Burning
1st Key: What Is Pollution?

Mobile Sources – On-Road

On-Road Vehicles such as:

- Cars
- Trucks
- Buses
1st Key: What Is Pollution?

Mobile Source – Off-Road

- Trains
- Ships and Boats
- Airplanes
- Construction Equipment
- Lawnmowers
- Farm Equipment
1st Key: What Is Pollution?

What is Carbon Monoxide?
Carbon Monoxide (CO)

- Odorless, colorless, gas
- A product of incomplete combustion
  - Incomplete burning of carbon in fuels such as gasoline
- Worse during the colder months
  - Night-time inversion conditions
1st Key: What Is Pollution?

What is Ozone?
1st Key: What Is Pollution?

OZONE Ingredients

Sunlight + Heat + VOC + NOx = Ozone
1st Key: What Is Pollution?

500 km (310 mil)

FHWA-RC-Air Quality

Thermosphere

85 km (53 mil)

Mesosphere

Ozone Layer

50 km (31 mil)

Stratosphere

10 km (6 mil)

Troposphere

Ground Level Ozone
1st Key: What Is Pollution?

OZONE: The Good, The Bad, and The Ugly

♦ Good Ozone
  – ozone layer
  – screens out harmful
  – UV rays

♦ Bad Ozone
  – smog/haze
  – harmful to elderly, children, people at risk

Ugly
  – designations
1st Key: What Is Pollution?

Air Quality Designations

- **Attainment**
  - Has NEVER violated the NAAQS

- **Non-Attainment**
  - Is in violation of the NAAQS

- **Maintenance**
  - Has violated the NAAQS BUT has once again attained the NAAQS
  - Has a maintenance plan
Kentucky Division for Air Quality
Ozone Monitoring Stations

1. Hazard, Perry County Horsepark, Perry County
2. Pikeville, 101 N. Mayo Trail, Pike County
3. Middlesboro, Airport, Bell County
4. Somerset, Clifty Drive, Pulaski County
5. Lexington, Newtown Pike, Fayette County
6. Lexington, Ironworks Pike, Fayette County
7. Nicholasville, US27 Bypass, Jessamine County
8. Sadieville, Hwy 32, Scott County
9. Fort Thomas, Alexandria Pike, Campbell County
10. Covington, 1401 Dixie Hwy, Kenton County
11. Eastend, Rabbit Hash Road, Boone County
12. Lewisport, Elementary School, Hancock County
13. Owensboro, 716 Pleasant Valley Rd, Daviess County
14. Paducah, 2001 Powell Street, McCracken County
15. Guffie, Ky 815, McClean County
16. Baskett, Fire Department, Henderson County
17. Ashland, Halt Street, Boyd County
18. Worthington, Scott and Center, Greenup County
19. Grayson Lake, Camp Webb, Carter County
20. Elizabethtown, Miles Street, Hardin County
21. Shepherdsville, 2nd Street, Bullit County
22. Buckner, Ky 393, Oldham County
23. Smithland, US 60, Livingston County
24. Parkersburg, 2001 Powell Street, McCracken County
25. Symsonia, Ky 1949, Graves County
26. Bowling Green, Oakland Elementary, Warren County
27. Franklin, DOT Garage Ky 1008, Simpson County
1st Key: What Is Pollution?

8-hr Ozone Designations

1. Boone
2. Boyd
3. Bullitt
4. Campbell
5. Christian
6. Jefferson
7. Kenton
8. Oldham
1st Key: What Is Pollution?

What is Particulate Matter?
1st Key: What Is Pollution?

What is Particulate Matter?

A complex mixture of extremely small solid particles and drops of liquid in the air
1st Key: What Is Pollution?

Particulate Matter

Fine Particles Can Be Emitted Directly or Formed in the Air from Gases
Sources of PM$_{2.5}$

Directly Emitted Into The Air
- Cars, trucks, buses
- Power plants, factories
- Construction sites
- Tilled fields, unpaved roads
- Wood burning
1st Key: What Is Pollution?

