Regional Air Quality Workshop
Day 1
Overview of Candidate Point Source Control Measures for SO2 and NOx

Regional Air Quality Workshop

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MACTEC Project Overview

- **Candidate Control Measures**
  - Identify potential emission reduction measures
  - Look broadly at categories needed to support regional haze, PM2.5, and ozone SIPs
  - Conduct technical and cost analysis
  - Develop control factor files for modeling
- **BART Regional Engineering Analysis**
  - Focus on specific categories affected by BART
  - Prioritize non-EGU source categories
  - Identify potential emission reduction measures
  - Recommend approach for BART analysis
  - Implement preliminary BART approach for specific sources

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Today's Presentations

- Focus on Point Sources of SO2 and NOx
- Phase I Candidate Control Measures (White Papers)
  - Electric Generating Units (EGUs)
  - Industrial/Commercial/Industrial (ICI) Boilers
  - Cement Kilns
- Non-EGU BART Engineering Analyses
  - ICI Boilers
  - Chemical Plants
  - Iron & Steel Plants
  - Cement Kilns
  - Petroleum Refineries

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Basis for Selection of Candidate Measures (White Papers)

- Three Factors Considered:
  - Emissions Contribution
  - Source Apportionment
  - Potential for Additional Reductions in 2007/08/09 timeframe
- States ranked relative importance of various categories to develop initial list of source categories for further study
- Initial focus on SO2, NOx, and VOC
  - Future may address primary PM, EC/OC, Ammonia

