

An Analysis of Progress toward MANE-VU's Long-Term Strategy, Emphasizing Key EGU Sources

MANE-VU Meeting

September 15th 2011 – Manchester Village, Vermont

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Outline

1. MANE-VU'S Long-Term Strategy
2. Emission reductions at key sources
 - Regional analysis
 - Virginia example
3. Visibility Improvement
4. Conclusions

Second MANE-VU Interim Report

- Summarizes MANE-VU Analysis and Strategy
- Provides current information on BART Determinations
- Reports progress in visibility improvement
 - Based on IMPROVE report
- Next we will be reviewing emissions trends

MANE-VU Long Term Strategy

- Three parts
 - a) Pursue controls within MANE-VU
 - b) Ask other states to do their part
 - c) Ask EPA to strengthen CAIR

a. Controls within MANE-VU

- Timely Implementation of BART
- Low Sulfur Fuel Oil Strategy phase in
 - Inner Zone - NY, NJ, DE, Portions of PA
 - Outer Zone – Remainder of MANE VU
- Reduce SO2 by 90% from key EGU stacks or equivalent measures by 2018
- Continued evaluation of other measures

b. Asked of other states

- Timely implementation of BART
- Reduce SO₂ by 90% from key EGU stacks or equivalent measures by 2018
- 28% reduction in SO₂ emission from non-EGU sources such as boilers and sources burning heating oil
- Continued evaluation of other measures

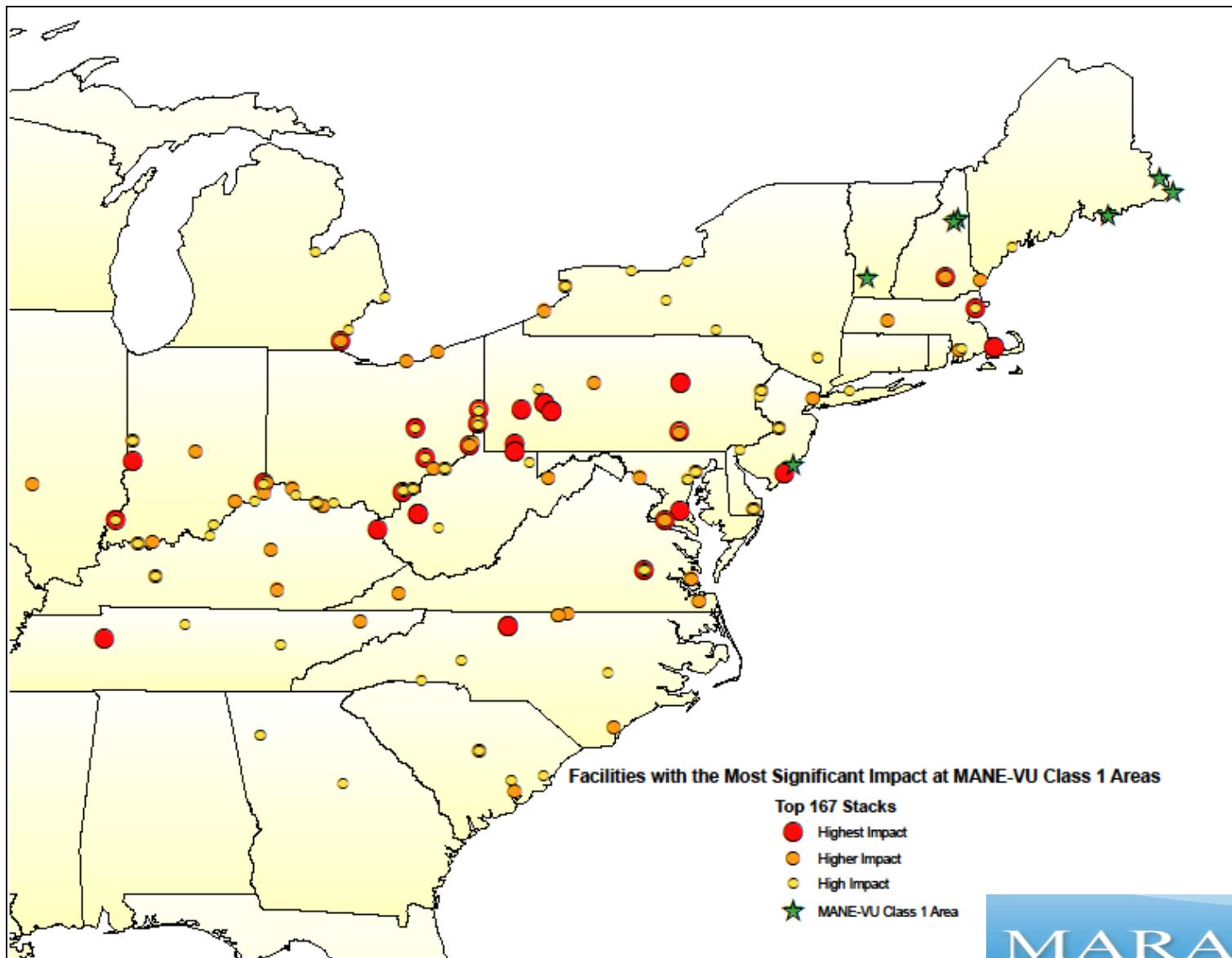
c. Asked of EPA

- Work with the eastern RPOs to develop a proposal to tighten SO2 emissions controls beyond CAIR
 - Achieve an additional 18% reduction in SO2 emissions by 2018

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Key EGUs Impairing Visibility in MANE-VU in 2002



The Goal of this Analysis

- Determine the changes in actual emissions since 2002 from the 167 stacks
- Review predicted emissions based on
 - MANE-VU modeling inventory
 - Cross State Air Pollution Rule (CSAPR)
- Will a 90% or greater reduction in SO₂ emissions be achieved?