Sources of PM$_{2.5}$

Indirectly Formed
1st Key: What Is Pollution?

Fine Particles Reduce Visibility

Chicago - Summer 2000.
Clear Day: PM 2.5 < 5 µg/m³
1st Key: What Is Pollution?

Fine Particles Reduce Visibility

Chicago - Summer 2000.
Hazy Day: PM 2.5 = 35 µg/m³
1st Key: What Is Pollution?

Fine Particles Reduce Visibility

Atlanta
1st Key: What Is Pollution?

Kentucky
PM2.5 Air Monitoring Stations
2003 Network

1. Middlesboro, Airport, Bell County
2. Hazard, Perry County Horsepark, Perry County
3. Pikeville, North Mayo Trail, Pike County
4. Lexington, Newtown Pike, Fayette County
5. Lexington, South Limestone, Fayette County
6. Richmond, Mayfield Elementary, Madison County
7. Frankfort, S03 Schenkel Lane, Franklin County
8. Covington, Dixie Highway, Kenton County
9. Fort Thomas, Alexandria Pike, Campbell County
10. Grayson Lake, Camp Webb, Carter County
11. Ashland, Holt Street, Boyd County
12. Shepherdsville, 2nd Street, Bullitt County
13. Elizabethtown, Miles Street, Hardin County
14. Bowling Green, Kerebakes Park, Warren County
15. Hopkinsville, Pilot Rock Road, Christian County
16. Owensboro, Ky Wesleyan College, Daviess County
17. Henderson, Bend Gate School, Henderson, County
18. Paducah, Paducah Middle School, McCracken, County
20. Louisville Metro

[Legend: Mass Only, Mass and Speciation, Improve]
1st Key: What Is Pollution?

**PM$_{2.5}$ Designations**

1. Boone
2. Boyd
3. Bullitt
4. Campbell
5. Jefferson
6. Kenton
7. Lawrence (p)
2nd Key to Understanding:

What is the Law?
2nd Key: What Is The Law?

**Air Pollution Control Act of 1955**
- Provided federal funds to conduct research and technical assistance

**Amendment of 1962**
- Authorized US Surgeon General to evaluate health effects from various vehicle exhaust substances

**The Clean Air Act of 1963**
- Replaced the 1955 Act
- Provided federal research funds to both federal and outside agencies
- Granted federal authority to address interstate air pollution problems
- Encouraged establishment of emission standards
### 2nd Key: What Is The Law?

**Amendment of 1965**  
(Motor Vehicle Air Pollution Act)  
Established automobile emission standards

**National Environmental Policy Act 1969**  
Created the Environmental Protection Agency

**Clean Air Act of 1970**  
Established NAAQS  
Proposed new source performance standards  
Established strict vehicle emission standards  
**Citizen's right to take legal actions against any organizations including the government for violation**
2nd Key: What Is The Law?

The Energy Supply and Environmental Coordination Act of 1974

- Loosened restriction of the CAA
- Delayed the motor vehicle emission standards of the 1970 CAA

Amendment of the 1977 CAA

- New motor vehicle emission standards
- Time to meet MVES
- Time to meet NAAQS
- Stratospheric ozone
2nd Key: What Is The Law?

**Acid Precipitation Act of 1980**

Identified the causes and sources of acid precipitation
Evaluated the environmental, social, and economic effects
Take action to the extent necessary and practicable to limit or eliminate or remedy the harmful effects.
Clean Air Act Amendment of 1990

Smog
Motor vehicle emissions
Toxic air pollution
Acid rain
State responsible for non-attainment area
Definite time table of MVES
Low sulfur fuel
Mandate installation of BACT
Reduction of CFCs
2nd Key: What Is The Law?