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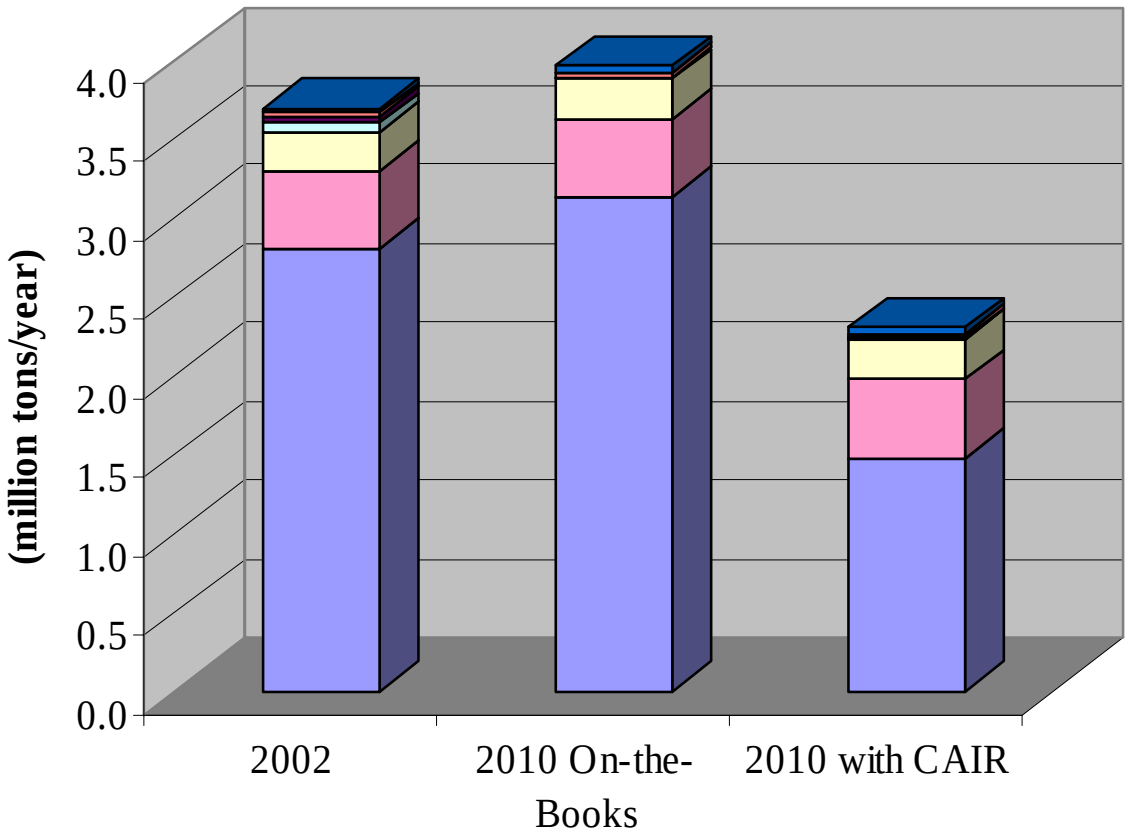
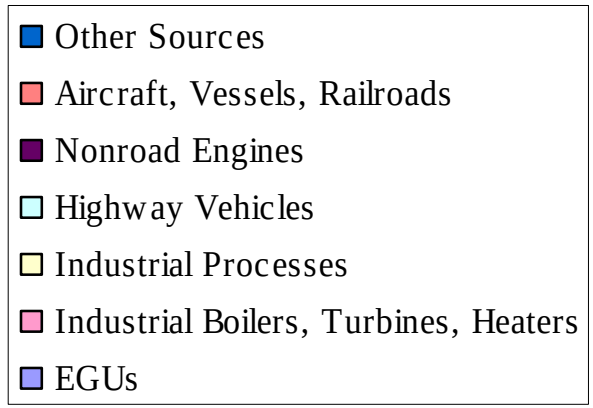
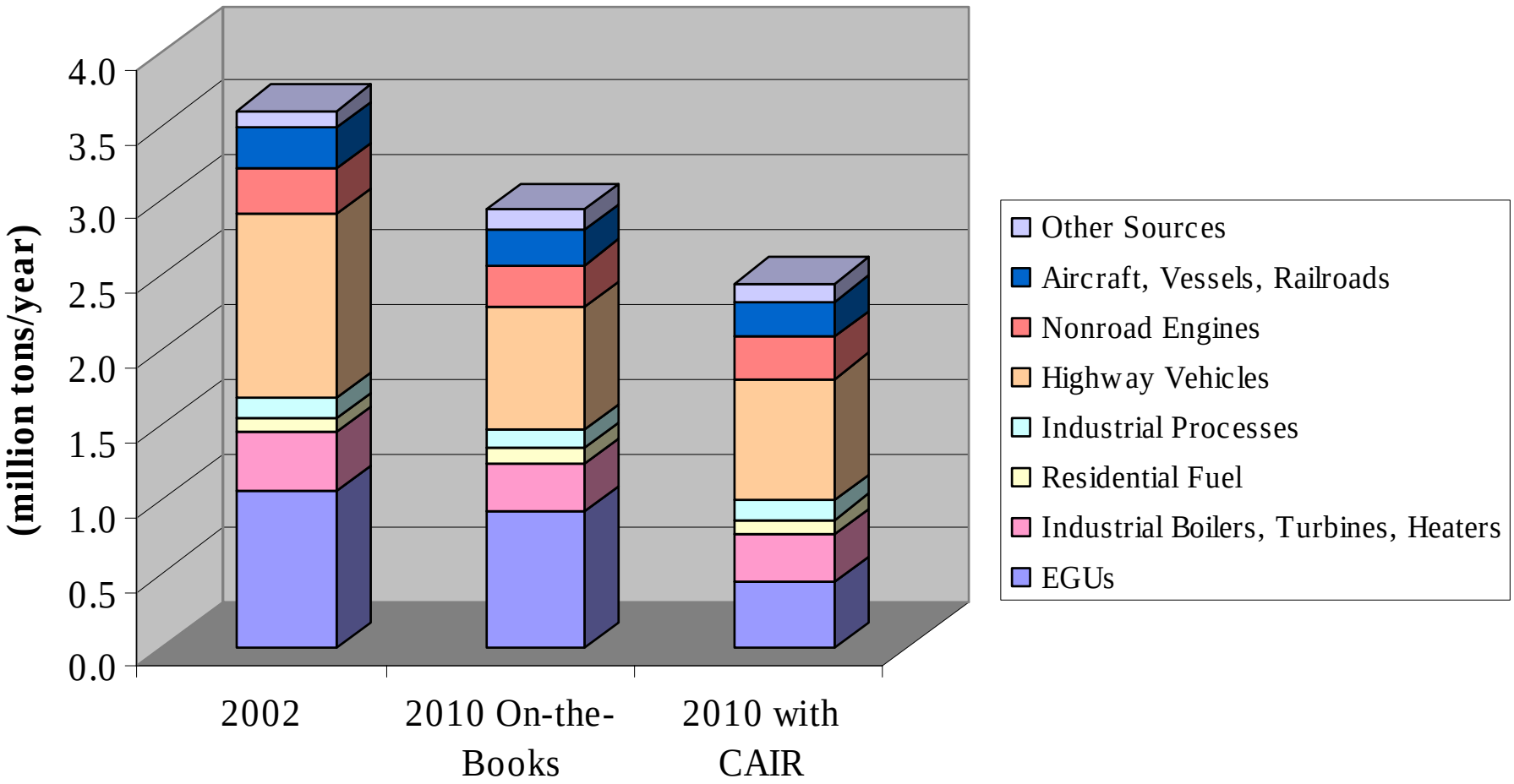
SO2 Emissions By Sector for LADCO Region (based on June 2004 Proposed CAIR requirements)





