



DFW Modeling and Power Plant Impacts

Presentation to Modeling Summit 1-21-04

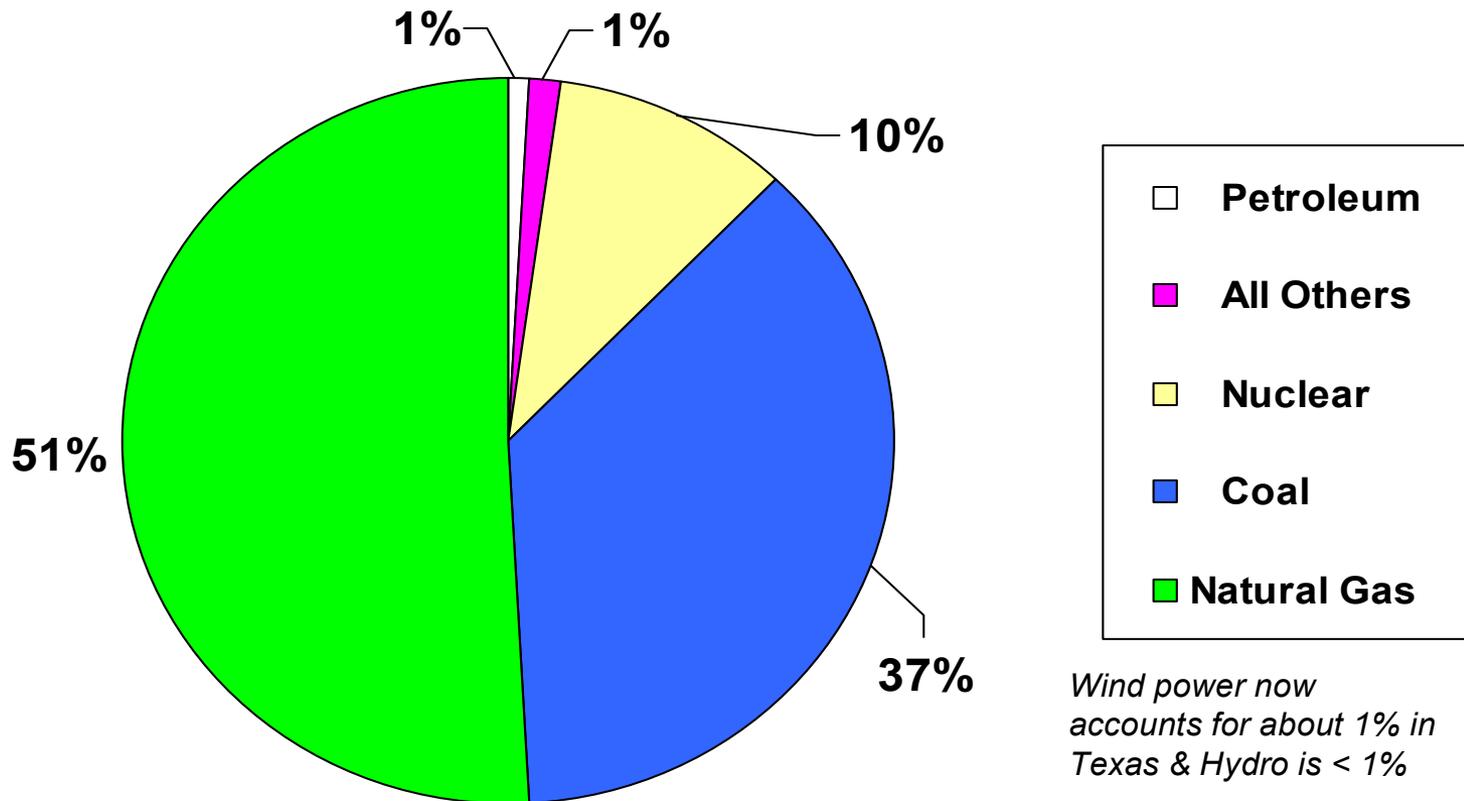
Dick Robertson

Purpose of Paper

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- Give Background on Power Plant Emissions
- Summarize Impacts of current SIP regulations on future Power Plant Emissions
- Review recent DFW Modeling Results with focus on point source contributions
- Project potential effect of power plant reductions on ozone in DFW non-attainment area