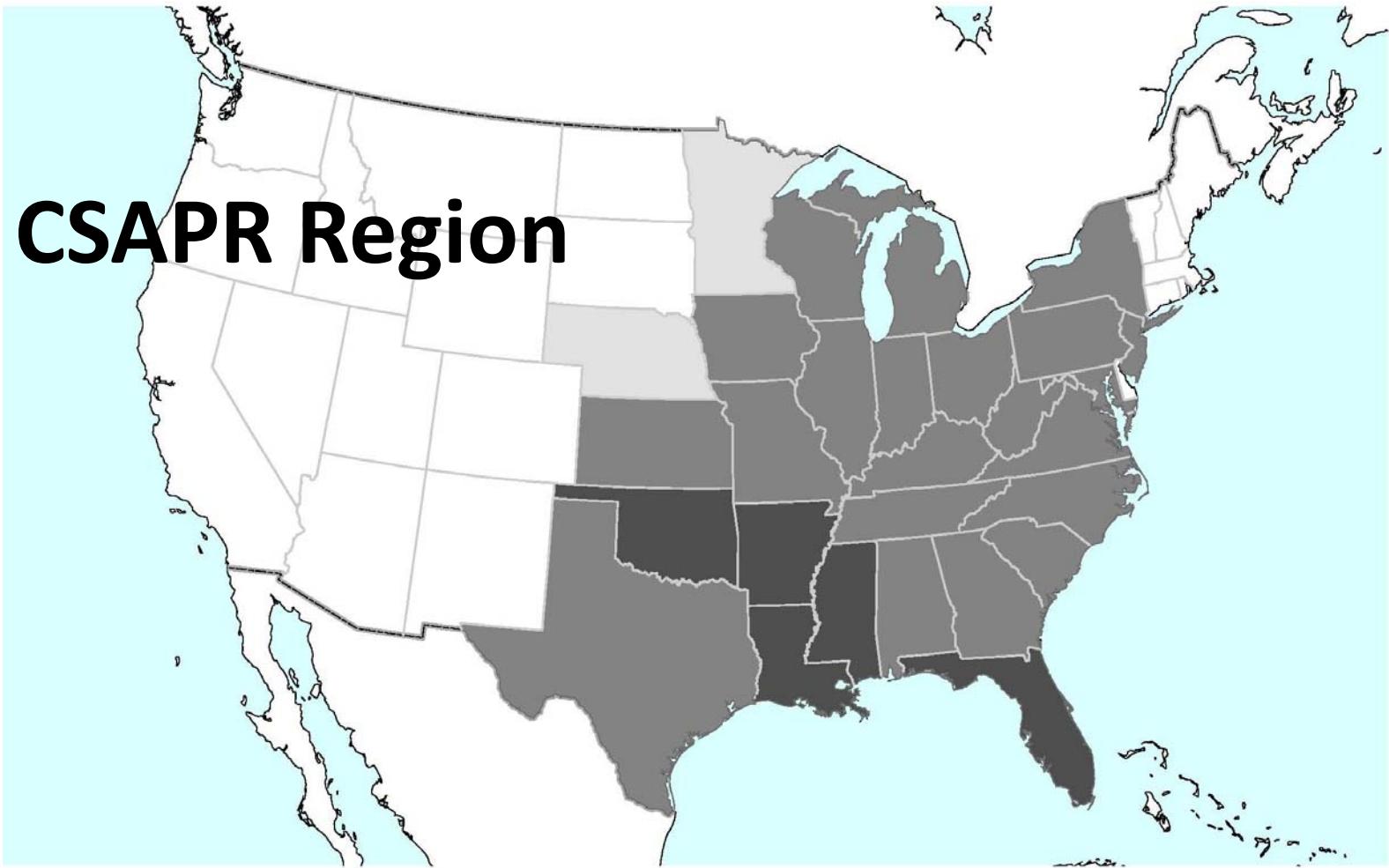
Emissions Data Reviewed

- NOx, SOx and CO₂ emissions
- CO₂ is a surrogate for Heat Input

Emissions Data Sources

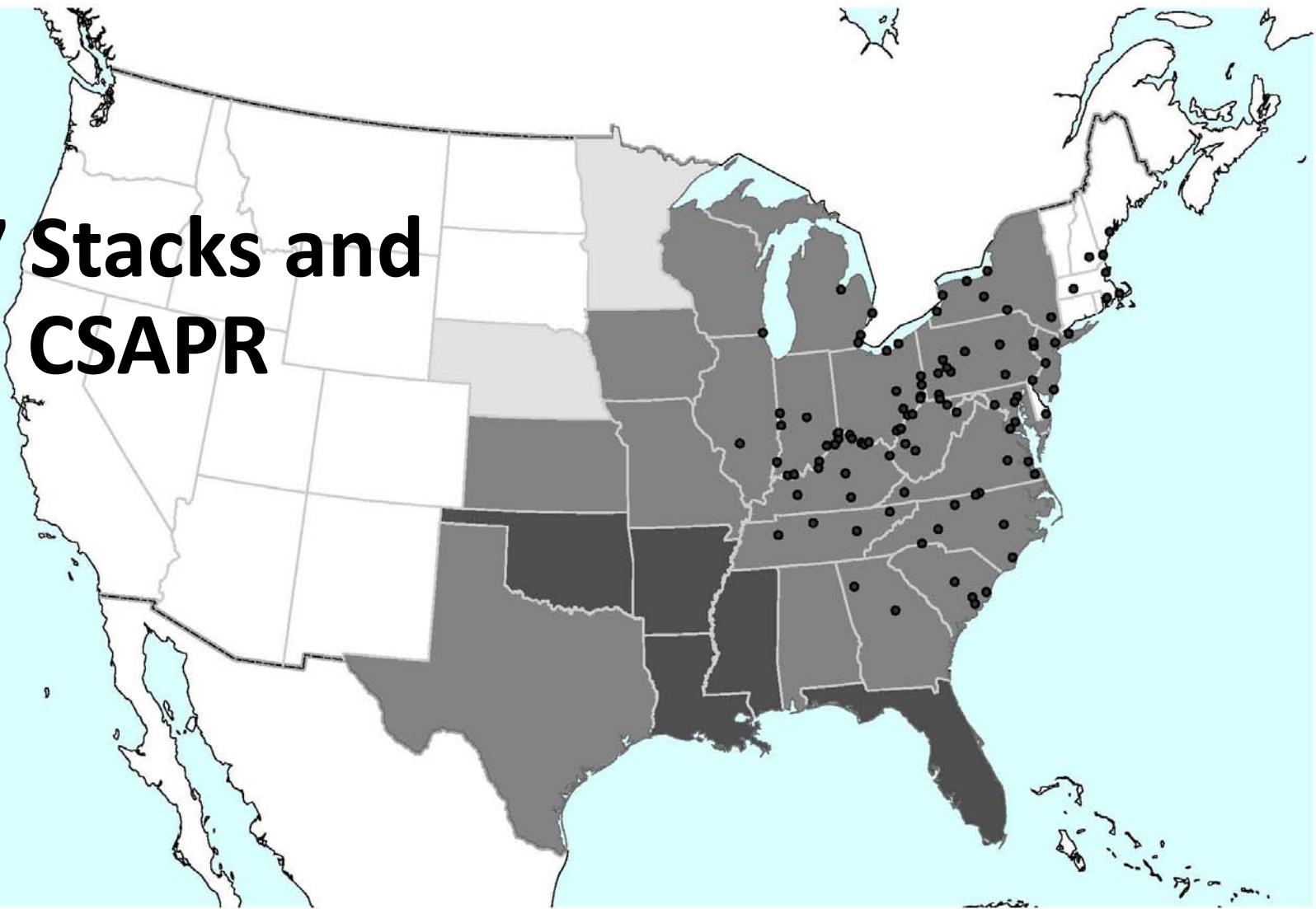
- Data Base Created for 167 Stacks (263 units)
 1. Actual emissions for **2002**, **2007**, and **2010** – EPA CAMD
 2. Modeled emissions for **2018** – MANE-VU modeling inventory
 3. Allocations for **2012** and **2014** – CSAPR
 4. Calculated 90% reduction **goal** from 2002 emissions

CSAPR Region



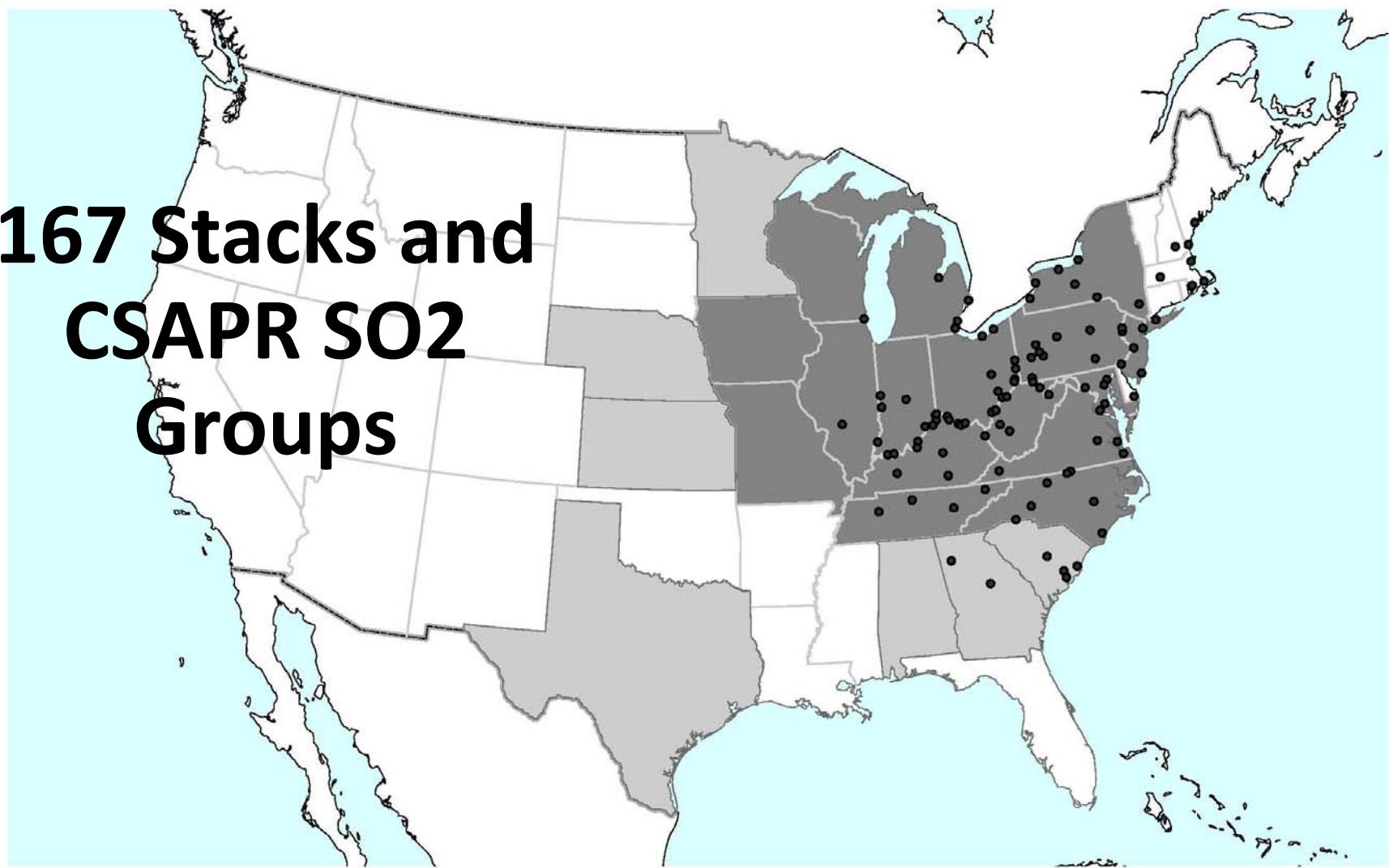
- Not Covered by CSAPR
- Fine Particles Only (Annual NOx and SOx)
- Fine Particles (Annual NOx and SOx) and Ozone (Ozone Season NOx)
- Ozone Only (Ozone Season NOx)

167 Stacks and CSAPR



- Top 167 Stacks
- | | |
|---|--|
| □ | Not Covered by CSAPR |
| □ | Fine Particles Only (Annual NOx and SOx) |
| ■ | Fine Particles (Annual NOx and SOx) and Ozone (Ozone Season NOx) |
| ■ | Ozone Only (Ozone Season NOx) |