NOx (Emissions By Sector for LADCO Region (based on June 2004 Proposed CAIR requirements)



Basis for Selection of BART Categories

- States identify those sources which meet the definition of “BART-eligible source” set forth in 40 CFR 51.031
- States determine whether such sources “emit any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility (in a Class I area)”
- 25 Facilities identified as “Subject to BART”

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25 Non-EGU Facilities Determined to Be Subject to BART (based on May 2004 proposed BART Guidelines)

BART Category	IL	IN	MI	OH	WI	Total
22 Industrial Boilers		1	2	4	3	10
11 Petroleum Refineries	4			1		5
04 Portland Cement Plants		2	1	1		4
06 Iron and Steel Mills	1	1				2
21 Chemical Process Plants	1	1				2
17 Primary Lead Smelters	1					1
07 Primary Aluminum Plants		1				1
Total	7	6	3	6	3	25

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Categories Selected for Analysis

- **White Papers**
  - Electric Generating Units
  - Industrial/Commercial/ Institutional (ICI) Boilers
  - Cement Kilns
- **BART Engineering Analysis**
  - Industrial/Commercial/ Institutional (ICI) Boilers
  - Cement Kilns
  - Petroleum Refineries
  - Iron & Steel Plants
  - Chemical Plants

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Candidate Control Measures – EGU1 and EGU2

- Designed alternative emission caps that reflect application of clearly reasonable levels of today's best available control technology
- Allow sources to choose compliance options:
  - Controls
  - Fuel switching
  - Purchasing allowances
- Achieve more reductions sooner than proposed CAIR

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Derivation of EGU1

- Reviewed retrofit BACT levels in recent EPA settlement agreements for PSD cases
- Selected a “Retrofit BACT Level” which represents a typical settlement agreement BACT level for a retrofit
  - 0.15 lbs/mmBtu for SO2
  - 0.10 lbs/mmBtu for NOx
- Developed emission caps for 2013 for 5-state MRPO region using above average emission rates and projected 2013 heat input for 5-state region
- Developed interim emission caps for 2008 using:
  - 0.36 lbs/mmBtu for SO2
  - 0.15 lbs/mmBtu for NOx

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Derivation of EGU2

- Reviewed EPA's BACT/LAER Clearinghouse to identify emission rates in recently permitted new sources
- Selected a "BACT Level for New Plants" which represents BACT level for new sources
  - 0.10 lbs/mmBtu for SO2
  - 0.07 lbs/mmBtu for NOx
- Developed emission cap for 2013 using above average emission rates and projected 2013 heat input
- Developed interim emission cap for 2008 using:
  - 0.24 lbs/mmBtu for SO2
  - 0.12 lbs/mmBtu for NOx