Fuel Mix in Texas by Generation

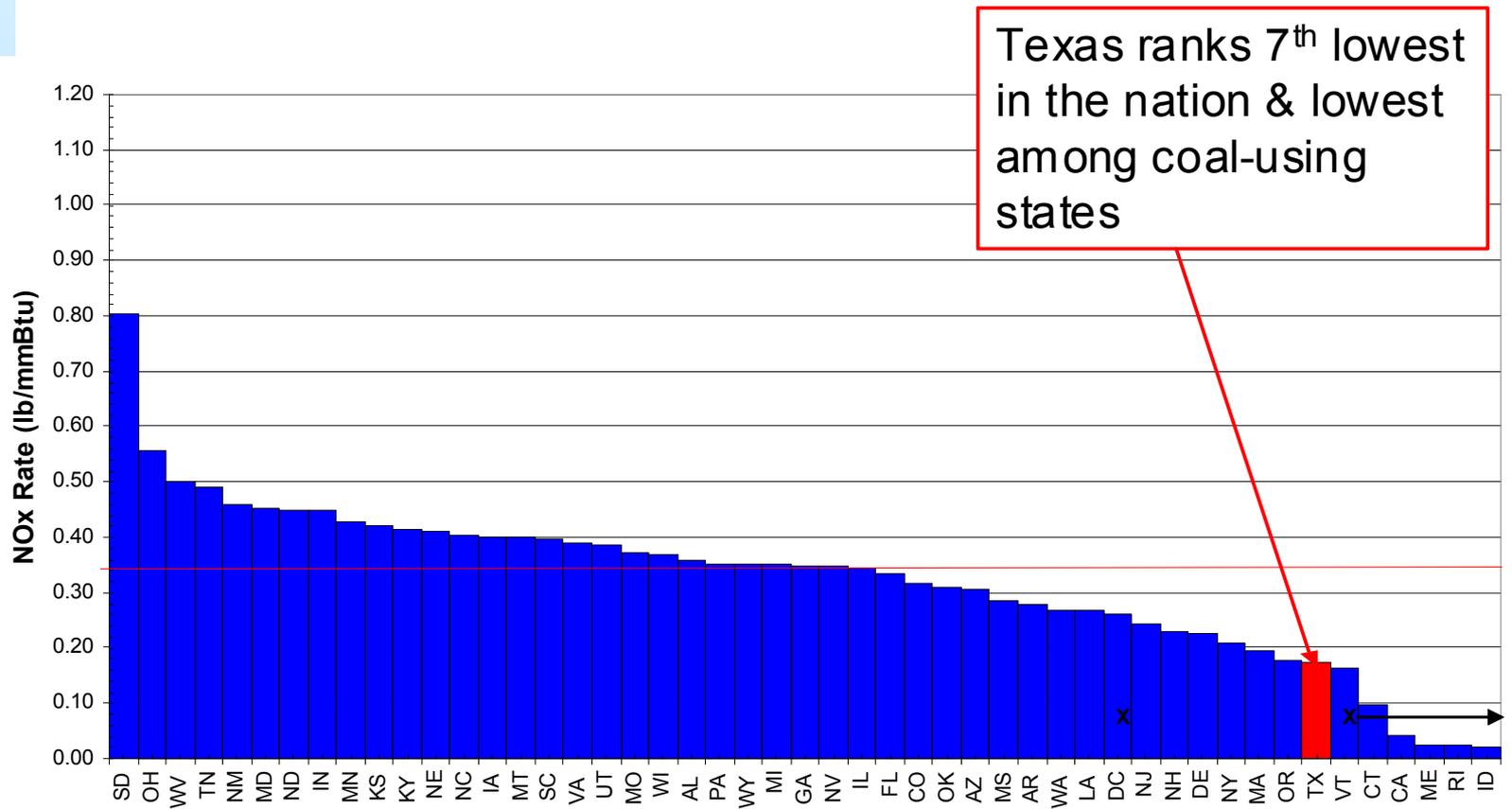


Source: EIA Electricity Net Generation by Fuel 2001

2002 Statewide NO_x Average Emissions Rates for Electric Generating Units (lbs/mmBtu)



Acid Rain Scorecard Data for 2002



Texas ranks 7th lowest in the nation & lowest among coal-using states

Source: EPA 2002 Acid Rain Database

X : States in which electric utilities do not use coal; 1999 EIA

Electric Utility SIP Requirements for NOx Reductions

– HGA SIP

- May, 2004; **86%** overall reduction from 1997
 - 50% progress reduction by 2003
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– DFW SIP