167 Stacks and CSAPR SO₂ Groups

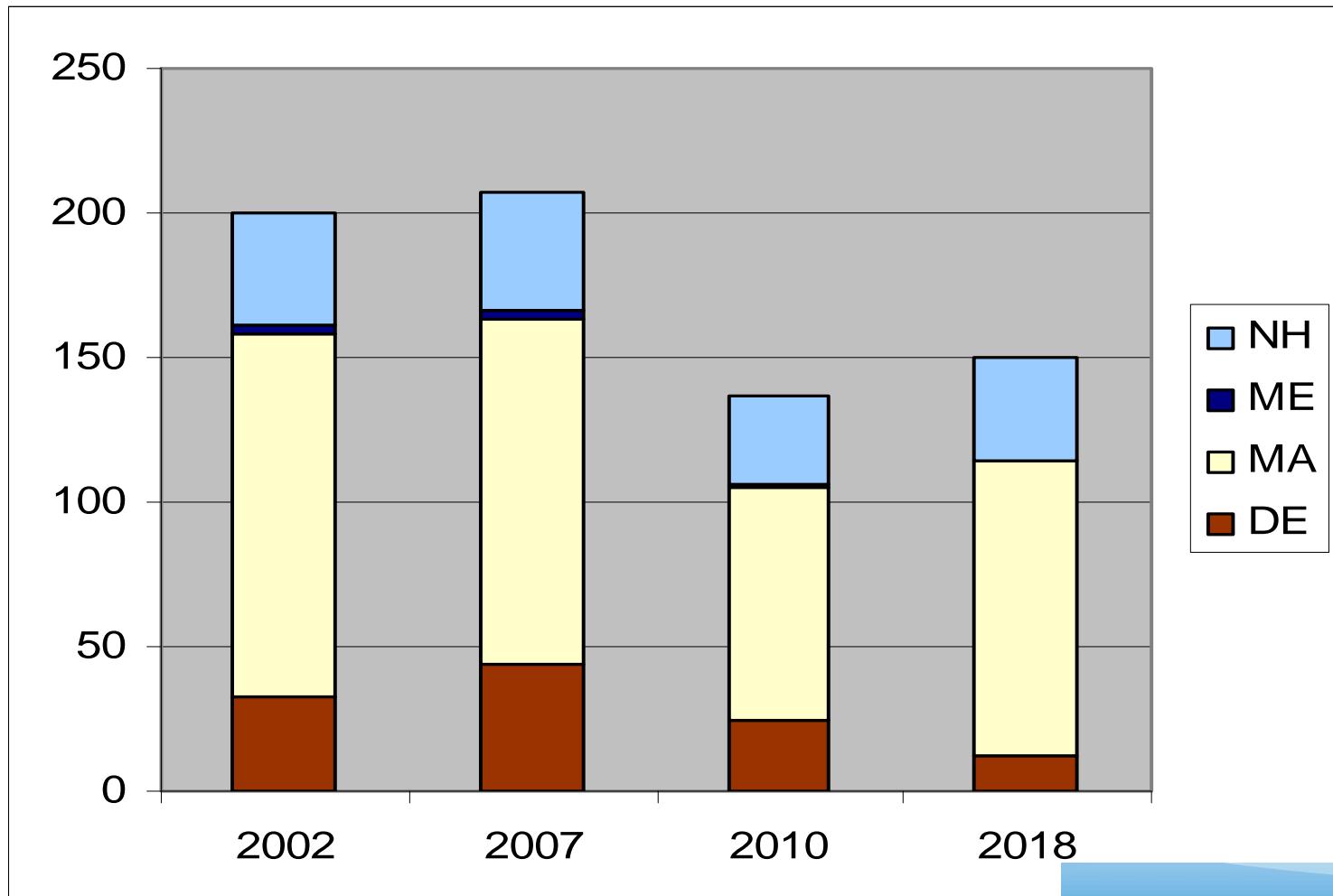


- Top 167 Stacks
- SO₂ Group 1
- SO₂ Group 2

Data Quality Control

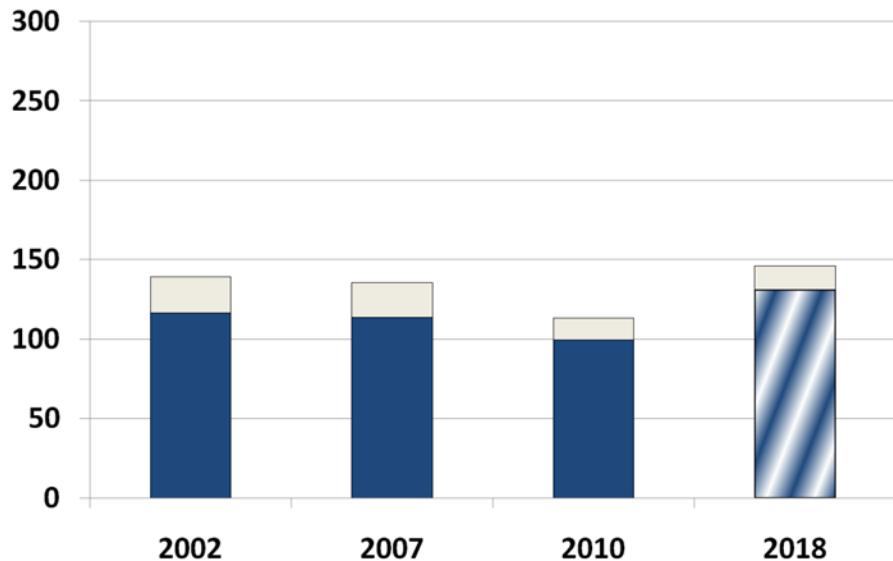
- Units not included in CSAPR
 - Assumed 2012 and 2014 emissions same as 2002
- Determine reasons for other missing data
 - Closures
 - Temporary Retirements