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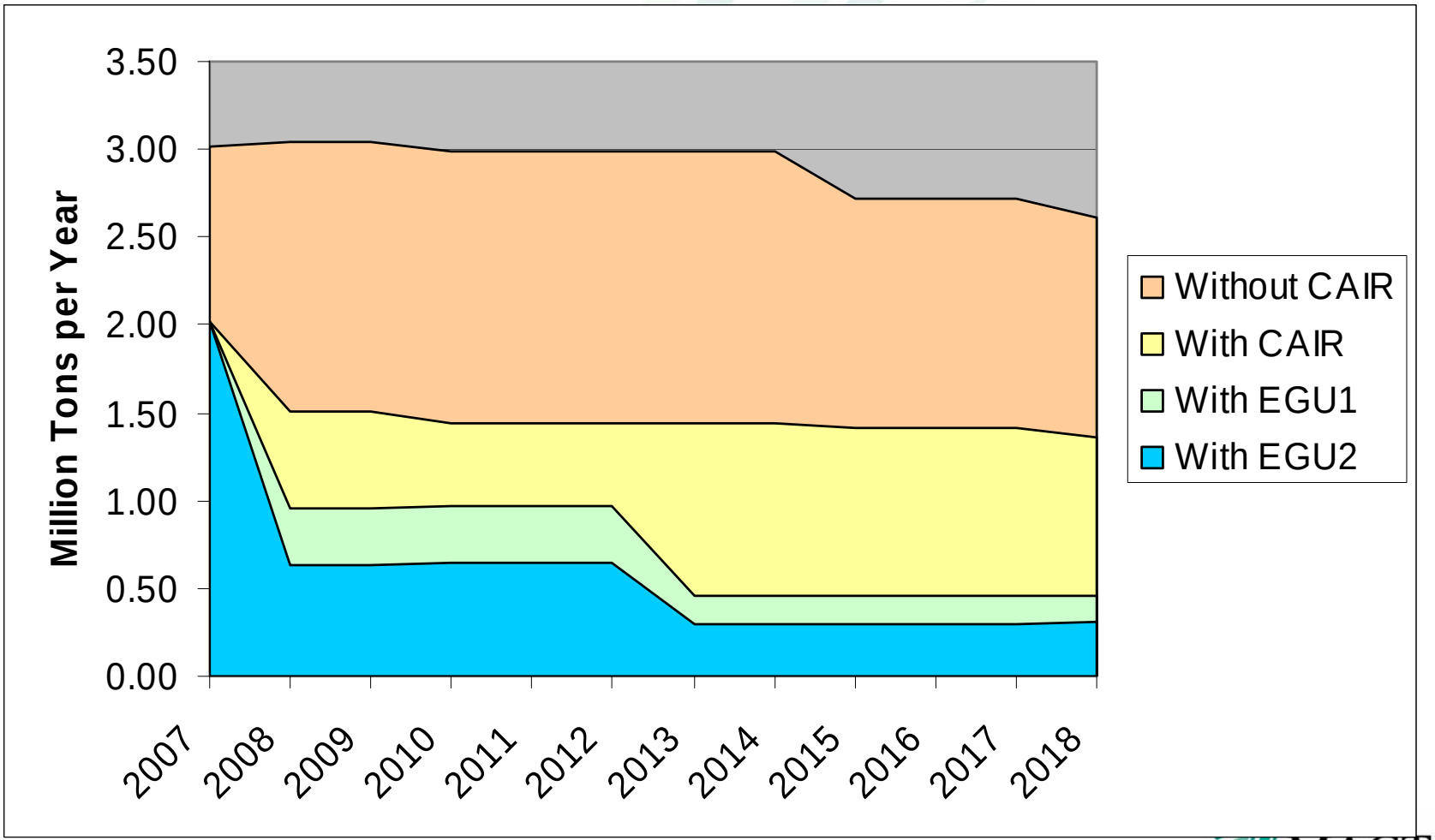
Projected SO2 Reductions from EGU1 and EGU2 In the 5-State MRPO Region