- May, 2005; **88%** overall reduction from 1997
 - 66% by May 2003

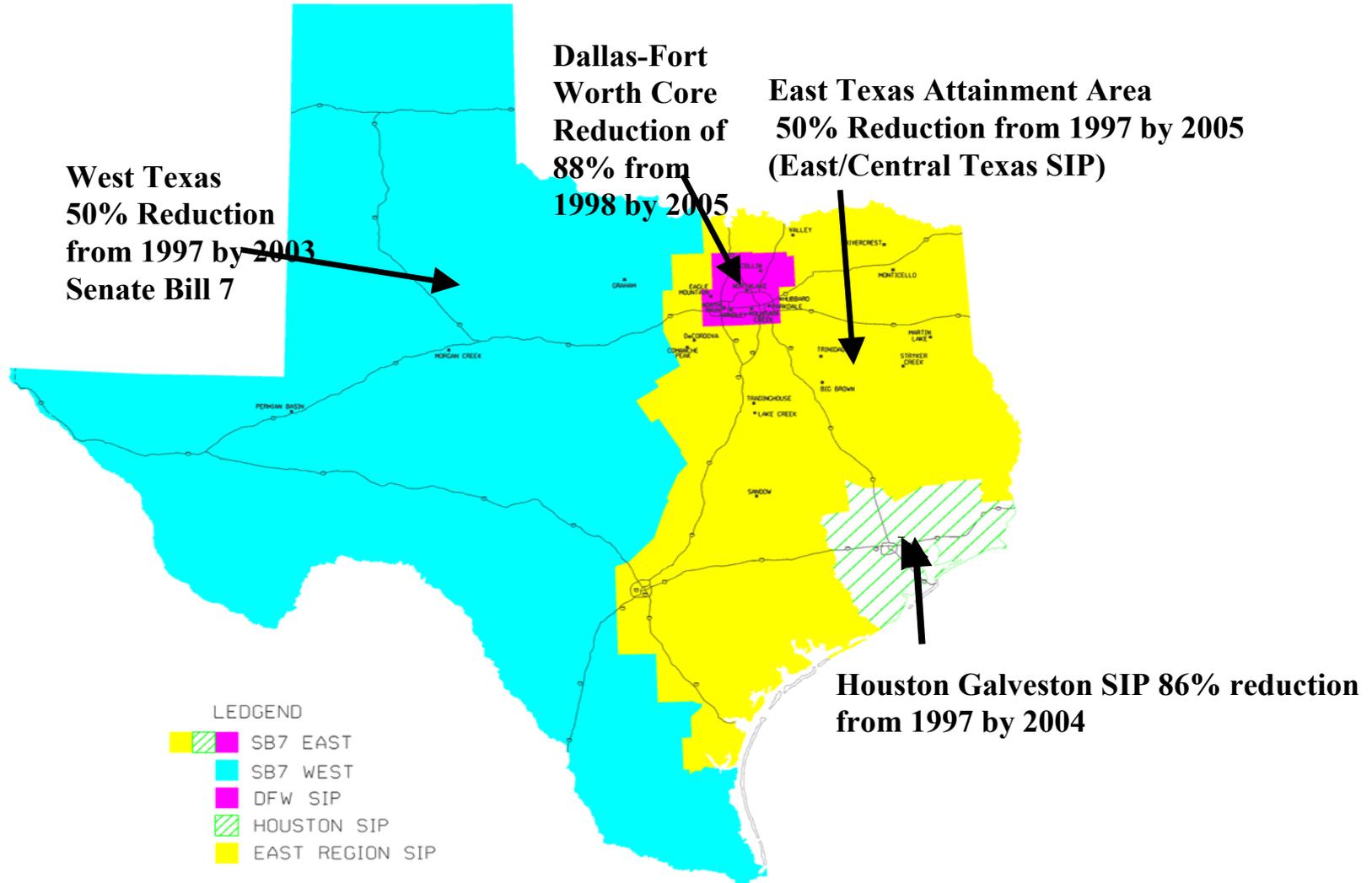
– Beaumont SIP

- **45%** reduction by 2005 from 1997

– East Texas SIP **50%** reduction by 2005 from 1997

– West Texas SB7 **50%** reduction by 2005 from 1997

Required Power Plant NO_x Reductions Under Current SIP's



DFW Modeling Results

- As part of the mid-course review, the TCEQ is conducting DFW area ozone modeling
- ENVIRON has been contracted to do modeling and has completed the baseline 1999 analysis
- Appendix A of the Final Report for Base Case includes an apportionment analysis of source types and areas
- Apportionment was done with the Anthropogenic Precursor Culpability Assessment (APCA) feature of CAMx

Apportionment Results

- The following ENVIRON table summarizes the average contributions from areas and source types on 8 hour ozone levels for August 18, 1999.
- The average ozone was 96.48 for all hours over 85 ppb
- The breakdown identifies the impact from each of 4 core DFW non-attainment counties, each of 12 surrounding counties, East Texas Attainment Area, West Texas, HG/BPA , other states and boundary conditions
- Similar tables are in the report for one hour and other days with very similar results

Table A-10. Average contributions to high 8-hour ozone for August 18, 1999 (Run 7c).