CO₂ from Key EGU Sources in MANE-VU States not in CSAPR



CO2 Emissions 167 Stacks

MANE-VU



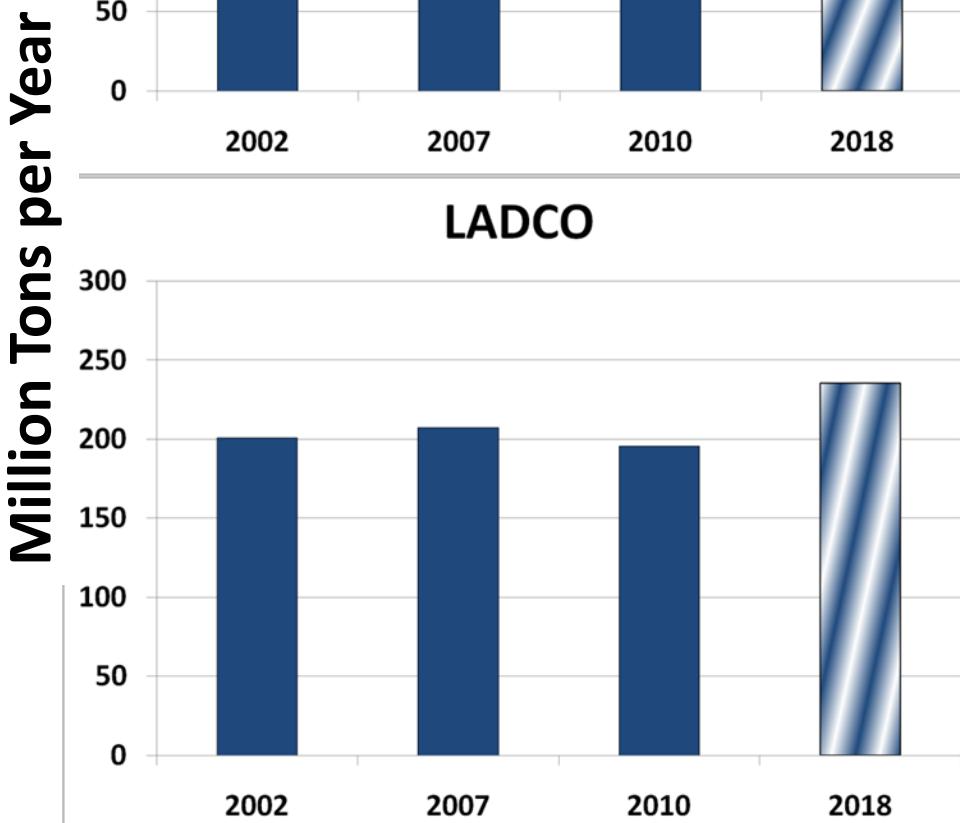
- CAMD Data

- 2018 Projection Data

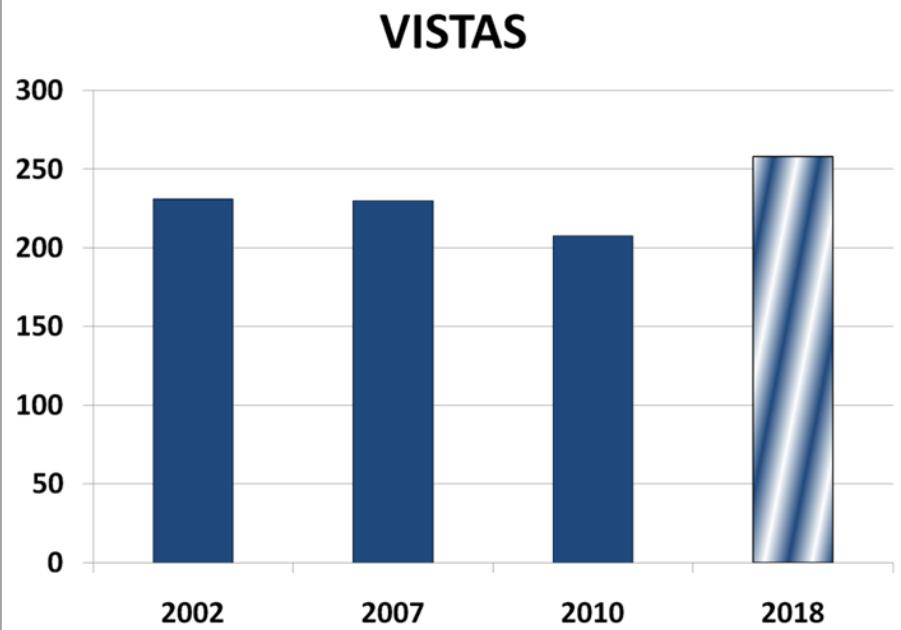
- Units not included in CSAPR

Preliminary – Need feedback
from other regions

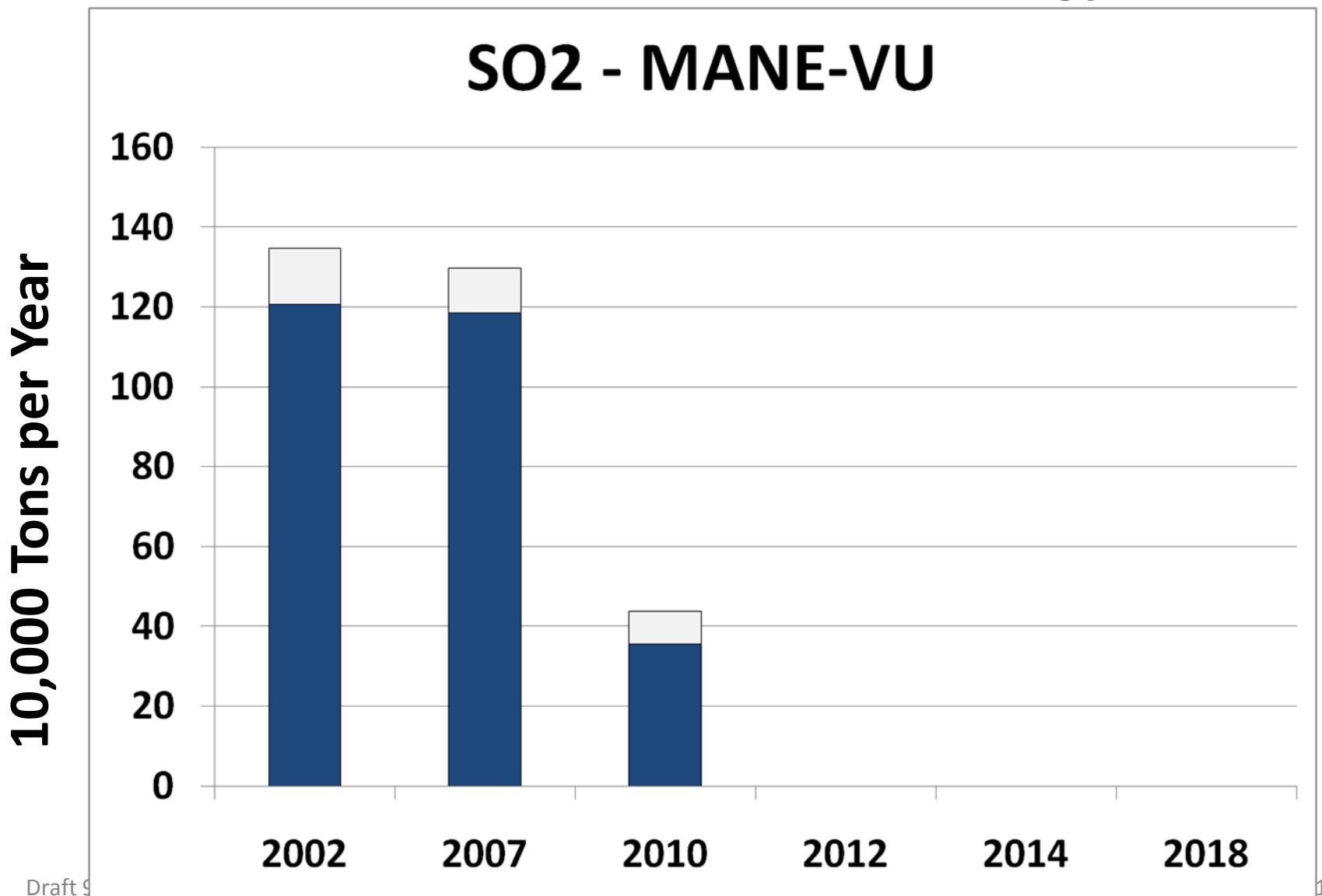
LADCO



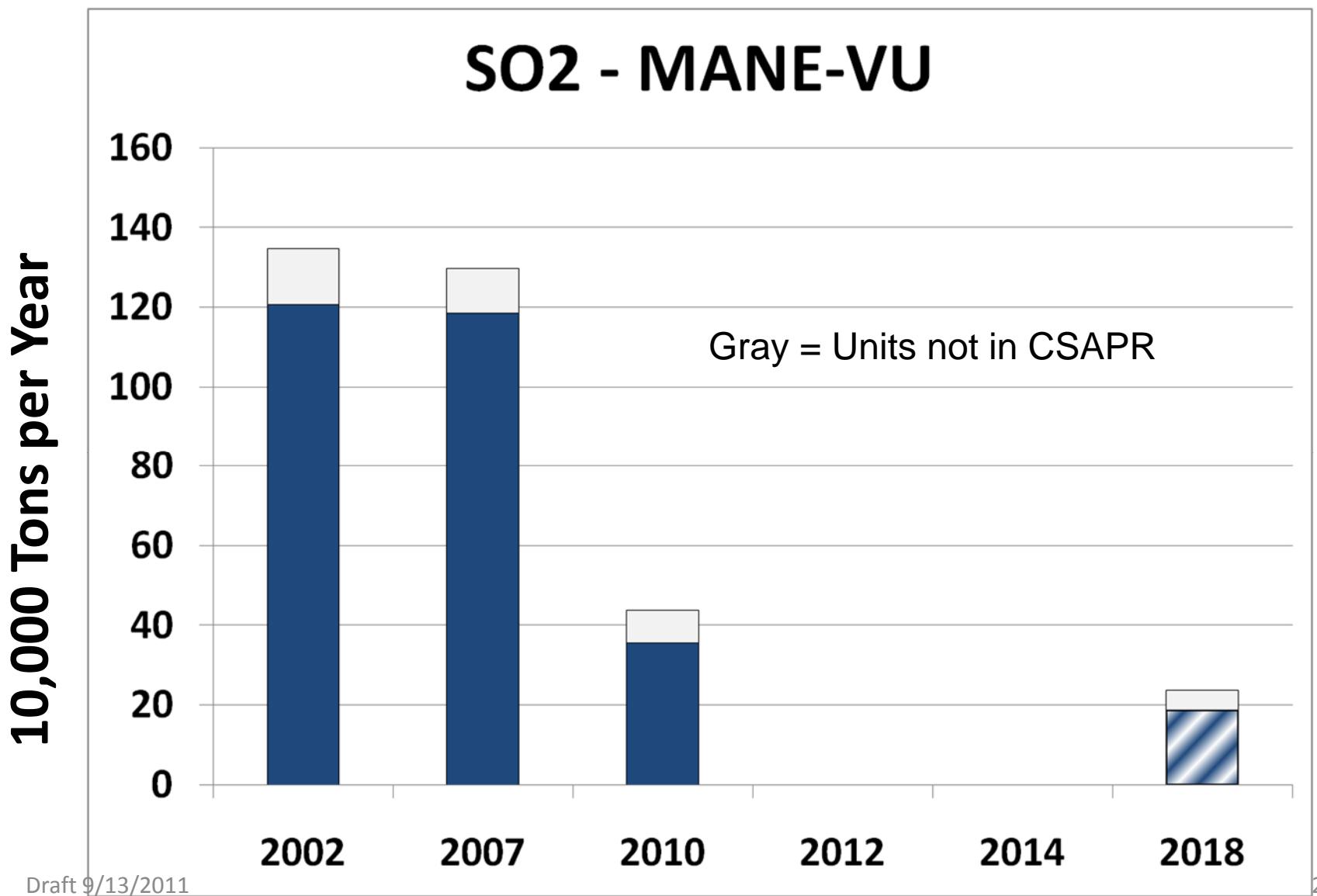
VISTAS



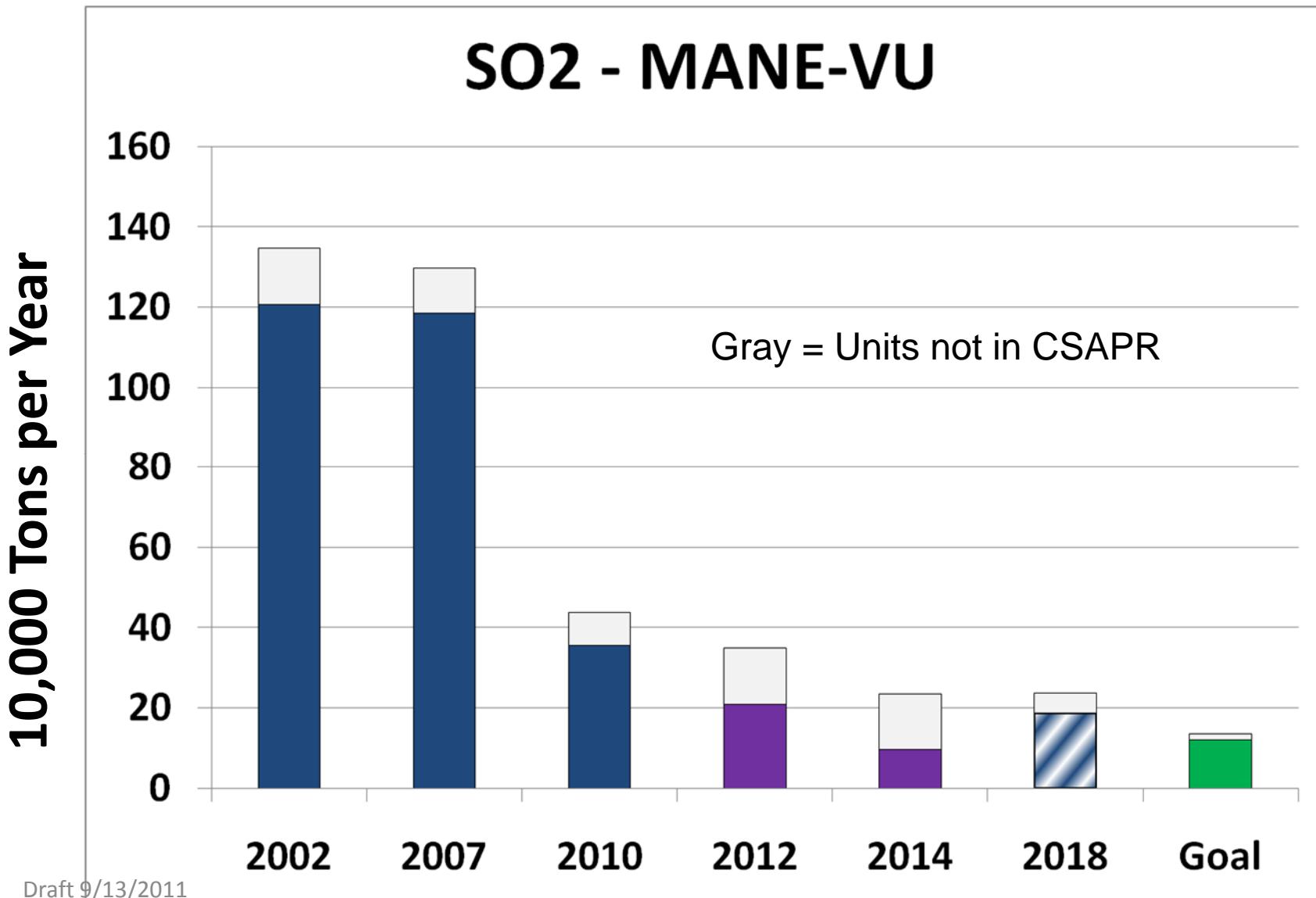
Step 1: CAMD Data for years 2002, 2007 and 2010 for units included in 167 Stack strategy



Step 2: Projection data for 2018 for 167 stacks

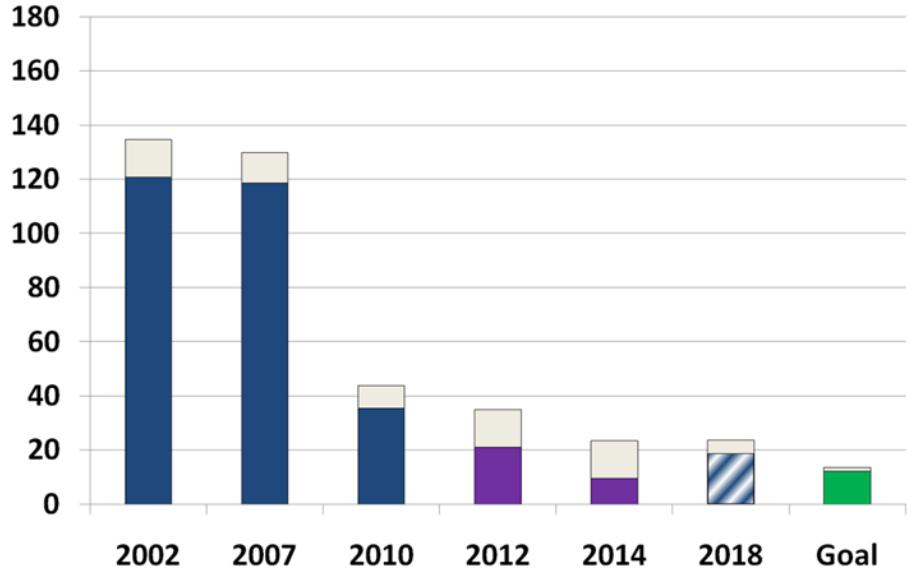


Step 3: CSAPR allocations for 2012 and 2014 and 90% Reduction Goal for 167 stacks