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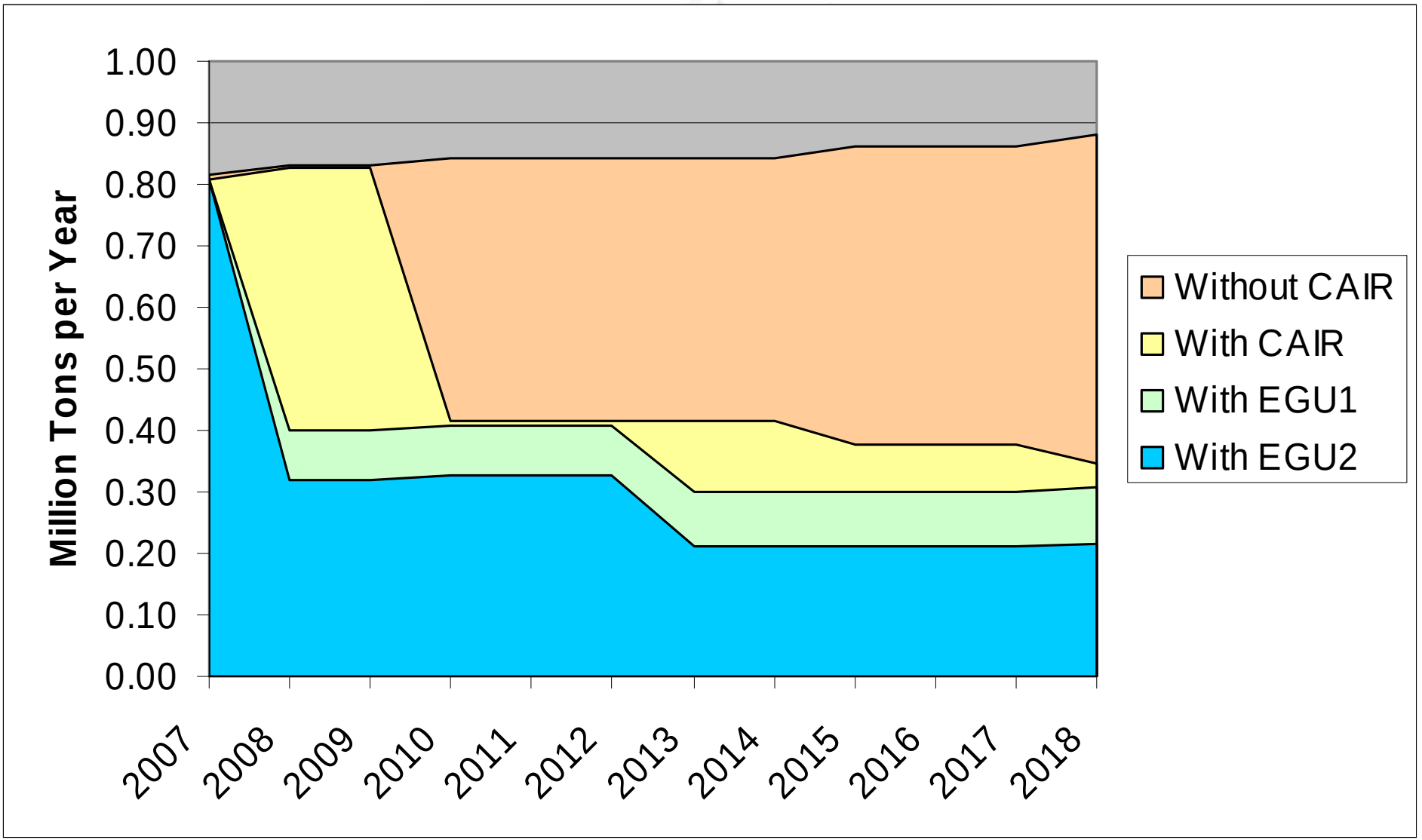
Projected NOx Reductions from EGU1 and EGU2 In the 5-State MRPO Region



Rule Development Issues: How to Implement EGU1 or EGU2?

- National cap-and-trade program
  - More stringent, timely reductions than CAIR
- Regional cap-and-trade program
  - 5 MRPO states only?
  - 13 Midwest Governor's Association member states?
- State-specific caps?
- Others?

