Refining and Analyzing Point & Area Source Emissions Inventory Data for Use in Regional Haze Planning

Presentation to the
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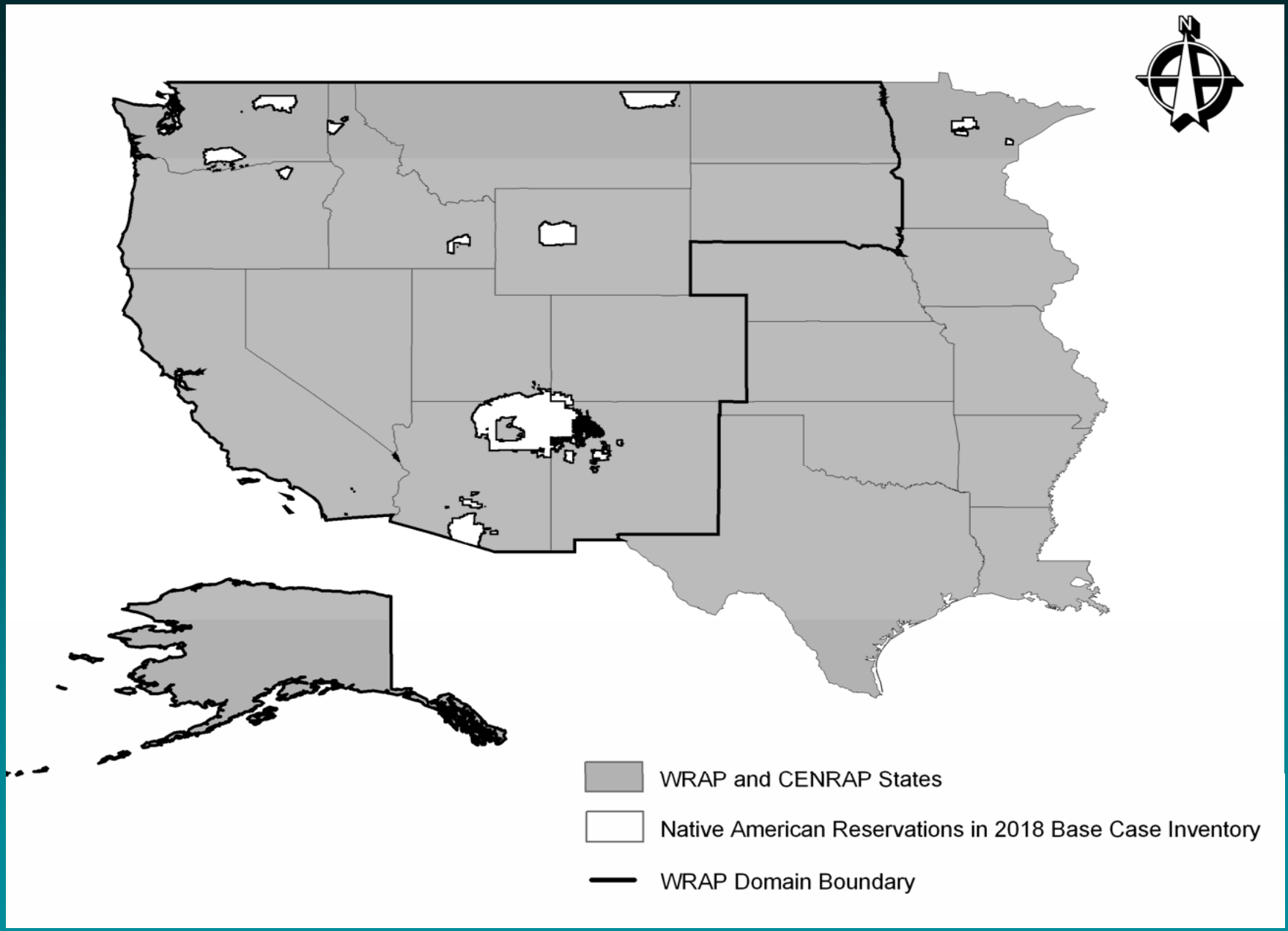
Presentation Overview

- **Background on Regional Haze Rule and Western Regional Air Partnership (WRAP)**
- **WRAP point and area source emissions inventory development and refinement**
- **Data analyses using the inventories:**
  - BART analysis
  - SO_2 milestone program
  - Reasonable progress goals
- **Conclusions and recommendations for future Improvements**

Regional Haze Rule

- **Promulgated in 1999**
- **Goal is to protect visibility in 156 Class I areas**
- **States with Class I areas must conduct detailed analyses, submit RH SIPs (December 2007)**
- **Achieve natural background levels by 2064**
- **Establish reasonable progress goals for 2018**
- **5 Regional Planning Organizations (RPOs):**
  - WRAP established in 1997
  - Other haze RPOs established post-1999