SOx Emissions for 167 Stacks

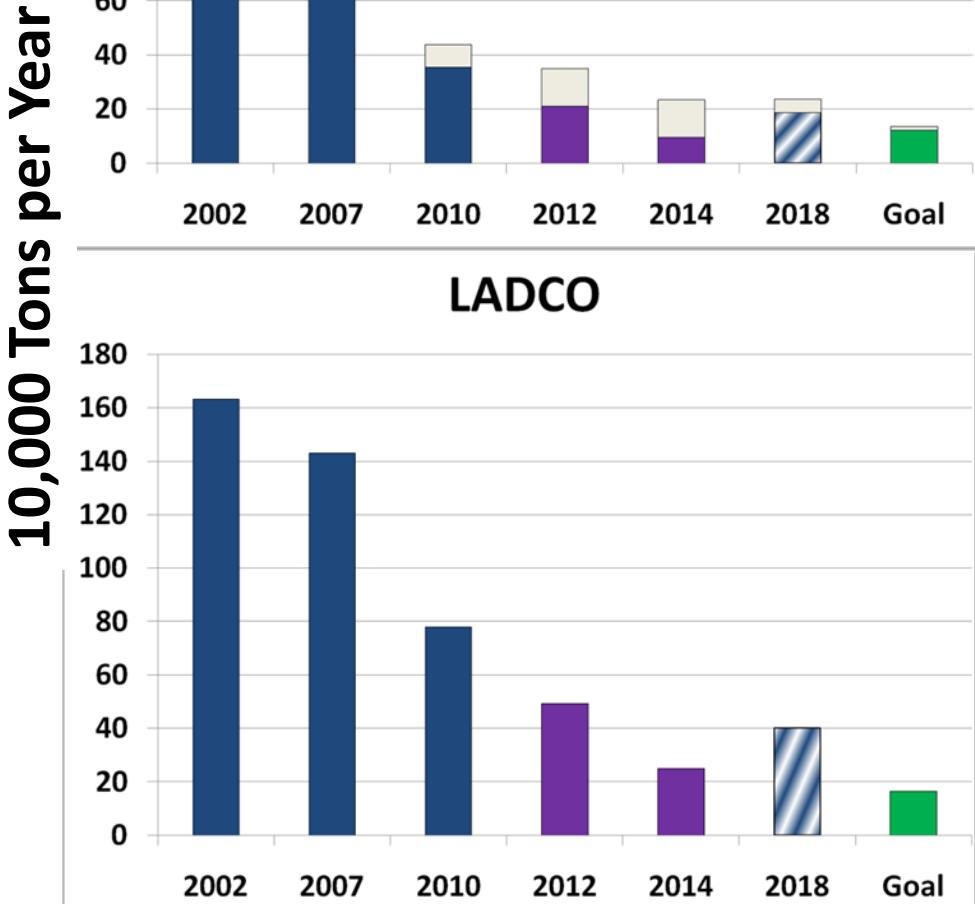
MANE-VU



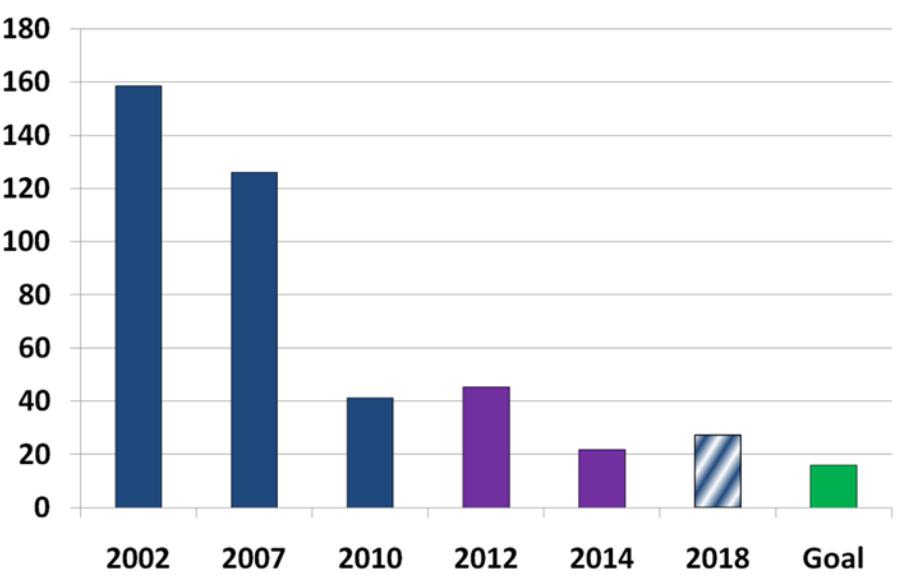
- CAMD Data
- CSAPR Allocations Data
- 2018 Projection Data
- Units not included in CSAPR
- 90% Reduction of 2002 SO2 emissions

Preliminary – Need feedback
from other regions

LADCO

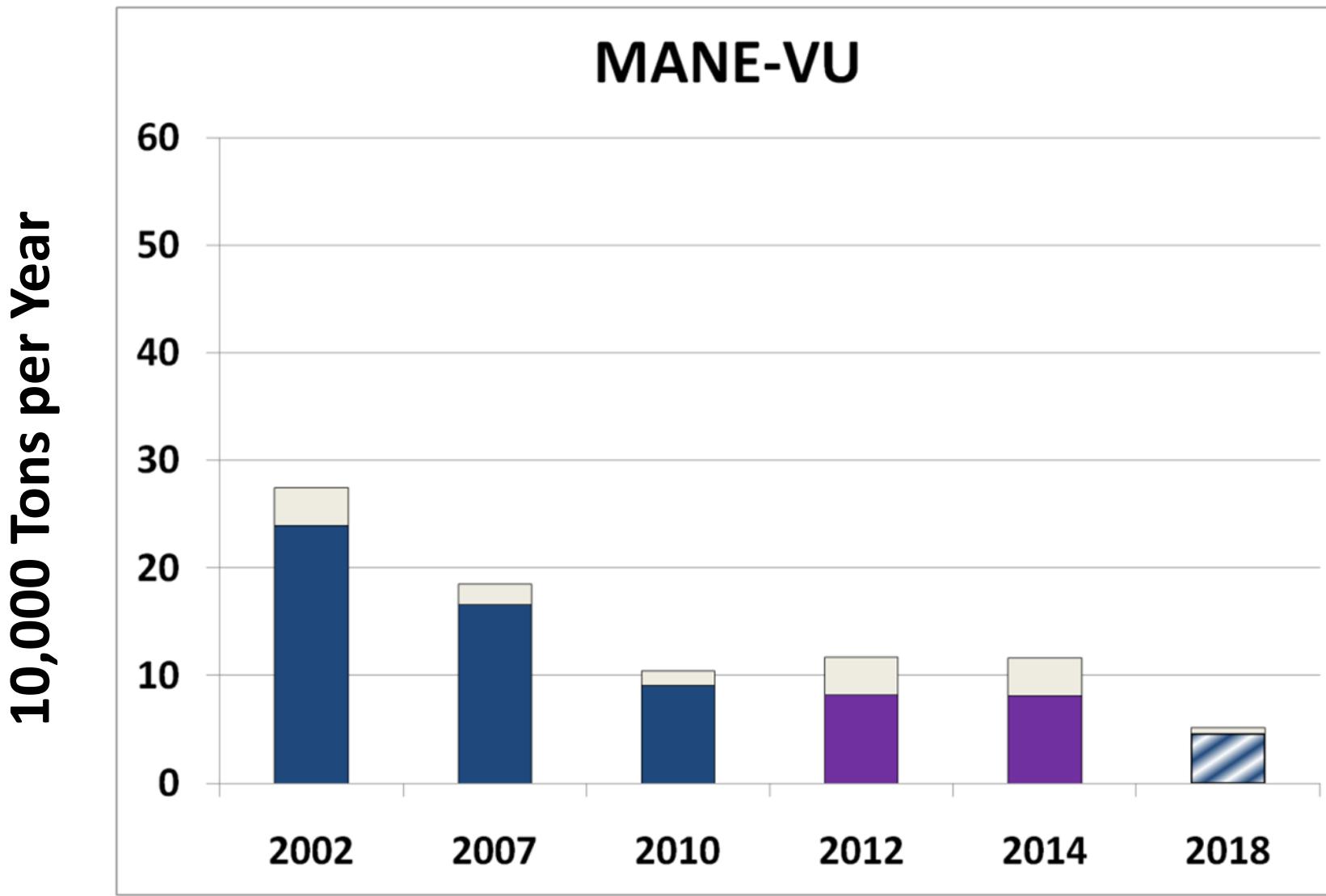


VISTAS



NOX – MANE-VU Units in 167 Stacks

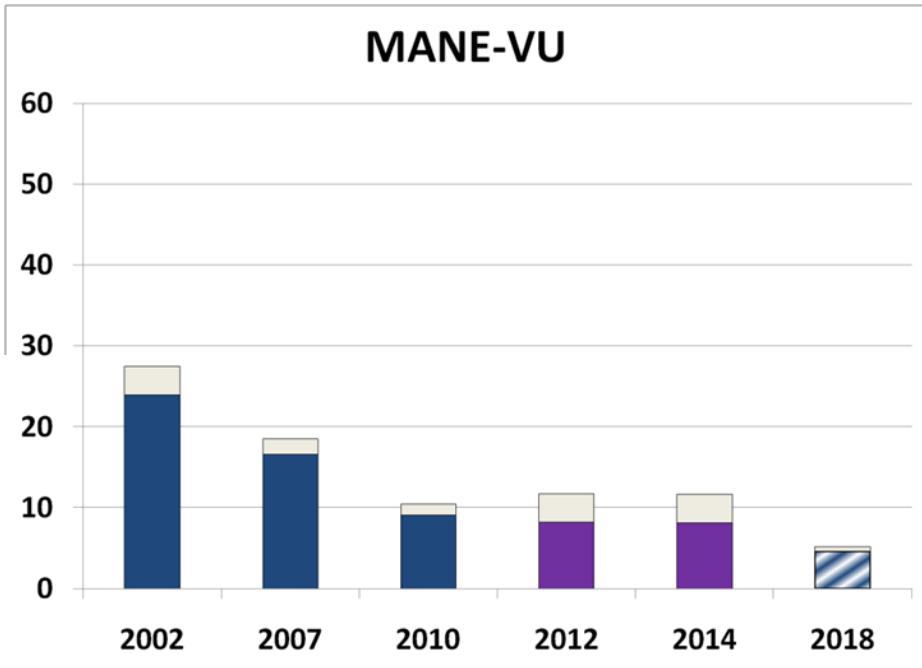
CSAPR allocations for 2012 and 2014



NOx Emissions for 167 Stacks

MANE-VU

10,000 Tons per Year



- CAMD Data

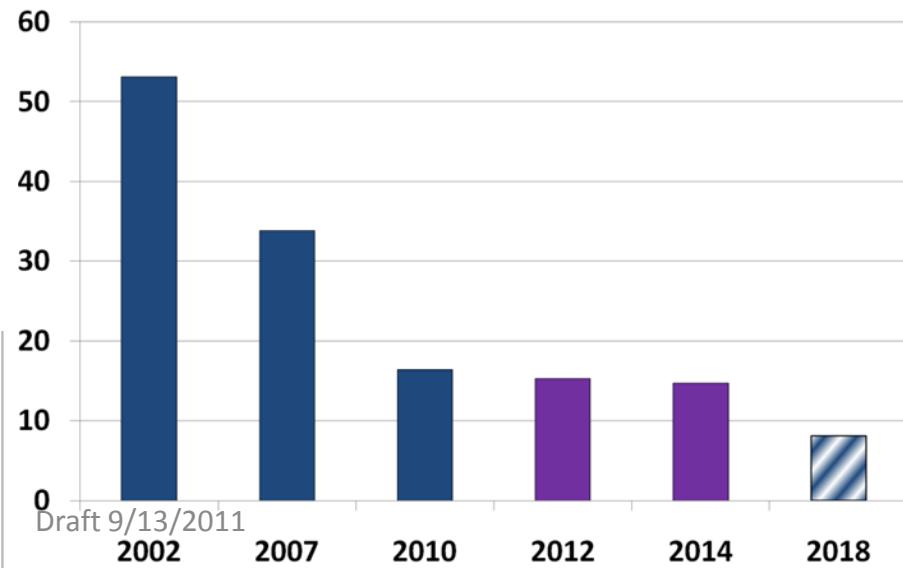
- CSAPR Allocations Data

- 2018 Projection Data

- Units not included in CSAPR

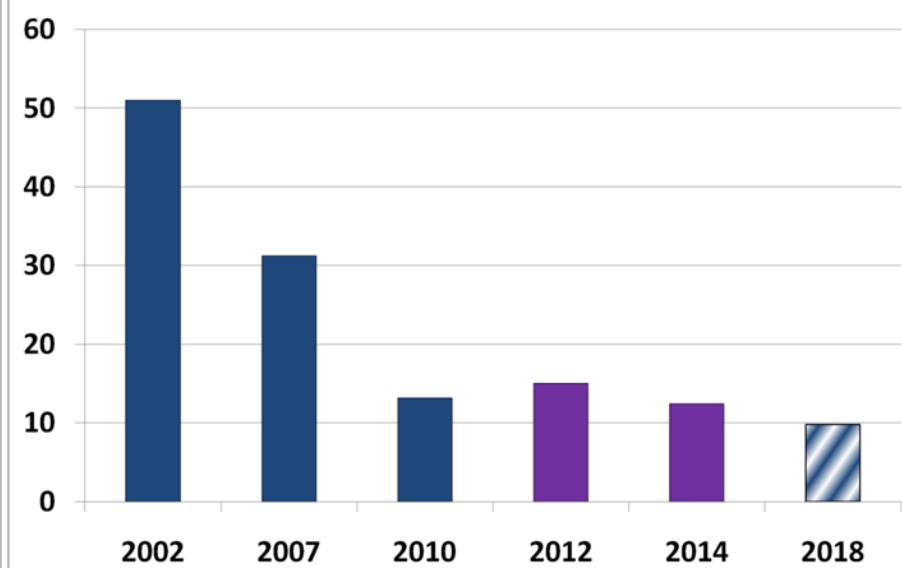
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LADCO