Sum of Ozone	Source Category										Area Totals	
Region	IC	BC East	BC North	BC South	BC Top	BC West	Biogenics	Elev Pts	On Road	OAN	Grand Total	Area Totals
Collin							0.32	0.41	1.88	1.86	4.47	
Dallas							0.10	1.99	8.02	4.70	14.81	
Denton							0.26	0.33	2.91	1.73	5.23	
Tarrant							0.09	1.34	7.35	4.88	13.66	38.17
Wise							0.00	0.00	0.02	0.12	0.14	
Parker							0.01	0.01	0.15	0.10	0.27	
Hood							0.00	0.32	0.01	0.02	0.35	
Johnson							0.05	0.09	0.28	0.26	0.68	
Ellis							0.12	0.85	0.39	0.19	1.55	
Henderson							0.03	0.04	0.06	0.09	0.22	
Cooke							0.00		0.00	0.00	0.00	
Kaufman							0.11	0.00	0.35	0.15	0.61	
Rockwall							0.04		0.25	0.07	0.36	
Hunt							0.07	0.01	0.16	0.06	0.30	
Fannin							0.02		0.01	0.01	0.04	
Grayson							0.01	0.02	0.02	0.01	0.06	4.58
Central Texas							0.93	1.23	0.92	1.17	4.25	
East Texas							0.24	0.88	0.66	0.99	2.77	
South Texas							0.14	0.19	0.09	0.21	0.63	
HGBPA							0.11	1.30	0.66	0.90	2.97	
West Texas							0.01	0.01	0.01	0.02	0.05	10.67
AR							0.09	0.22	0.13	0.28	0.72	
LA							0.26	2.88	0.92	2.02	6.08	
OK							0.00	0.01	0.01	0.01	0.03	
Other States							0.35	2.14	0.85	1.42	4.76	
Boundary Conditions		2.52	8.98	1.43	17.89	0.08					30.90	
Initial Conditions	0.57										0.57	11.59
Grand Total	0.57	2.52	8.98	1.43	17.89	0.08	3.36	14.27	26.11	21.27	96.48	96.48

Contributions from all areas and source types – **Mobile, Area and Point 1999**

1999 Contribution from all Point Sources

14.8% of 96.48 ppb total

Contribution to DFW ozone from all point source emissions

	1999 All Point <u>Source Contribution</u>	Power Plant* % <u>of Point Sources</u>
• 4 County Core Non-attainment area	4.07 ppb	77%
• 12 Surrounding Counties	1.34	33%
• East Texas Attainment Area	2.30	67%
• HGBPA	1.30	19%
• West Texas	.01	34%
• Other States in Domain	5.25	unknown

- The contribution of power plant impacts to total point source impacts are estimated by multiplying these values (see next slide)

*Power plant inventory percentages based on analysis of 2001 TCEQ inventory

The future power plant impacts after SIP Controls can then be estimated by applying the applicable SIP reduction percentage required in each source region.

	Percent Reduction required from 1999 Power Plants	Remaining Contribution after SIP Power Plant Reductions
4 County Core Non-attainment area	88%	.38 ppb
12 Surrounding Counties	50%	.22
East Texas Attainment Area	50%	.77
HGBPA	86%	.03
West Texas	50%	0

Even if all power plants were shut down in these areas, there would be very little benefit in ozone reduction

Future NO_x Limits for Power Plants – Regional Transport Rule

- In December EPA proposed a new NO_x and SO₂ Control Plan designed to control power plant contribution to regional fine particulate and ozone transport.
- The rule will apply to 28 eastern US states including Texas
- New limits: .150 lbs/MMBtu by 2010
 and .125 lbs/MMBtu by 2015
- For reference, Texas rules already require power plants to meet by 2005:
 .14 to .165 in attainment areas
 and .03 to .05 in non-attainment areas