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ICI Boiler Candidate Control Measures

- *Measure ICI1 – Apply 60% NOx and 40% SO2 Reduction to All Medium and Large ICI Boilers*
  - Applies to Large (>250 mmBtu/hr) and medium (100-250 mmBtu/hr) ICI boilers
  - NOx - 60% percent reduction which is comparable to the levels used in developing the NOx SIP call budgets (note: no additional controls are applied for boilers already subject to the NOx SIP call).
  - SO2 - 40% percent reduction is achievable using dry sorbent injection-type systems

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ICI Boiler Candidate Control Measures

- *Measure ICI2 – Apply Likely Controls to ICI Boilers Subject to BART Requirements*
  - Applies case-by-case control requirements for those ICI boilers subject to BART
  - NOx - 80 percent reduction for NOx (based on ultra-low NOx burner or SCR technology)
  - SO2 - 90 percent reduction for SO2 (based on a wet or dry FGD systems)

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ICI Boiler Candidate Control Measures

- *Measure ICI3 – Apply 80% NOx and 90% SO2 Reductions (similar to BART) to All Medium and Large ICI Boilers*
  - Applies to Large (>250 mmBtu/hr) and medium (100-250 mmBtu/hr) ICI boilers
  - NOx – 80% percent reduction, which is comparable to the BART level of control (note: incremental reductions are applied for boilers already subject to the NOx SIP call).
  - SO2 – 90% percent reduction based on a wet or dry FGD systems

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Cement Plant Candidate Control Measures

- *Measure KILN1 – Apply Reasonably Available Controls to All Kilns in Region*
  - Applicable to all cement kilns in the MRPO region
  - For NOx, we are assuming that sources could combine mid-kiln firing with low-NOx burners or apply SNCR technologies such as biosolids injection and NOXOUT®. These technologies showed average emission reductions about 50 percent from uncontrolled levels
  - For SO2, we are assuming that sources could reduce SO2 emissions by 90 percent using wet FGD systems

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Cement Plant Candidate Control Measures

- *Measure KILN2 – Apply Likely Controls to Cement Kilns Subject to BART Requirements*
  - Applies case-by-case control requirements for those Cement kilns subject to BART
  - Only nine of the 26 kilns in the region appear to be subject to BART
  - NOx - 80 percent reduction for NOx (based on SCR technology)
  - SO2 - 95 percent reduction for SO2 (based on a wet FGD systems)

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Other Point Source NOx/SO2 Candidate Control Measures

- *Measure REF1 – Apply likely controls (90% SO2 and 80% NOx Reduction) to boilers/heaters and process units subject to the proposed BART requirements*
- *Measure I&S1 - Apply likely controls to sources subject to the proposed BART requirements*
- *Measure CHEM1 - Apply likely controls (90% SO2 and 80% NOx Reduction) to chemical plant boilers subject to the proposed BART requirements*

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Category	ID	Description
Electric Generating Units	EGU1	Adopt emission caps based on “Retrofit BACT Level” of 0.15 lbs/mmBtu for SO2 and 0.10 lbs/mmBtu for NOx
	EGU2	Adopt emission caps based on “BACT Level for New Plants” of 0.10 lbs/mmBtu for SO2 and 0.07 lbs/mmBtu for NOx
ICI Boilers	ICI1	Apply 40% SO2 and 60% NOx reduction to all medium and large ICI boilers
	ICI2	Apply Likely Controls (90% SO2 and 80% NOx Reduction) to ICI Boilers subject to the proposed BART requirements
	ICI3	Apply 90% SO2 and 80% NOx reduction (similar to BART) to all medium and large ICI boilers
Petroleum Refineries*	REF1	Apply likely controls (90% SO2 and 80% NOx Reduction) to sources subject to the proposed BART requirements
Iron and Steel Plants*	I&S1	Apply likely controls to sources subject to the proposed BART requirements
Portland Cement Plants	KILN1	Apply reasonably available controls (90% SO2 and 50% NOx reduction) to all cement kilns in the region
	KILN2	Apply likely controls (95% SO2 and 80% NOx reduction) to kilns subject to the proposed BART requirements
Chemical Plants*	CHEM1	Apply likely controls (90% SO2 and 80% NOx Reduction) to chemical plant boilers subject to the proposed BART requirements