Draft 9/13/2011

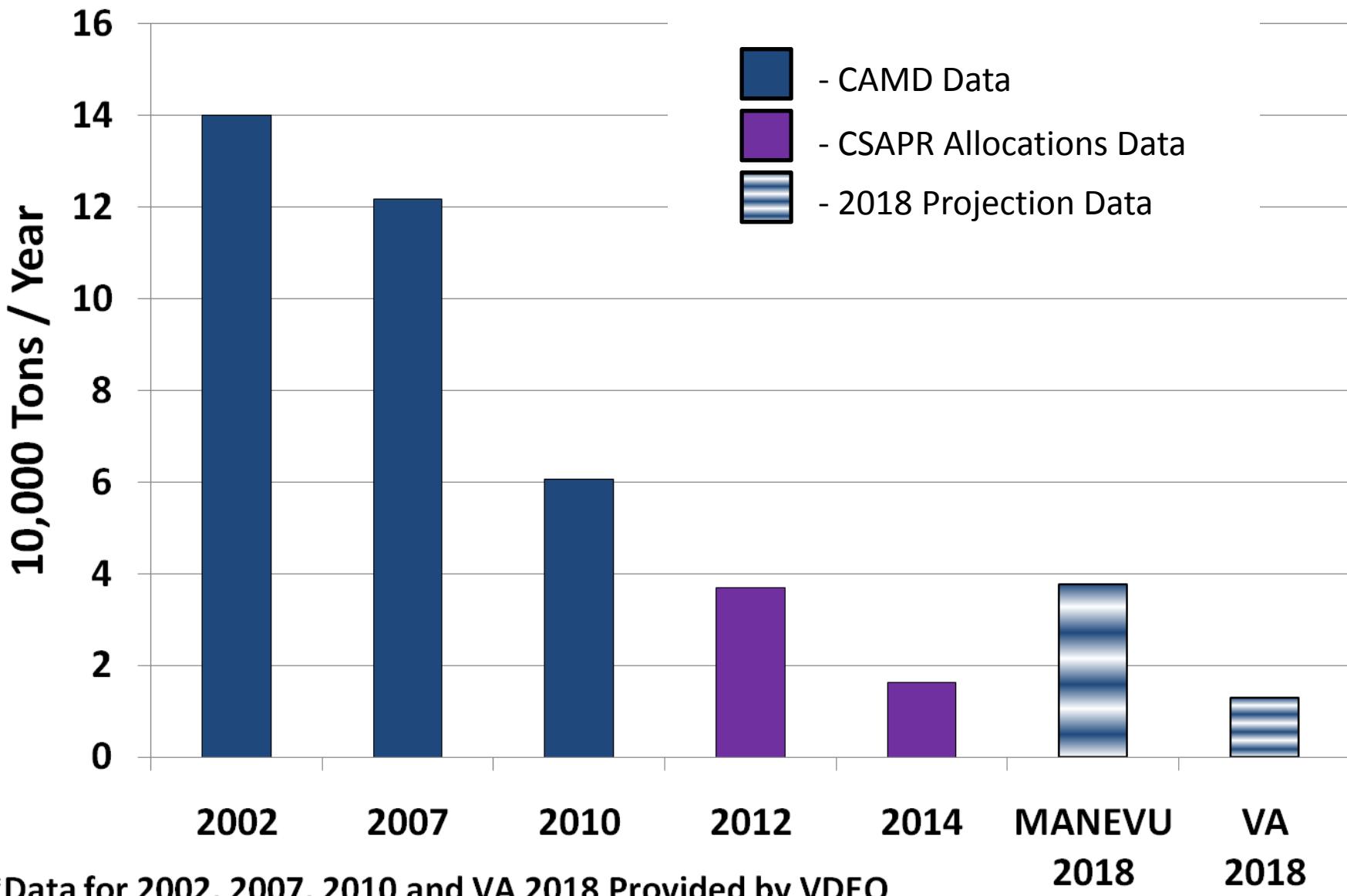
VISTAS



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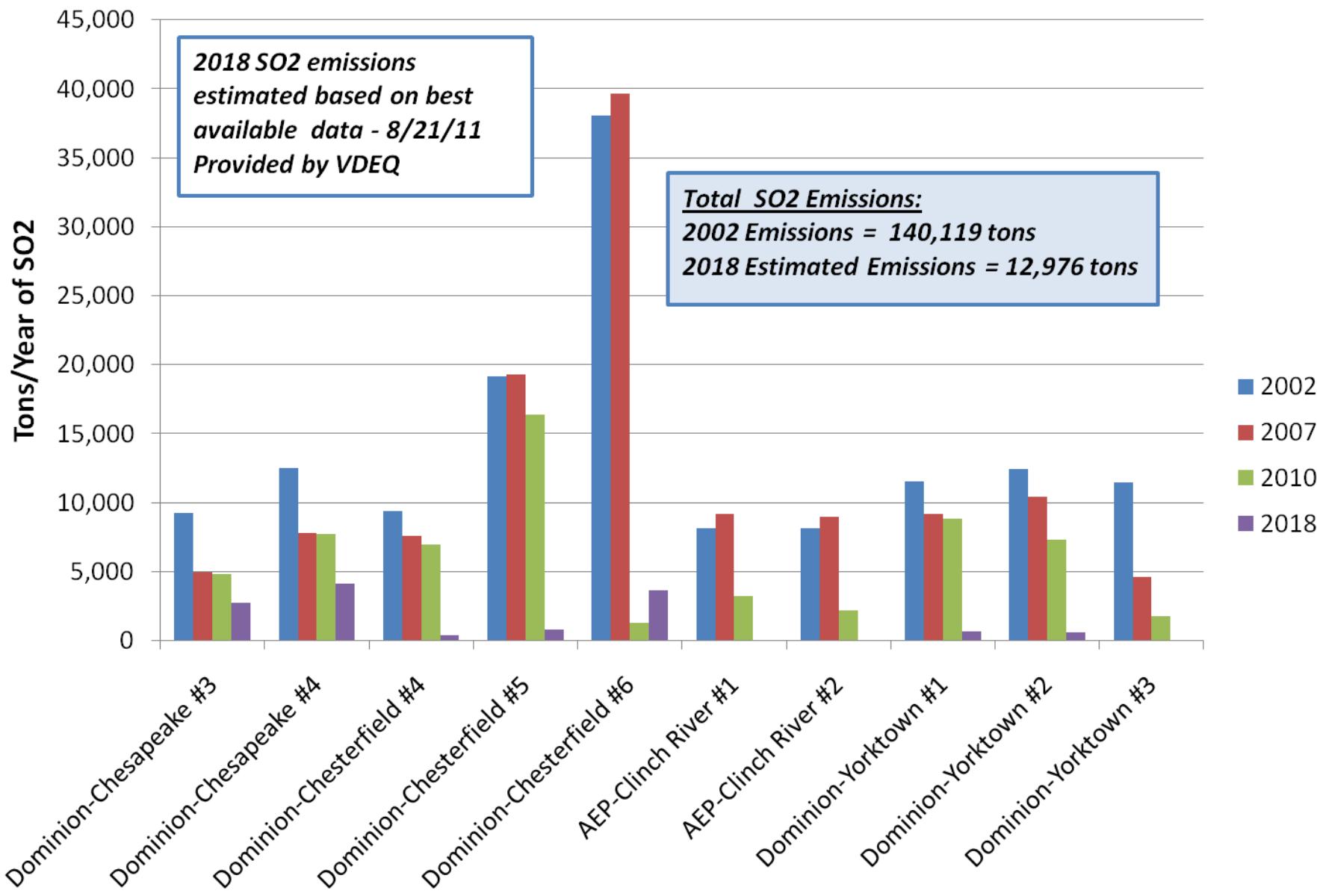
1. MANE-VU'S Long-Term Strategy
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 - **Virginia example**
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SO₂ from Key EGUs in Virginia