116 of the 156 Class I areas are in the WRAP states and tribal areas

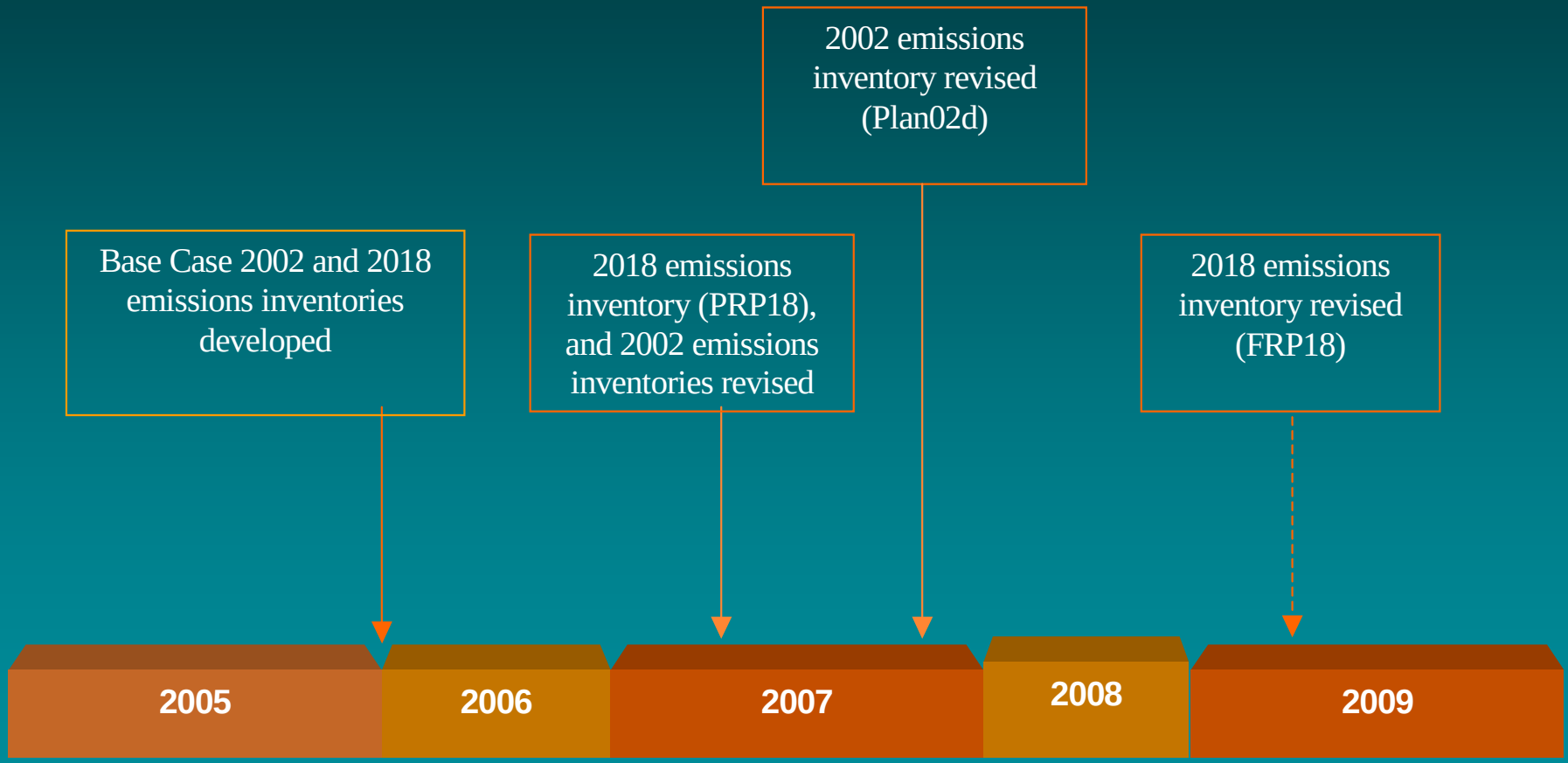
WRAP Objectives

- **Collaborative effort of tribal, state and various federal agencies**
- **Network of committees and forums**
- **Develop technical and policy tools**
- **Technical studies to support RHR compliance by members**
  - Emissions inventory development and analysis
  - Modeling studies
  - SIP development

WRAP Point & Area Source Emissions Inventory Characteristics

- **2002, 2018**
- **Source Types:**
  - Point sources and area (nonpoint) stationary sources
  - Excluding these categories dealt with in other WRAP projects:
    - Fugitive dust from paved and unpaved roads
    - Windblown dust
    - Wildfires, waste burning, agricultural burning
    - Agricultural production-livestock
    - On-road and nonroad mobile sources
- **Pollutants: NO_x, SO_2, total VOC, CO, PM_{10}, $PM_{2.5}$, and NH_3**

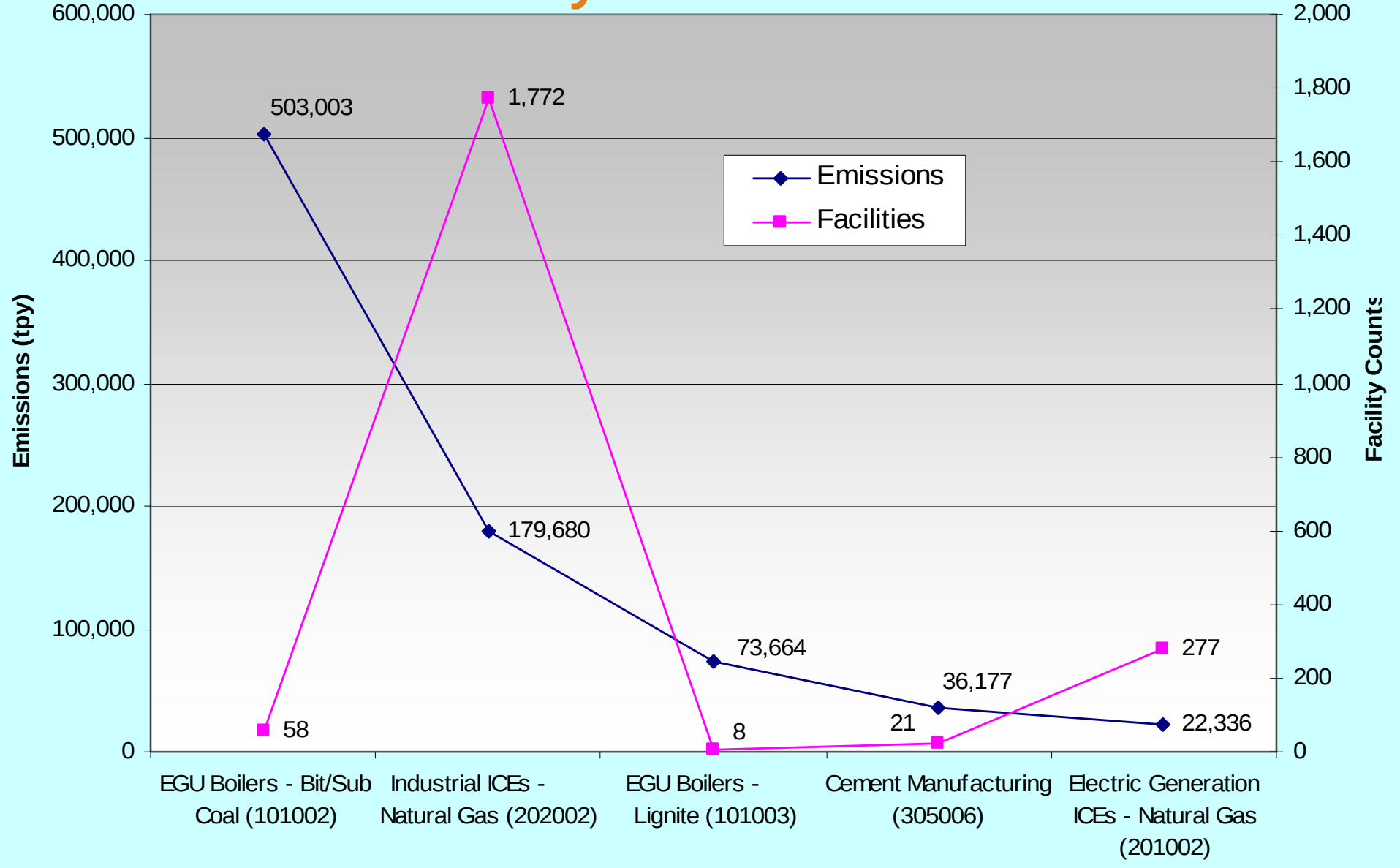
Evolution of the WRAP Point & Area Source Emissions Inventories