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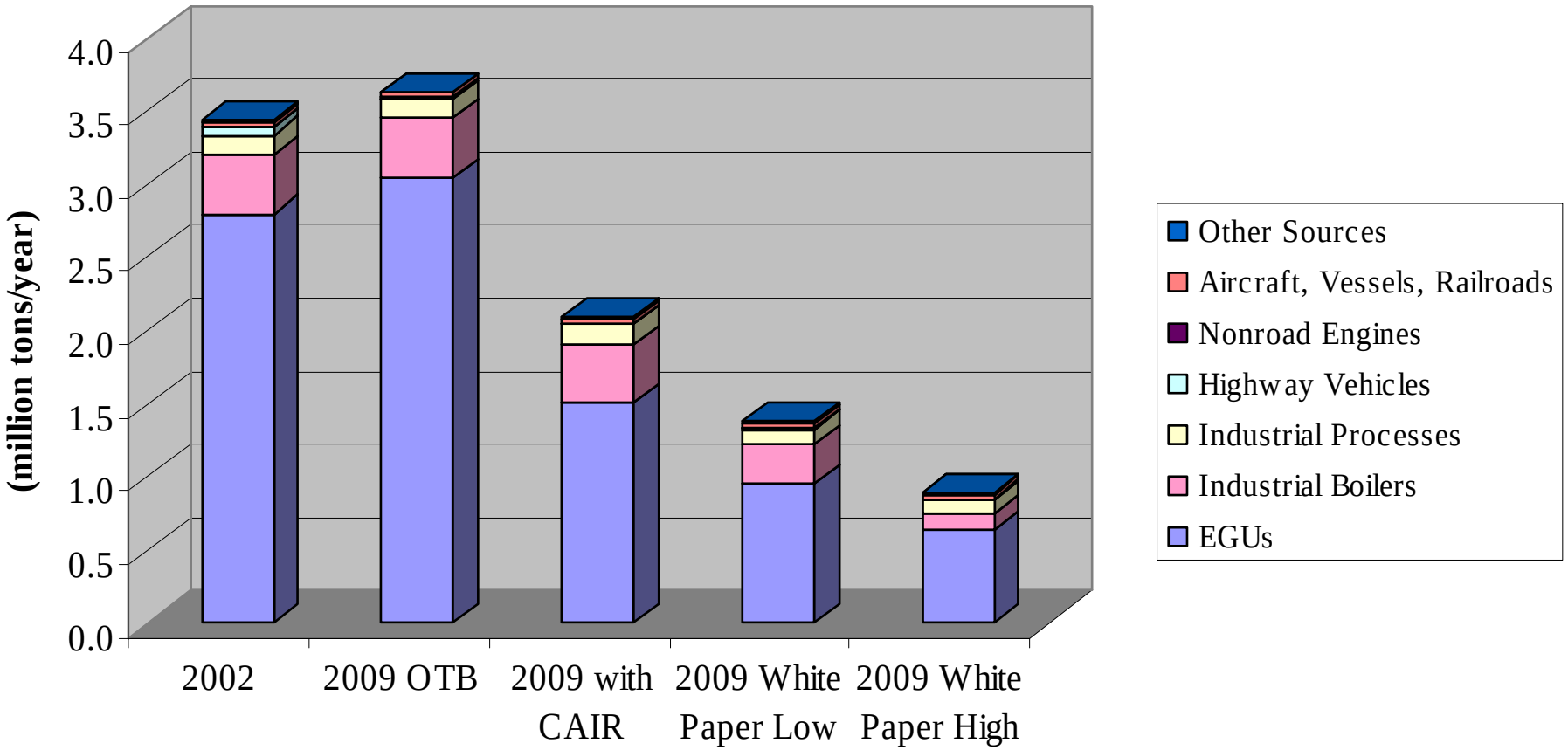
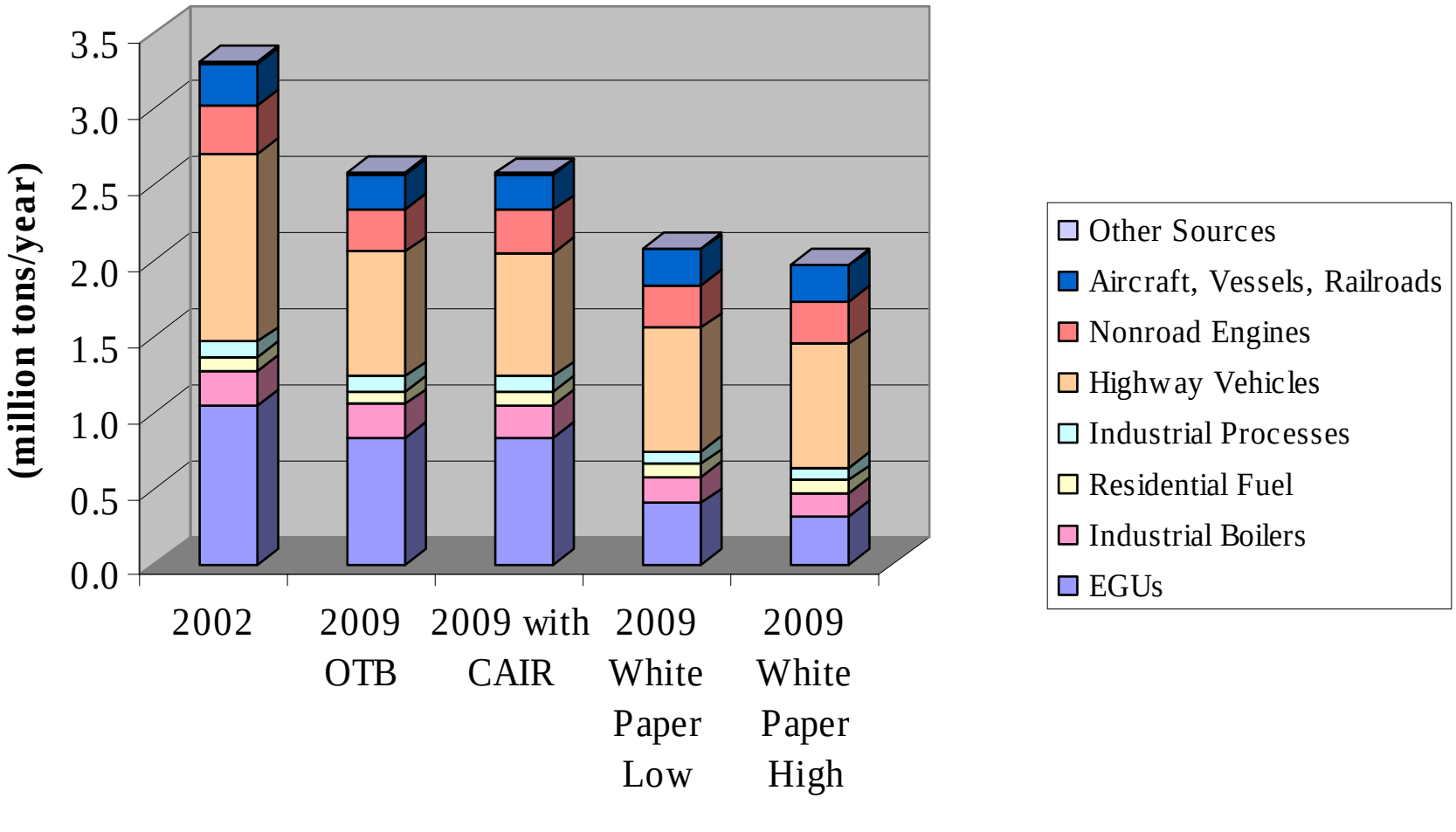
Projected SO2 Emissions with Candidate Control Measures



Projected NOx Emissions with Candidate Control Measures



Next Steps

- Updated IPM Modeling of EGU Strategies
- Summer (and beyond): Further Refinements Based on Feedback and Updated Results from IPM and AQ Modeling
- Phase II Candidate Control Measures Project
  - Update existing White Papers
    - *Final CAIR*
    - *Final BART Guidelines*
  - Possibly develop new White Papers for point source SO2/NOx
  - SO2/NOx controls for onroad/noroad sources
  - PM/NH3 and other pollutant controls

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