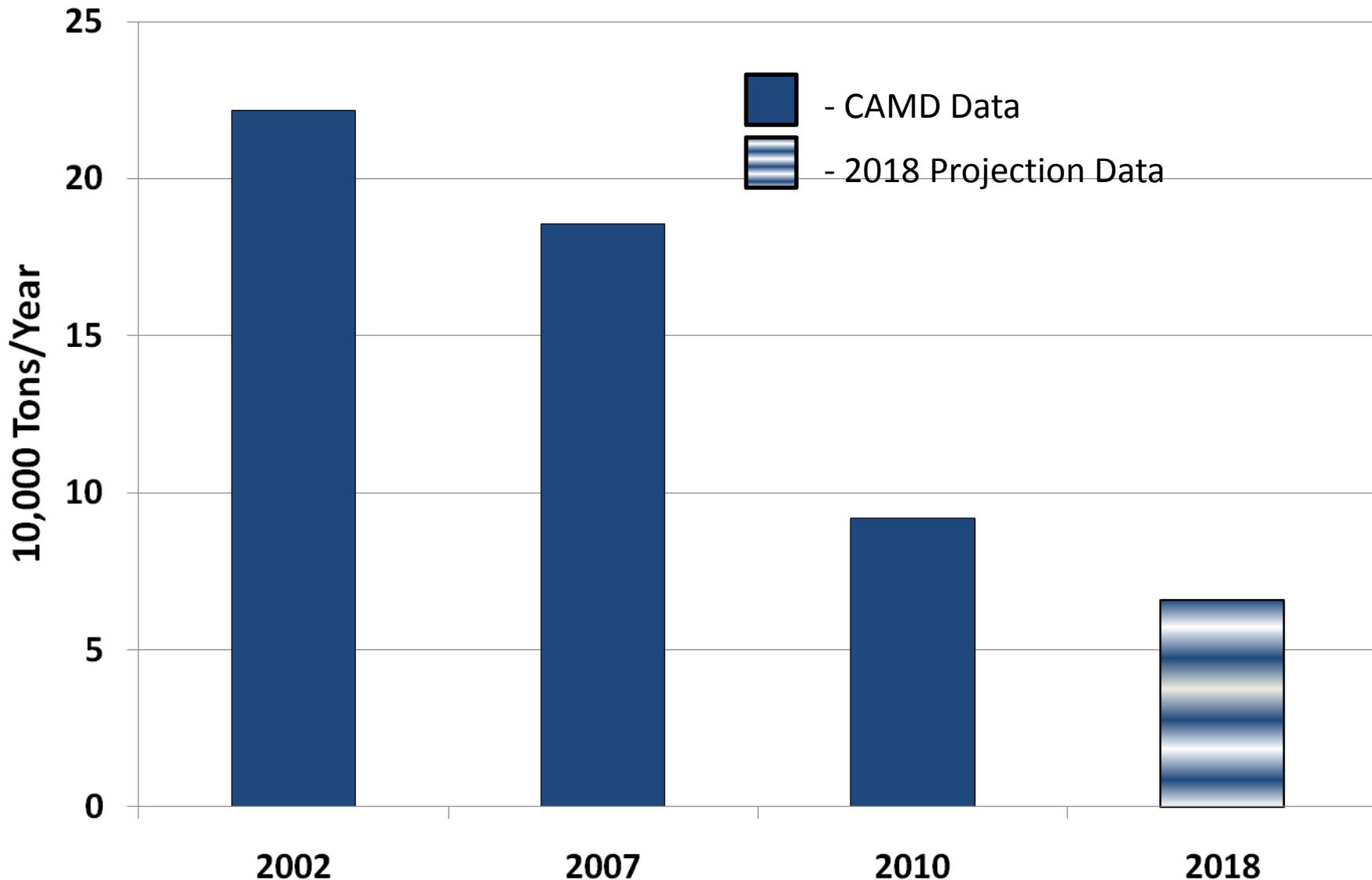


*Data for 2002, 2007, 2010 and VA 2018 Provided by VDEQ

Virginia Units in the 167 MANE-VU Key EGUs

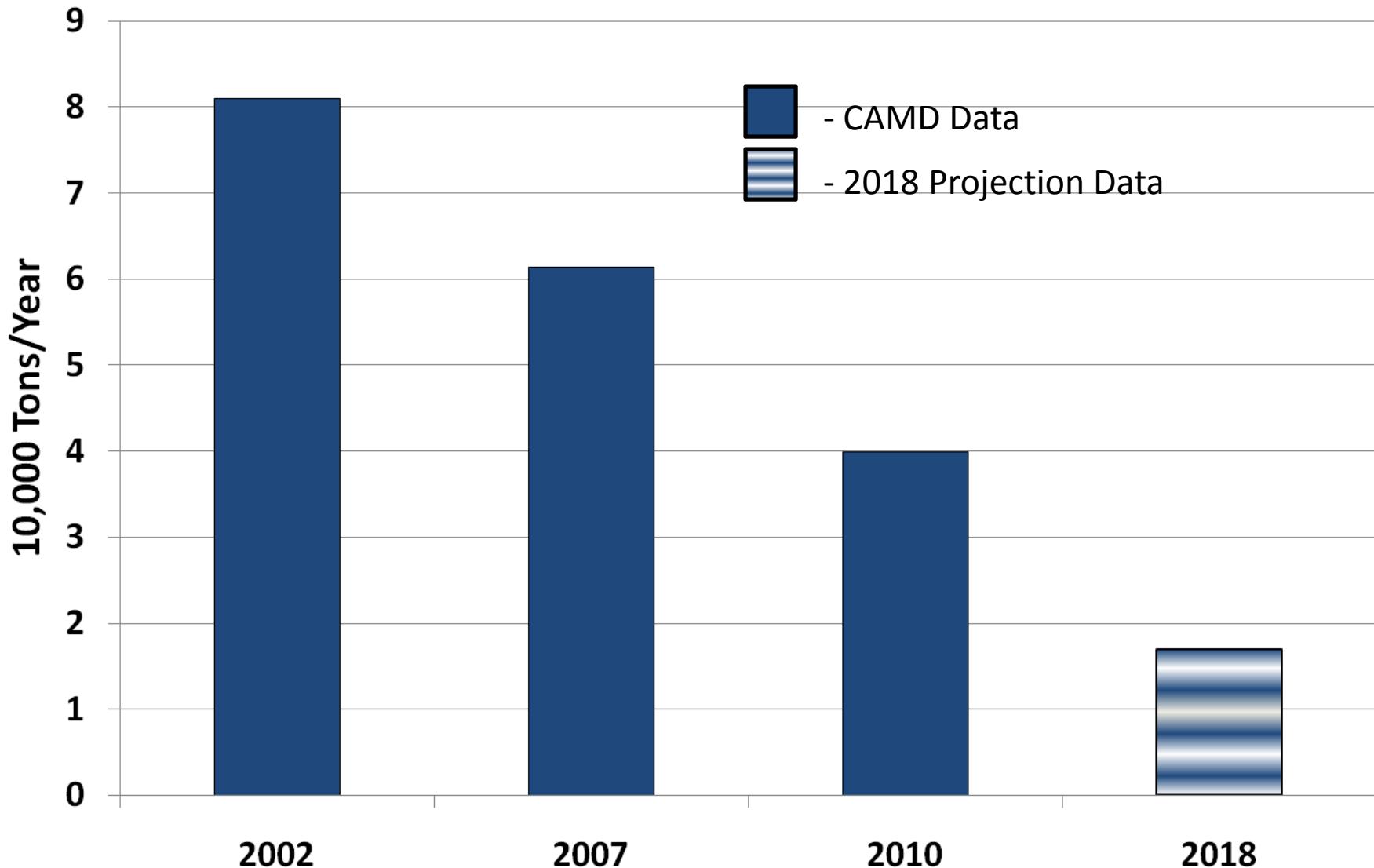


SO₂ from All EGUs in Virginia



*2002, 2007 and 2010 data supplemented by VDEQ. 2018 is MANE-VU data only

NOx from All EGUs in Virginia



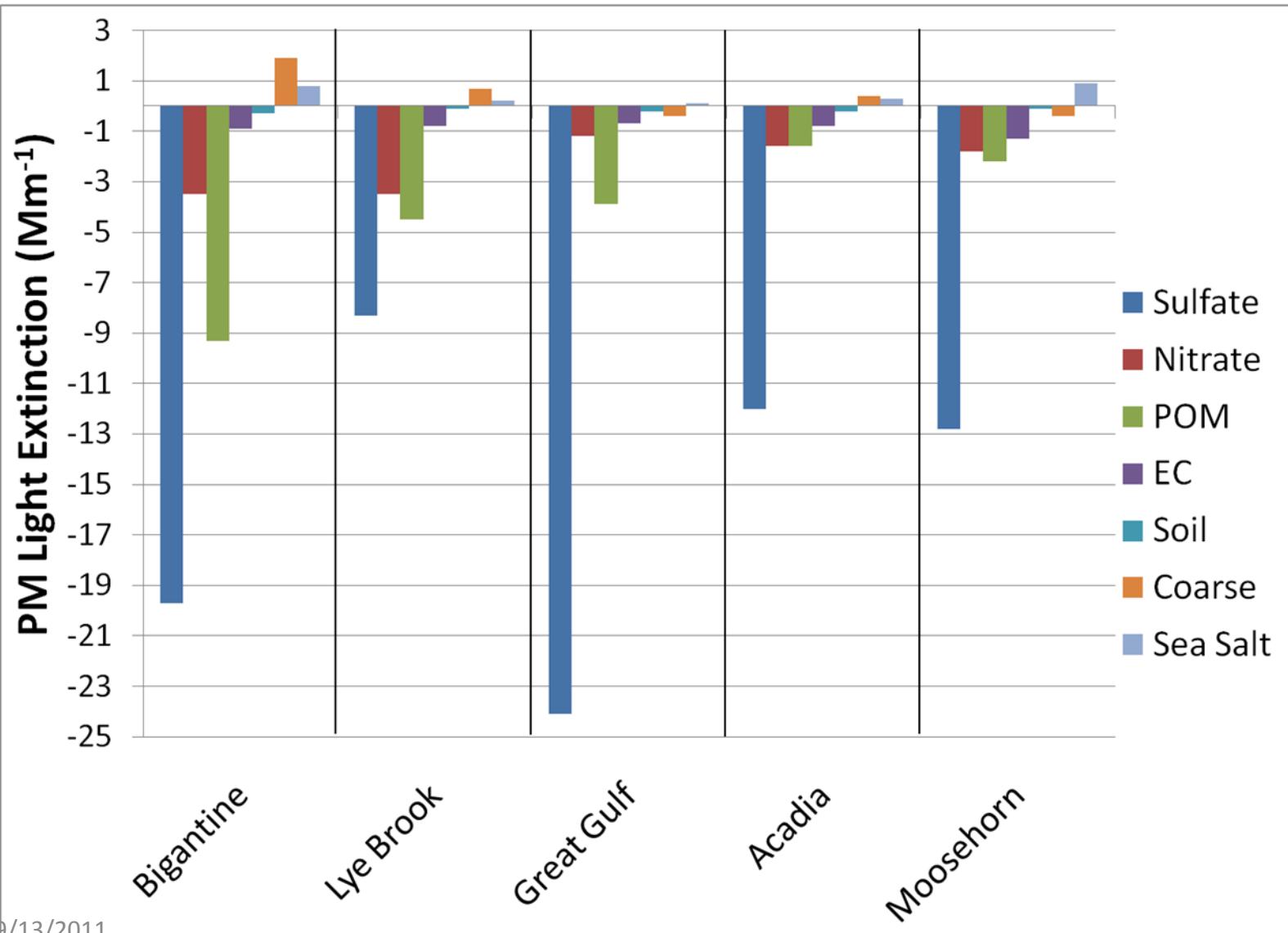
*2002, 2007, and 2010 data supplemented by VDEQ