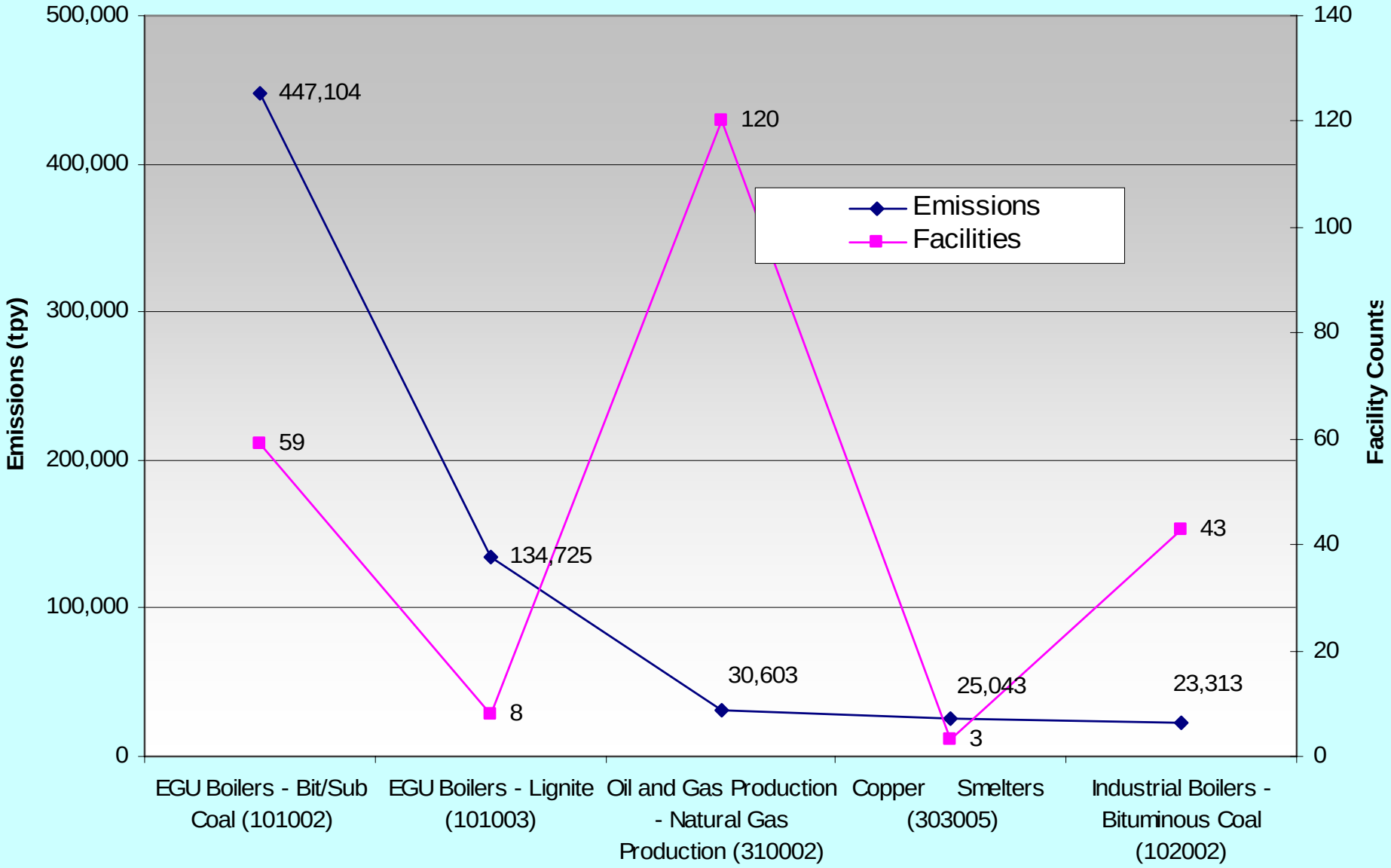
WRAP 2002 and 2018 Emissions Inventory Development and Refinement

- **Planning Inventories for 2002**
  - Plan02a (developed in 2005)
    - Based on NEI
    - Regionally consistent, more representative and comprehensive
  - Modeling analyses
    - Plan02b
    - Plan02c
  - Plan02d (developed in 2007)
- **Projections Inventories for 2018**
  - 2018 Base case (developed in 2005)
  - Preliminary Reasonable Progress (PRP18) (developed in 2006)

