



SSJF/EF/TDDWG Point and Area EI Project: Review of 2018 Base Case Emissions Projections

**Emissions Forum Meeting
February 7, 2006**

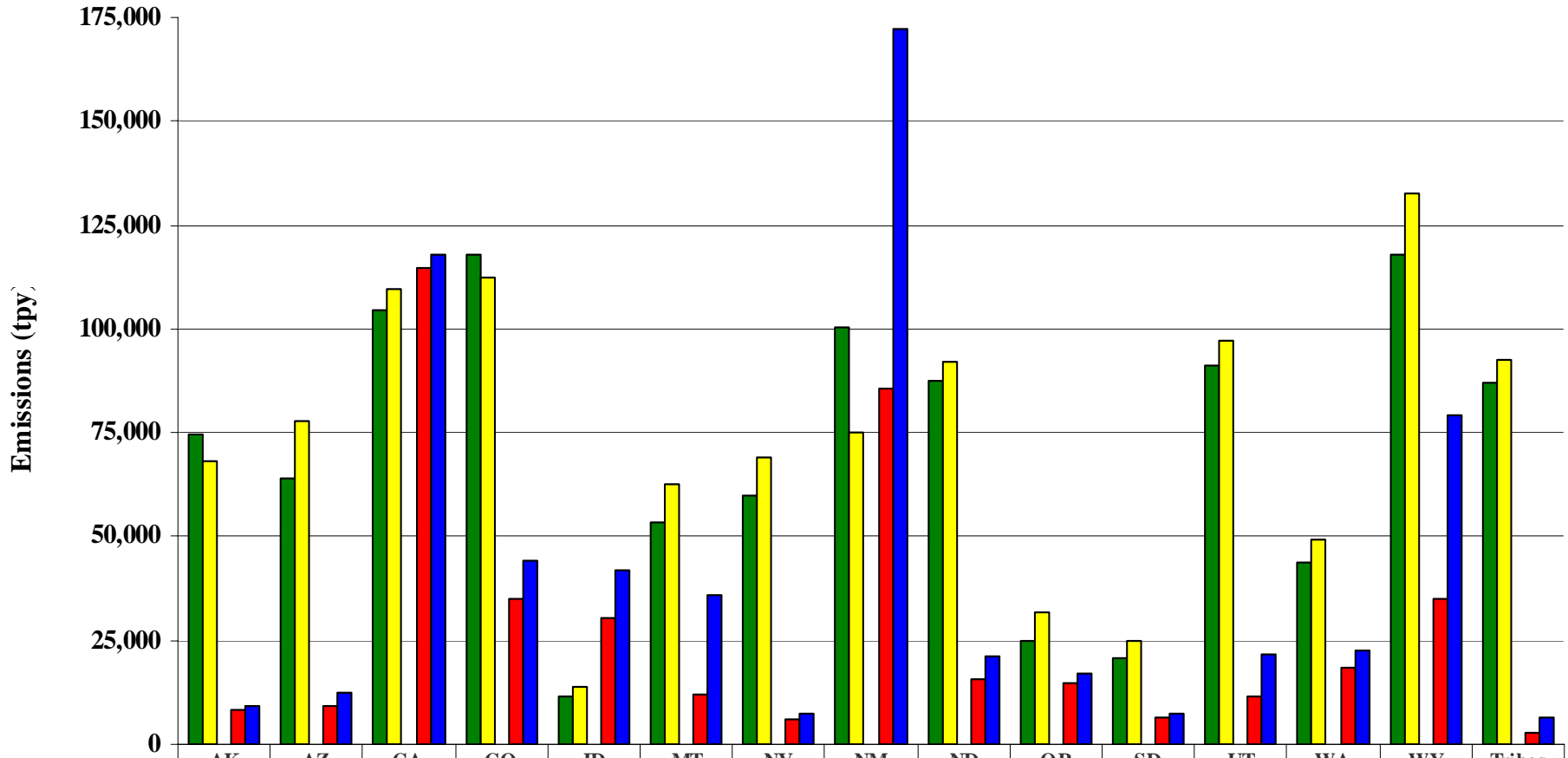
Presentation Topics

- **Review Emissions in 2018 Base Case version 1**
 - **WRAP region NO_x and SO_x projections**
 - **Focus on Non-EGU and area sources**
 - **Retirements, growth and controls accounted for**
 - **Review and verification of projections needed**
 - **Oil and gas production and distribution EI**
 - **Next steps cribbed from Don Arkell's February 1-2 SSJF meeting notes**