Ozone 8-hr and PM2.5 NAAQS 1997
- Established the 8-hour ozone standards
- Established the PM2.5 standards

Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standards, 2004
- 40 CFR Parts 50, 51 and 81
2nd Key: What Is The Law?

Transportation Conformity Rule Amendments for the New 8-hour Ozone and PM2.5 NAAQS and Miscellaneous Revisions for Existing Areas, 2004

40 CFR Part 93 - 07/01/2004

Transportation Conformity Rule Amendment - Revised March, 2006
3rd Key to Understanding: Who is Involved?
3rd Key: Who Is Involved? US EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

♦ Sets National Ambient Air Quality Standards (NAAQS)

♦ Mandated to review NAAQS every 5 years
Pollution Standards:

♦ Primary Standard
  – Public Health (children, elderly, asthmatics)

♦ Secondary Standard
  – Public Welfare
    Soils, Water, Crops, Vegetation
  – Buildings, Property
  – Animals, Wildlife
  – Weather, Visibility
  – Transportation

3rd Key: Who Is Involved? US EPA
National Ambient Air Quality Standards (NAAQS)

Transportation Related Pollutants include:

- Carbon Monoxide (CO)
- Ground Level Ozone (becomes Smog)
  - Nitrogen Oxides (NOx)
  - Volatile Organic Compounds (VOC)
- Particulate Matter
  - PM$_{10}$
  - PM$_{2.5}$
### TRANSPORTATION RELATED POLLUTANTS

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Type of Average</th>
<th>Concentration</th>
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<tbody>
<tr>
<td>CO</td>
<td>8-hr</td>
<td>9 ppm</td>
</tr>
<tr>
<td></td>
<td>1-hr</td>
<td>35 ppm</td>
</tr>
<tr>
<td>O3</td>
<td>8-hr</td>
<td>0.08 ppm</td>
</tr>
<tr>
<td></td>
<td>1-hr</td>
<td>0.12 ppm</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>Annual</td>
<td>15 µg/m$^3$</td>
</tr>
<tr>
<td></td>
<td>24-hr</td>
<td>35 µg/m$^3$</td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>Annual</td>
<td>50 µg/m$^3$</td>
</tr>
<tr>
<td></td>
<td>24-hr</td>
<td>150 µg/m$^3$</td>
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</tbody>
</table>

3rd Key: Who Is Involved? US EPA
KY EPCC’s Division for Air Quality (DAQ) – Develops State Implementation Plan (SIP) – Set Emission Budgets for each maintenance area
State Implementation Plan (SIP)

- States HOW the state will meet NAAQS for each pollutant
- Performs Regional Analyses
- Sets Emission Budgets for each type of pollutant
- Each Pollution Source is assigned an emission reduction target
### Example Emission Budgets

Pollution is measured in **TONS PER DAY!!**

#### Christian County

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>2004 (tpd)</th>
<th>2016 (tpd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC</td>
<td>3.83</td>
<td>2.08</td>
</tr>
<tr>
<td>CO</td>
<td>40.56</td>
<td>25.31</td>
</tr>
<tr>
<td>NOx</td>
<td>9.53</td>
<td>3.83</td>
</tr>
</tbody>
</table>

3rd Key: Who Is Involved? DAQ
3rd Key: Who Is Involved? KYTC

STATE DEPARTMENTS OF TRANSPORTATION

Responsible for:

♦ Statewide Transportation Planning for Rural Areas

♦ Building Transportation Projects

♦ NOT exceeding the On-Road Motor Vehicle Emissions Budgets (MVEB)
3rd Key: Who Is Involved? KYTC

Rural Areas

KYTC Develops the:

- State Transportation Plan (STP)
- State Transportation Improvement Program (STIP)
  - Projected Emissions must be less than those identified in SIP
  - Otherwise, there is a LAPSE and projects are not receive Federal funding.
3rd Key: Who Is Involved? KYTC