WRAP Point Source NO_x Emissions and Facility Counts - 2002



WRAP Point Source SO_2 Emissions and Facility Counts - 2002



Dissemination of WRAP Emissions Inventory Data

- **Standard Inventory Development Output Formats**
  - U.S. National Emissions Inventory Format (NIF) database
  - Inventory Data Analyzer (IDA) format
- **Technical Support System (TSS)**
- **Emissions Data Management System (EDMS)**
- **Pivot Tables for Point and Area Sources**

WRAP Technical Information Centers

Visibility Information Exchange Web System (VIEWS): VIEWS provides on-line access to monitoring data, research results and special studies related to visibility. http://vista.cira.colostate.edu/views/

Regional Modeling Center: The WRAP's Regional Modeling Center at the University of California Riverside provides state and tribal agencies with sophisticated modeling of regional haze in the Western United States. http://pah.cert.ucr.edu/aqm/308/

Emissions Data Management System: An emission inventory data warehouse for states and tribes. The system provides a consistent, complete and regional approach to emissions data management and tracking. http://www.wrapedms.org/

Fire Emissions Tracking System (FETS): FETS is a database with a web interface for planned and unplanned fire events. Users can map fire data on-screen, and query the database for downloads in model-ready formats. http://www.wrapfets.org/

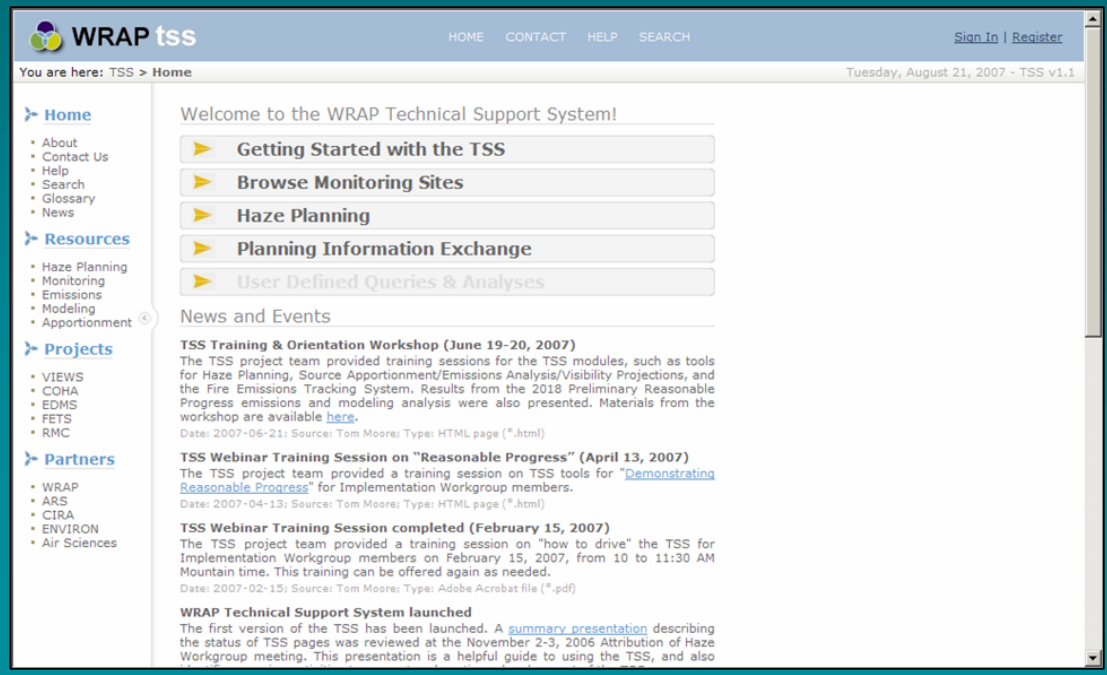
Causes of Haze Assessment: A detailed analysis of ambient monitoring data for regional haze in the WRAP region. http://www.coha.dri.edu/

WRAP tss

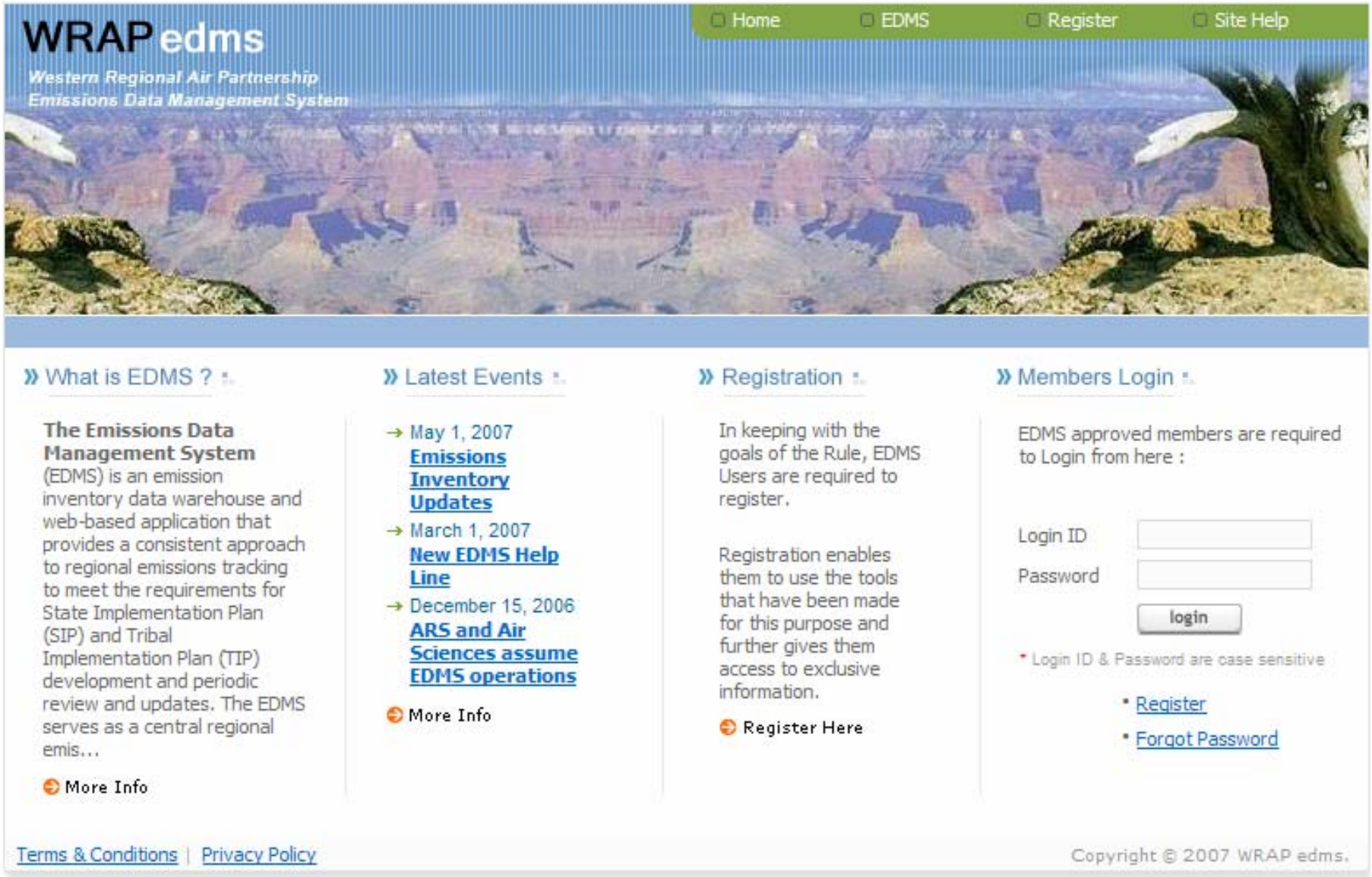
The Technical Support System integrates results from these technical information centers under one web-based umbrella. http://vista.cira.colostate.edu/tss