Progress on Emissions Inventories

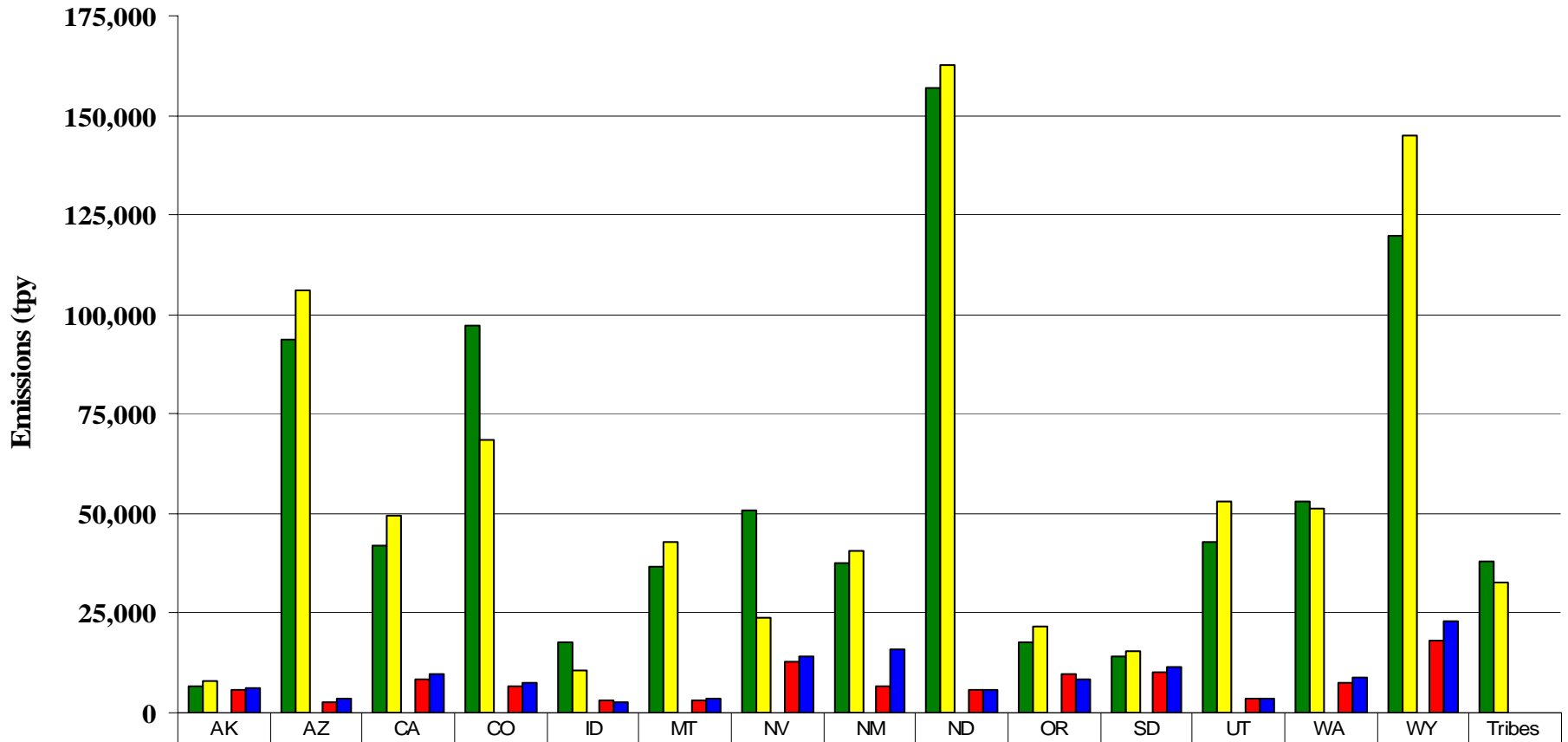
- **Standard methods for some source categories – WRAP Forums & Workgroups have improved/QAed**
 - **Point, area, on- and off-road mobile, biogenics**
 - **First regional EI for oil and gas production and distribution**
 - **Area sources are generally poorly resolved**
- **Inventory methods have been developed by WRAP Forums & Workgroups for some categories. Have received broad review and application**
 - **Fire**
 - **Ammonia**
 - **Windblown dust**
 - **Commercial marine and off-shore shipping**
 - **More than 25 tribes now have EIs**