15 Area Development Districts (Rural Planning Organizations)
Metropolitan Planning Organizations (MPO)

- Federal Surface Transportation Assistance Act of 1973
  - Populations > 50,000 must have an MPO
  - Populations > 200,000 are called Transportation Management Areas (TMA)
  - Consists of representatives from Local Governments and Transportation Authorities
3rd Key: Who Is Involved? MPO

MPO’s Core Functions

- Establish a fair and impartial setting to make regional decisions
- Evaluate transportation alternatives
- Involve the Public
- Participate in Air Quality Planning
- AND…
3rd Key: Who Is Involved?  MPO

MPO’s Core Functions

♦ Develop and Update

4 Key Documents:

– Unified Planning Work Program (UPWP)
– Public Participation Plan (PPP)
– Metropolitan Transportation Plan (MTP)
– Transportation Improvement Program (TIP)
Importance of Key Documents

♦ MTP
- Future Goals, Strategies and Projects
- Updated every 5 years in attainment areas/
  every 4 years in non-attainment and
  maintenance
- Projected Emissions must be less than
  those identified in SIP
- Otherwise, there is a LAPSE and projects
  will not receive federal funding

♦ TIP
- Transportation Investments
- Updated every 4 years
Kentucky’s 9 MPOs

- Ashland Area MPO (ASH)
- Bowling Green Area MPO (BWG)
- Cincinnati Area MPO (CIN)
- Clarksville Area MPO (CLK)
- Evansville Area MPO (EVN)
- Lexington Area MPO (LEX)
- Louisville Area MPO (LOU)
- Owensboro Area MPO (OWN)
- Radcliff/Elizabethtown MPO (REZ)
3rd Key: Who Is Involved? MPO Metropolitan Planning Organizations

MPO Planning Boundaries

REVISED AUGUST 2005
3rd Key: Who Is Involved?  US DOT

Federal Highway Administration and Federal Transit Administration

♦ 1 of the Core Functions
♦ Make Conformity Determinations
4th Key to Understanding: What is Conformity?
4th Key: What Is Conformity?

GOAL OF TRANSPORTATION CONFORMITY

To ensure that federal funding and approval of transportation projects and programs are consistent with the air quality goals established in the State Implementation Plan.
The Link Between Air Quality and Transportation Planning

- Transportation conformity is intended to help the SIP achieve its goal which is to attain the NAAQS

4th Key: What Is Conformity?
4th Key: What Is Conformity?

Transportation Conformity
1990 CAA – Section 176

No department, agency or instrumentality of the Federal government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity which does not conform to a implementation plan.

No MPO shall give its approval to any project, program, or plan which does not conform to a SIP.

AND....
4th Key: What Is Conformity?

Transportation Conformity
1990 CAA – Section 176

Such activities will not:
• Cause or contribute to any new violations
• Increase the frequency or severity
• Delay timely attainment of standards
Interagency Consultation Procedures Describe How...

MPOs, State DOTs, and US DOT will work with: State/local air agencies and US EPA

Plan/TIP & Conformity Determination will work with:

Consultation is required on the development of these plans/documents.

4th Key: What Is Conformity?
4th Key: What Is Conformity?

Steps in Process

♦ IAC
♦ Regional Emissions Analysis
♦ Conformity Report
♦ Public Participation
♦ MPO Approval
♦ Conformity Determination
4th Key: What Is Conformity?

Conformity Process and NAAQS

♦ Uses Key Documents to ensure that transportation projects meet air quality goals

♦ Once an area meets the transportation conformity requirements then projects can then be approved for federal funding
4th Key: What Is Conformity?

Transportation Conformity: Addresses Only One Piece of the Emissions Pie

Transportation conformity addresses emissions from on-road mobile sources.

Diagram:
- Area Sources
- Off-Road Mobile Sources
- On-Road Mobile Sources
- Stationary Sources
4 Keys to Understanding

1. What is Pollution?
2. What is the Law?
3. Who is Involved?
4. What is Conformity?
QUESTIONS?

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