WRAP Technical Support System (TSS)

- **Goal to provide a single web-based location for:**
  - Access and display of technical data
  - Display of analytical results
  - Single location for technical support documentation
- **TSS focus has been tools to support SIP writers' needs**
  - Dynamic tools: interactive graphs, tables, and maps
  - Static tools: analyses generated outside TSS

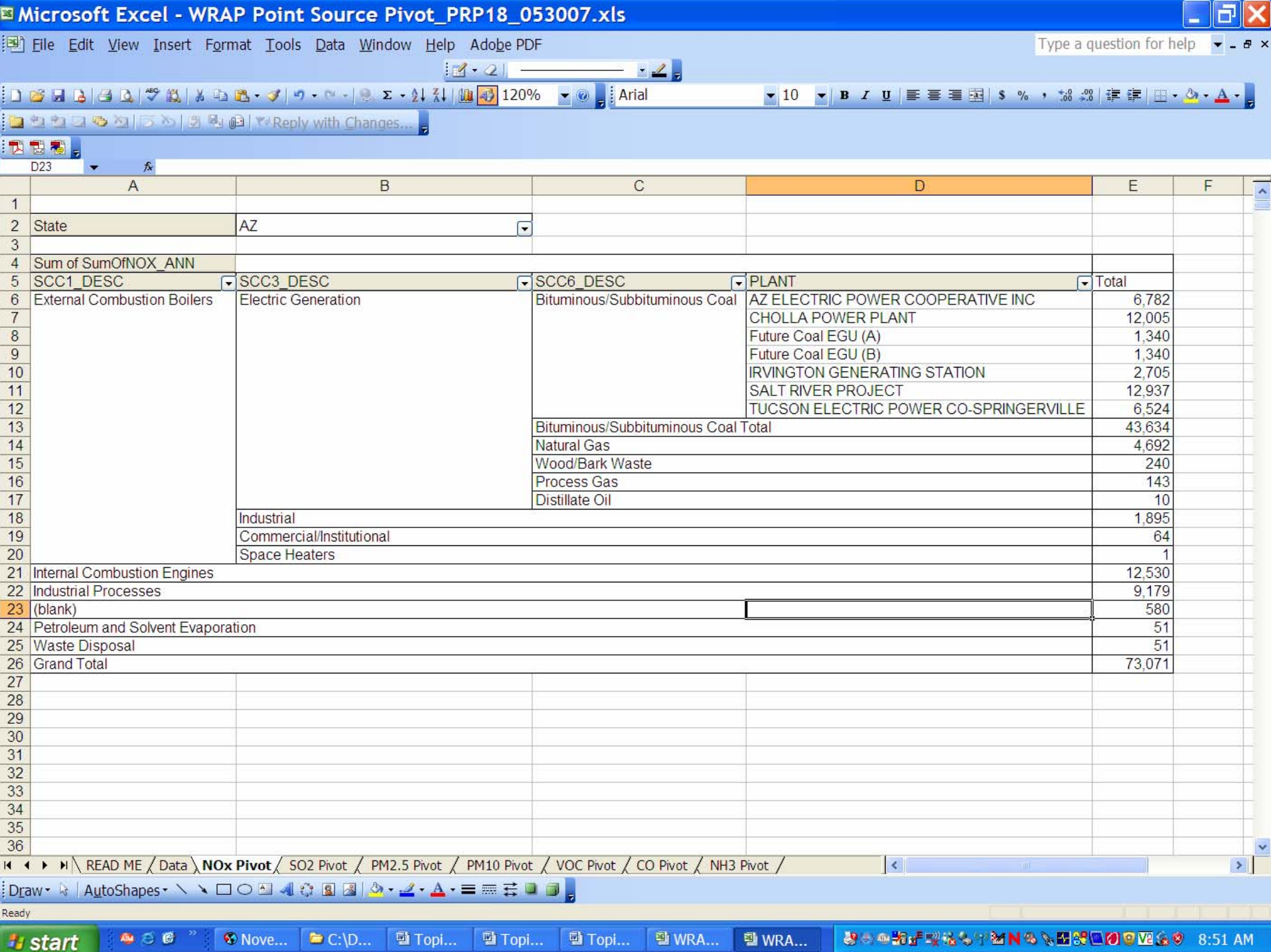


WRAP Emissions Data Management System

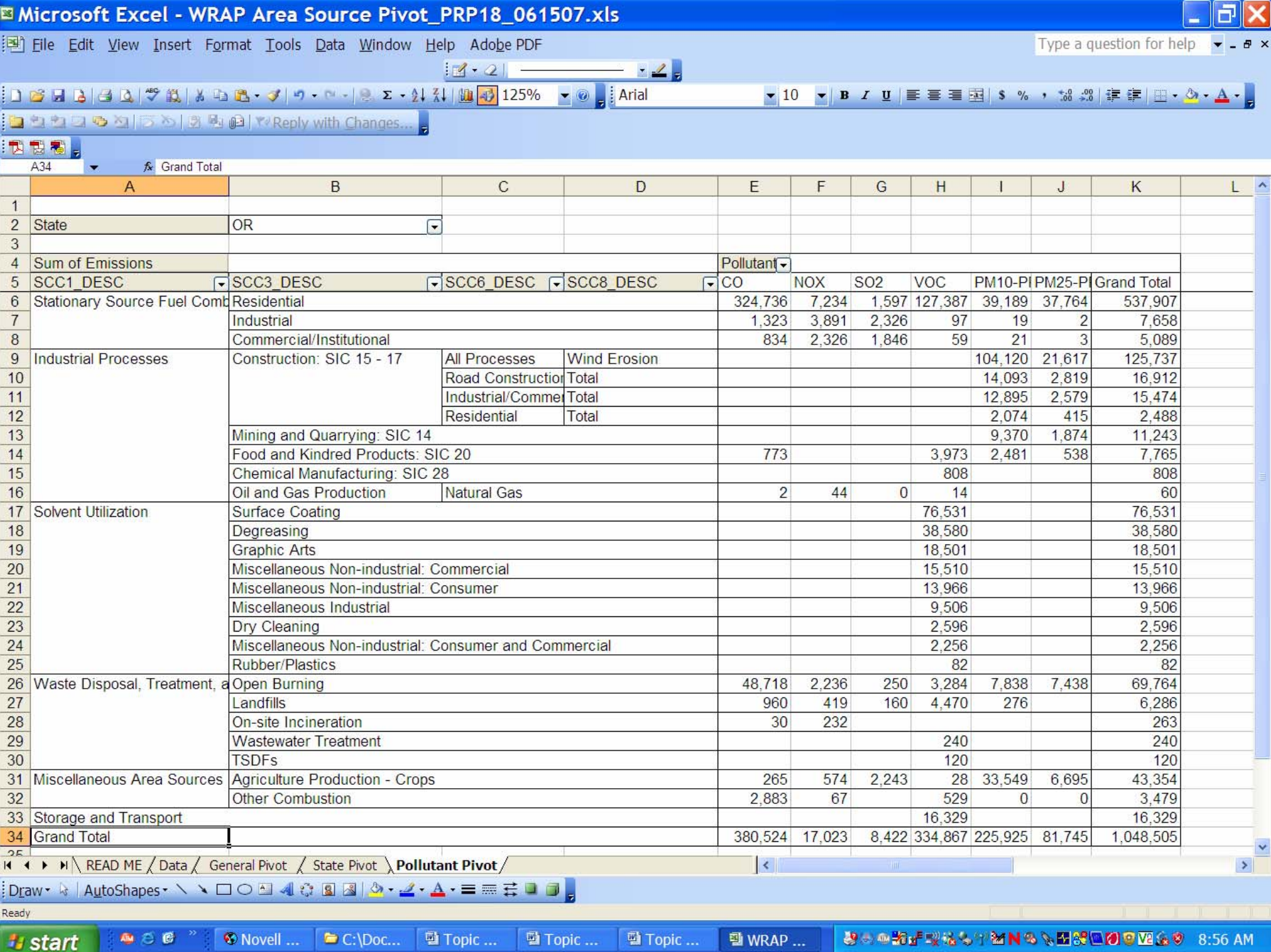


WRAP Point & Area Source Pivot Tables

- **Excel spreadsheets**
- **"Drill down"**
  - State totals
  - Pollutant totals
  - SCC totals
  - Source level
- **Facilitate state/tribal agency analysis of emissions data**



	A	B	C	D	E	F
1						
2	State	AZ				
3						
4	Sum of SumOfNOX_ANN					
5	SCC1_DESC	SCC3_DESC	SCC6_DESC	PLANT	Total	
6	External Combustion Boilers	Electric Generation	Bituminous/Subbituminous Coal	AZ ELECTRIC POWER COOPERATIVE INC	6,782	
7				CHOLLA POWER PLANT	12,005	
8				Future Coal EGU (A)	1,340	
9				Future Coal EGU (B)	1,340	
10				IRVINGTON GENERATING STATION	2,705	
11				SALT RIVER PROJECT	12,937	
12				TUCSON ELECTRIC POWER CO-SPRINGERVILLE	6,524	
13			Bituminous/Subbituminous Coal Total		43,634	
14			Natural Gas		4,692	
15			Wood/Bark Waste		240	
16			Process Gas		143	
17			Distillate Oil		10	
18		Industrial			1,895	
19		Commercial/Institutional			64	
20		Space Heaters			1	
21	Internal Combustion Engines				12,530	
22	Industrial Processes				9,179	
23	(blank)				580	
24	Petroleum and Solvent Evaporation				51	
25	Waste Disposal				51	
26	Grand Total				73,071	
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						