Outline

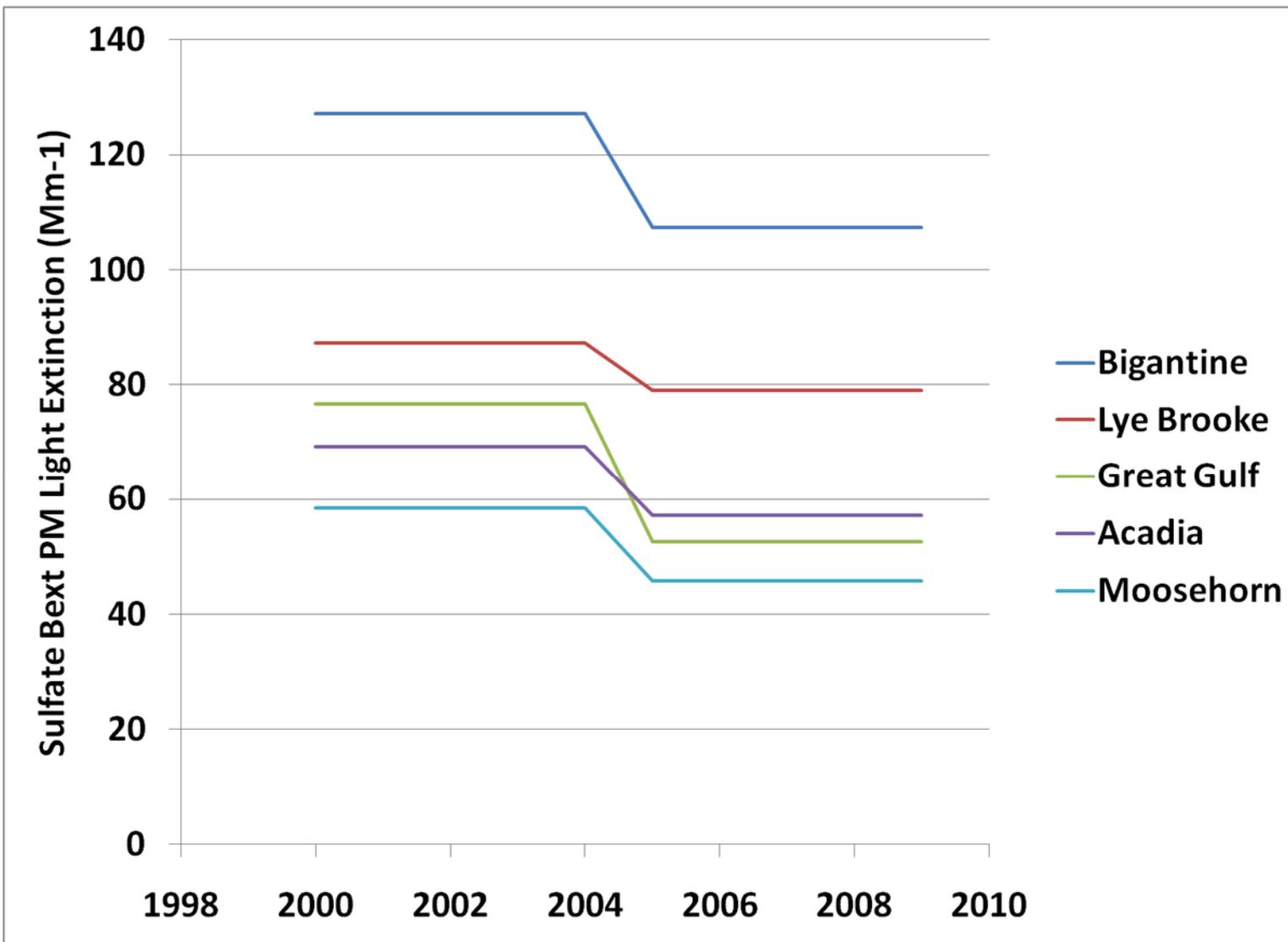
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Visibility Improvement by Species

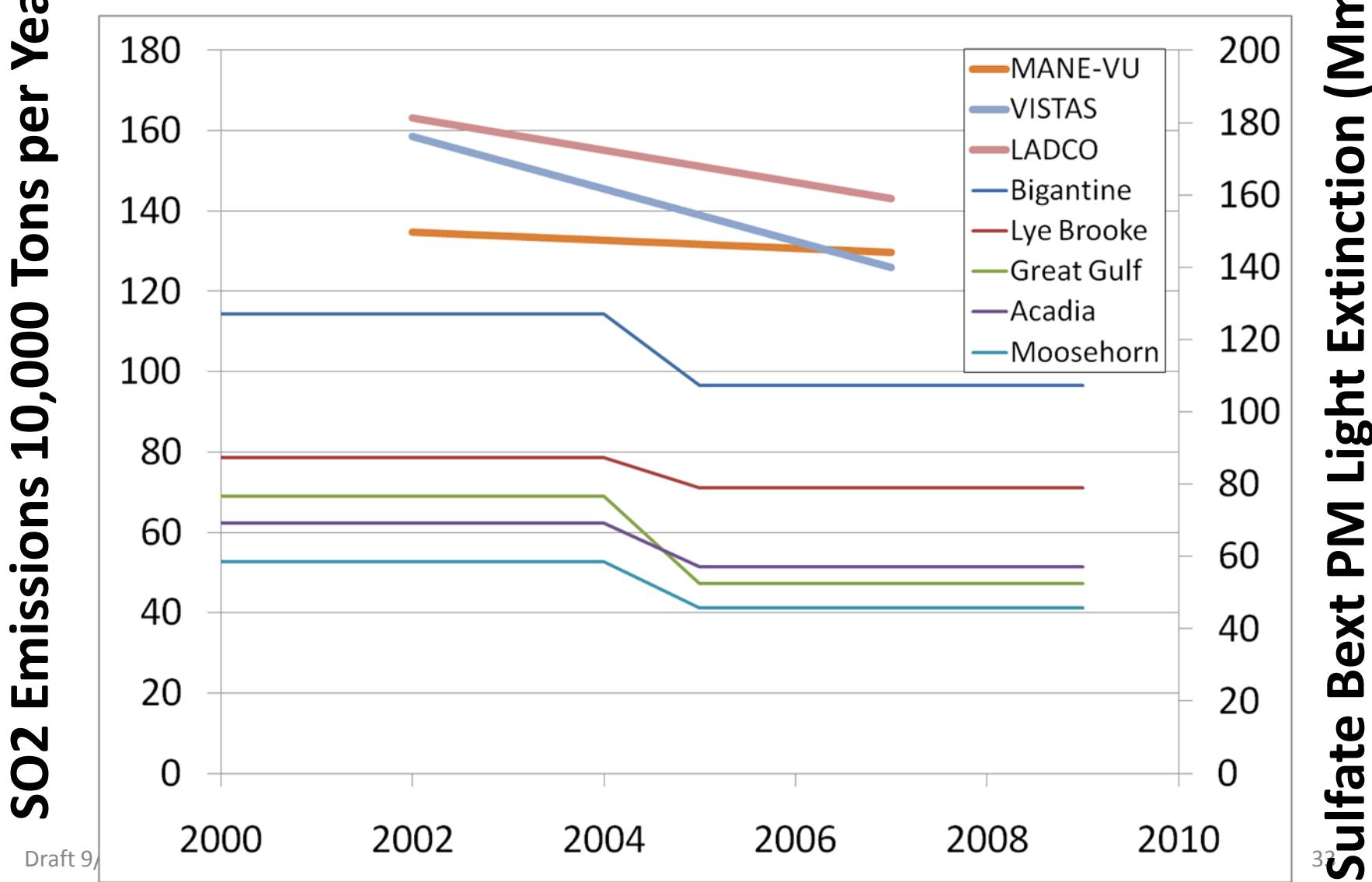
Comparing 2000-04 to 2005-09



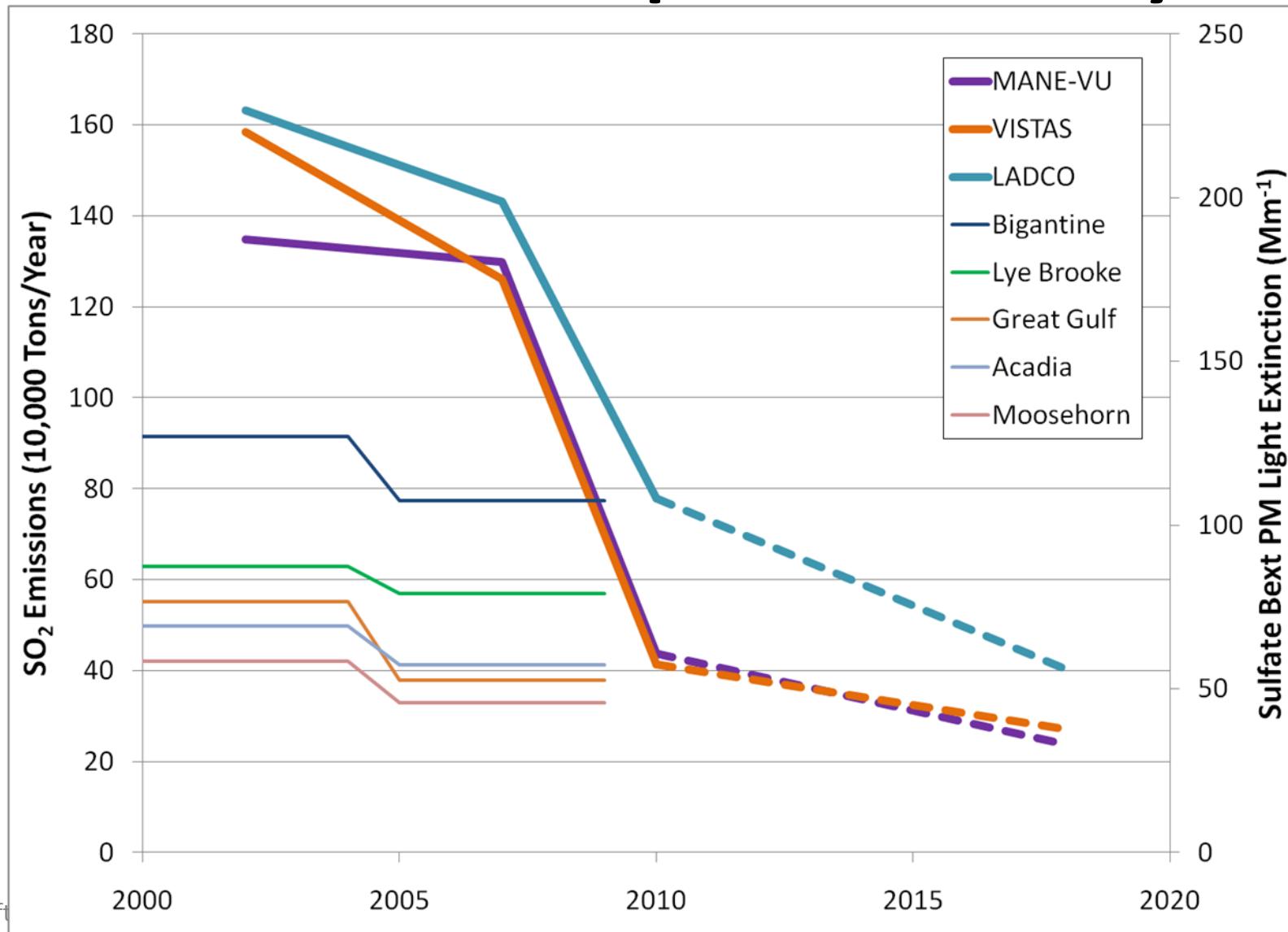
Sulfate Trends in MANE-VU



Sulfate Reductions Compared to SO₂ Emission Reductions at 167 Stacks



Additional Reductions at 167 Stacks will Continue to Improve Visibility



Caveats

- **State rules may cover units not in CSAPR**
- **Follow up may adjust some numbers**
- **Analysis of CSAPR allocations does not account for trading**
- **Analysis of 167 Stacks does not account for substitutions**

Conclusions

- **MANE-VU strategy called for reductions from 167 stacks**
- **Emissions of SO2 have declined**
- **Visibility has improved**
- **The strategy is working – there is more to be done**