	A	B	C	D	E	F	G	H	I	J	K	L
1												
2	State	OR										
3												
4	Sum of Emissions				Pollutant							
5	SCC1_DESC	SCC3_DESC	SCC6_DESC	SCC8_DESC	CO	NOX	SO2	VOC	PM10-PI	PM25-PI	Grand Total	
6	Stationary Source Fuel Comb	Residential			324,736	7,234	1,597	127,387	39,189	37,764	537,907	
7		Industrial			1,323	3,891	2,326	97	19	2	7,658	
8		Commercial/Institutional			834	2,326	1,846	59	21	3	5,089	
9	Industrial Processes	Construction: SIC 15 - 17	All Processes	Wind Erosion					104,120	21,617	125,737	
10			Road Constructior	Total					14,093	2,819	16,912	
11			Industrial/Comme	Total					12,895	2,579	15,474	
12			Residential	Total					2,074	415	2,488	
13		Mining and Quarrying: SIC 14							9,370	1,874	11,243	
14		Food and Kindred Products: SIC 20			773			3,973	2,481	538	7,765	
15		Chemical Manufacturing: SIC 28						808			808	
16		Oil and Gas Production	Natural Gas		2	44	0	14			60	
17	Solvent Utilization	Surface Coating						76,531			76,531	
18		Degreasing						38,580			38,580	
19		Graphic Arts						18,501			18,501	
20		Miscellaneous Non-industrial: Commercial						15,510			15,510	
21		Miscellaneous Non-industrial: Consumer						13,966			13,966	
22		Miscellaneous Industrial						9,506			9,506	
23		Dry Cleaning						2,596			2,596	
24		Miscellaneous Non-industrial: Consumer and Commercial						2,256			2,256	
25		Rubber/Plastics						82			82	
26	Waste Disposal, Treatment, a	Open Burning			48,718	2,236	250	3,284	7,838	7,438	69,764	
27		Landfills			960	419	160	4,470	276		6,286	
28		On-site Incineration			30	232					263	
29		Wastewater Treatment						240			240	
30		TSDFs						120			120	
31	Miscellaneous Area Sources	Agriculture Production - Crops			265	574	2,243	28	33,549	6,695	43,354	
32		Other Combustion			2,883	67		529	0	0	3,479	
33	Storage and Transport							16,329			16,329	
34	Grand Total				380,524	17,023	8,422	334,867	225,925	81,745	1,048,505	

Potential WRAP Emissions Inventory Improvements

- **Correct errors/inconsistencies in pollutants reported**
- **Focus improvements on key source categories:**
  - Industrial boilers
  - Industrial processes
  - Internal combustion engines
  - Residential wood combustion
- **Improve accuracy of SCCs**
- **Improve data on existing controls**
- **Improve activity data for sources varying with commodity prices (e.g., aluminum, copper)**

Analysis and Planning Activities Using WRAP Emissions Data

- **Best Available Retrofit Technology (BART)**
- **SO_2 Milestone Program**
- **Assessing Reasonable Progress**

What is BART?

- **Constructed/rebuilt 1962-1977**
- **26 industrial processes**
- **Potential to emit ≥ 250 tons/year of visibility pollutants**
- **Steps to assessing BART eligibility =>**

Step 1: Identify emission units in the BART categories.
Does the plant contain emission units in one or more of the 26 categories? No? ☐ Stop Yes? ☐ Proceed to Step 2
Step 2: Identify the start-up dates of these emission units.
Do any of these emissions units meet the following two tests – in existence on August 7, 1977 AND began operation after August 7, 1962? No? ☐ Stop Yes? ☐ Proceed to Step 3
Step 3: Compare the potential emissions to the 250 ton/year cutoff.
Add the current potential emissions from all emission units identified in Steps 1 and 2 that are included within the "stationary source" boundary. Are the potential emissions from these units 250 tons per year or more for any visibility-impairing pollutant? No? ☐ Stop Yes? ☐ These emission units comprise the "BART-eligible source"

44 EGUs and 49 non-EGUs are subject to BART and undergoing engineering analysis to determine level of control necessary.

Change Due to BART in North Dakota

Facility Name and Unit	BART Limits		Changes Due to BART	
	NO_x (tpy)	SO_2 (tpy)	NO_x (tpy)	SO_2 (tpy)
Coal Creek – Unit 143	4,285	3,781	-901	-10,925
Coal Creek – Unit 144	4,104	3,621	-1,837	-9,017
Leland Olds – Unit 121	2,661	3,578	-150	-13,744
Leland Olds – Unit 122	5,904	3,205	-4,646	-30,326
M.R. Young – Unit 152	3,857	2,571	-5,214	-17,426
M.R. Young – Unit 152	6,392	5,661	-7,940	-4,499
R.M. Heskett – Unit 154	858	1,660	-87	-1,094
Stanton – Unit 141	1,720	1,179	-381	-5,117
Change in ND Due to BART			**-21,156**	**-92,148**
Overall Total Change in WRAP Region Due to BART			**-34,267**	**-130,366**

SO_2 Milestone Program

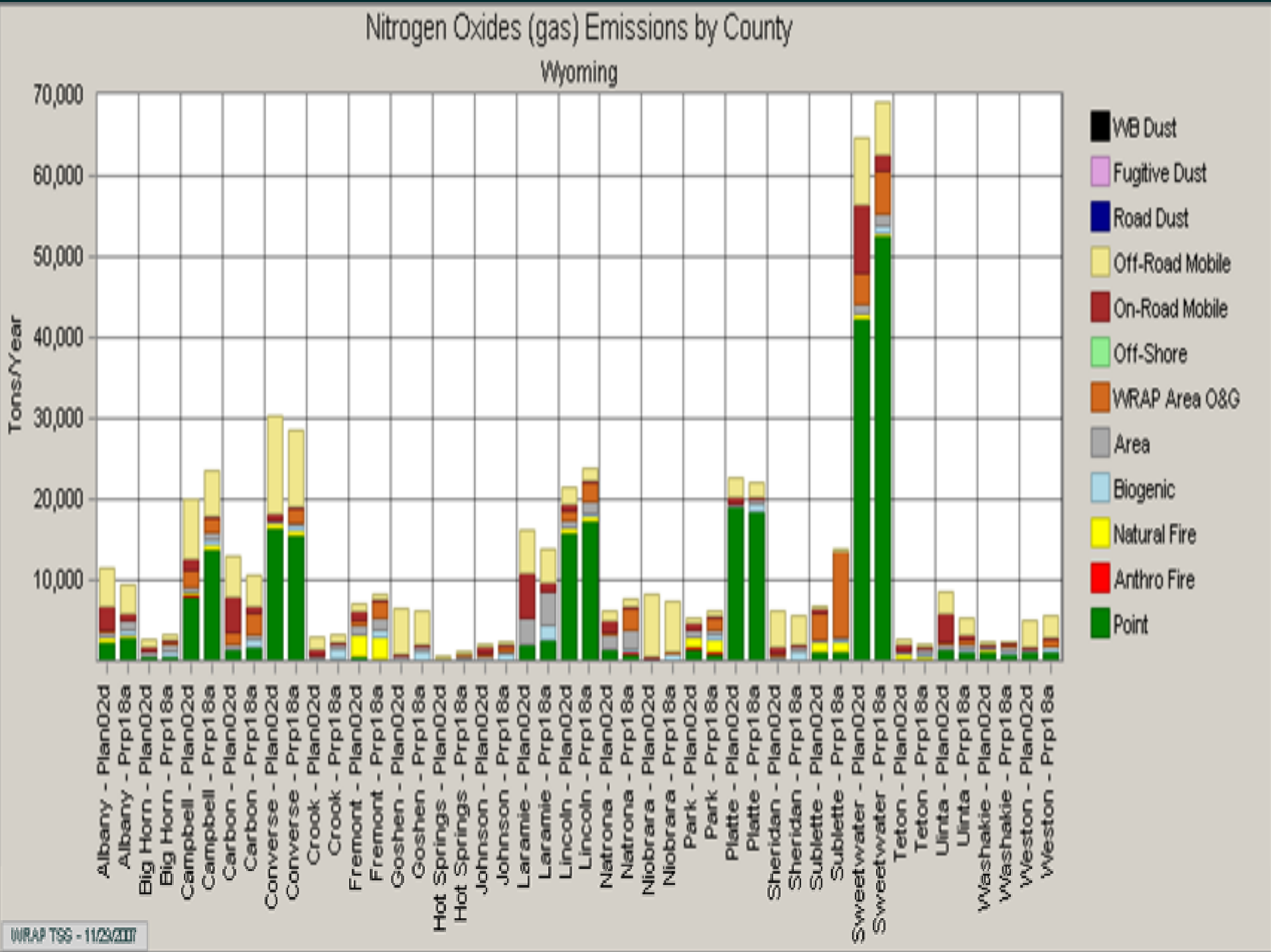
- **Compliance for Point Sources in GCVTC region under §309 RHR**
- **Chosen by AZ, NM, UT, WY**
- **2018 SO_2 Milestone was Established**
- **Backstop Emissions Trading Program to be Implemented if Milestones not met**

SO_2 Milestone Program Analysis

- **PRP18 Inventory Addressed:**
  - BART limits, if known
  - Presumptive BART limits, in lieu of completed analyses
  - Defined regional milestone cap
  - Updated 2006 inventories used to establish interim milestones for 2008 and 2013

Assessing Reasonable Progress

- **WRAP Staff Provides "Reasonable Progress Assessment"**
- **State Decides Which facilities/sources Need "4 Factor" Analysis:**
  - Type and costs of existing controls available
  - Useful life by source type
  - Energy and non-air impacts of source types
  - Time required for control project implementation
- **WRAP Staff Compiles Data for Each State**
- **States use Consistent Data**


Nitrogen Oxides (gas) Emissions by County
Wyoming
Tons/Year
70,000
60,000
50,000
40,000
30,000
20,000
10,000
WB Dust
Fugitive Dust
Road Dust
Off-Road Mobile
On-Road Mobile
Off-Shore
WRAP Area O&G
Area
Biogenic
Natural Fire
Anthro Fire
Point
Albany - Plan02d
Albany - Prp18a
Big Horn - Plan02d
Big Horn - Prp18a
Campbell - Plan02d
Campbell - Prp18a
Carbon - Plan02d
Carbon - Prp18a
Converse - Plan02d
Converse - Prp18a
Crook - Plan02d
Crook - Prp18a
Fremont - Plan02d
Fremont - Prp18a
Goshen - Plan02d
Goshen - Prp18a
Hot Springs - Plan02d
Hot Springs - Prp18a
Johnson - Plan02d
Johnson - Prp18a
Laramie - Plan02d
Laramie - Prp18a
Lincoln - Plan02d
Lincoln - Prp18a
Natrona - Plan02d
Natrona - Prp18a
Niobrara - Plan02d
Niobrara - Prp18a
Park - Plan02d
Park - Prp18a
Platte - Plan02d
Platte - Prp18a
Sheridan - Plan02d
Sheridan - Prp18a
Sublette - Plan02d
Sublette - Prp18a
Sweetwater - Plan02d
Sweetwater - Prp18a
Teton - Plan02d
Teton - Prp18a
Uinta - Plan02d
Uinta - Prp18a
Washakie - Plan02d
Washakie - Prp18a
Weston - Plan02d
Weston - Prp18a
WRAP TSS - 11/29/2007

Reasonable Progress Data Analysis for Wyoming - NO_x

PRP18 SCC1 Breakdown	TPY NO_x	Percent
External Combustion Boilers	111,124	83.4%
Industrial Processes	11,571	8.7%
Internal Combustion Engines	9,725	7.3%
(blank)	793	0.6%
Stationary Source Fuel Combustion	2	0.0%
Petroleum and Solvent Evaporation	1	0.0%
Waste Disposal	0	0.0%
Grand Total	133,216	100.0%

Conclusions

- **Significant Work to Develop and Refine WRAP Emissions Inventories has Occurred Over the Past 5 Years**
- **Future Refinements are Needed:**
  - Baseline emissions inventory data: SCCs, pollutant reporting, existing controls, activity data
  - Projection factors for non-EGU point sources
  - Routine/annual tracking of point and area source emissions for significant categories

For More Information

WRAP Website:

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