Point and Area Source 2002 and 2018 NOx Emissions



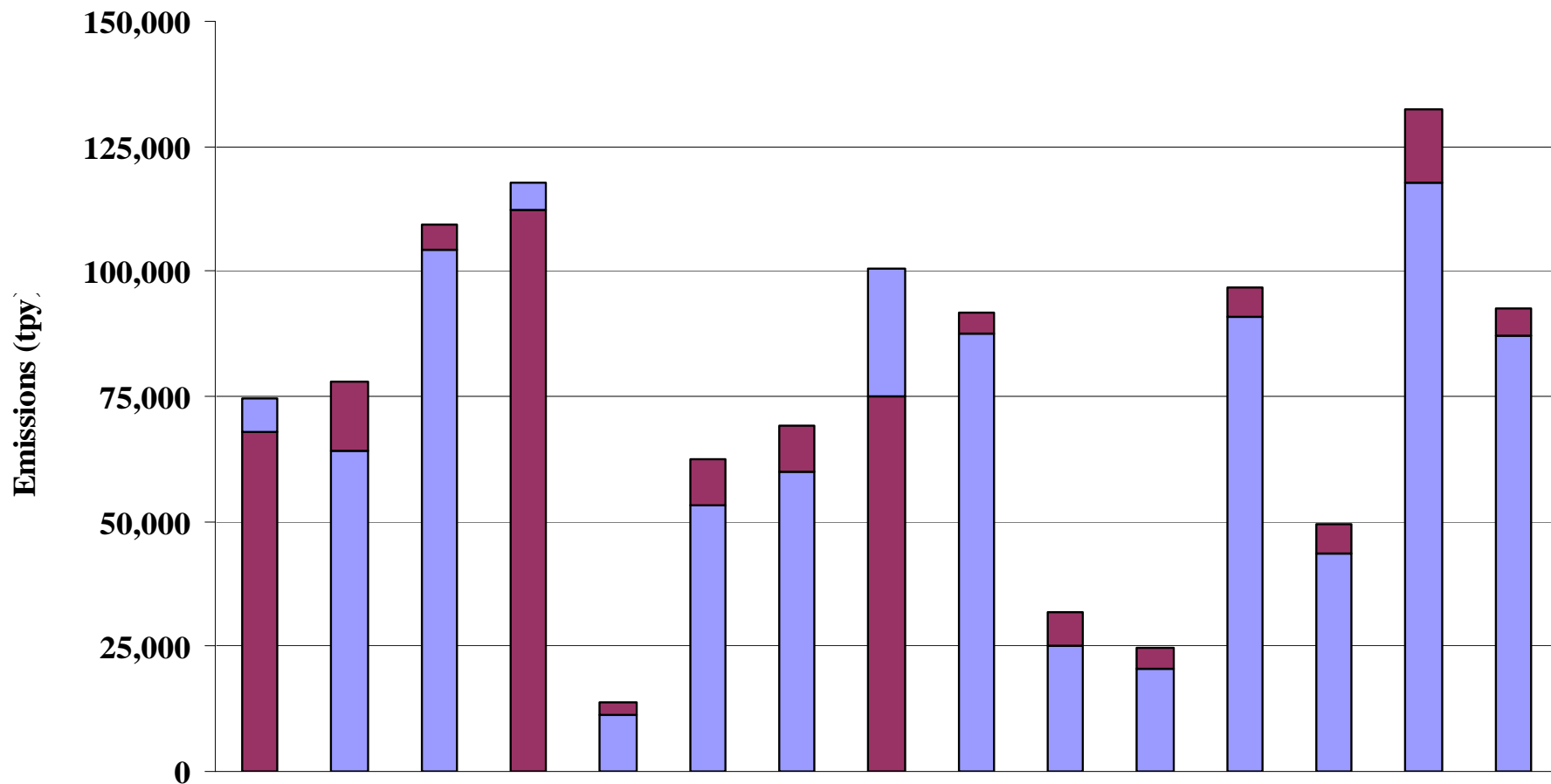
	AK	AZ	CA	CO	ID	MT	NV	NM	ND	OR	SD	UT	WA	WY	Tribes
■ 2002-Point	74,472	64,084	104,435	117,869	11,487	53,415	59,775	100,352	87,425	24,959	20,698	91,044	43,631	117,883	87,215
■ 2018-Point	67,959	77,737	109,515	112,153	13,946	62,583	69,016	74,874	91,895	31,761	24,726	96,974	49,397	132,591	92,580
■ 2002-Area	8,488	9,049	114,471	34,846	30,318	12,072	5,787	85,576	15,457	14,825	6,345	11,335	18,355	34,891	2,932
■ 2018-Area	9,293	12,559	117,717	44,041	42,068	36,053	7,488	172,319	21,129	17,027	7,207	21,636	22,746	79,196	6,639

Point and Area Source 2002 and 2018 SO2 Emissions



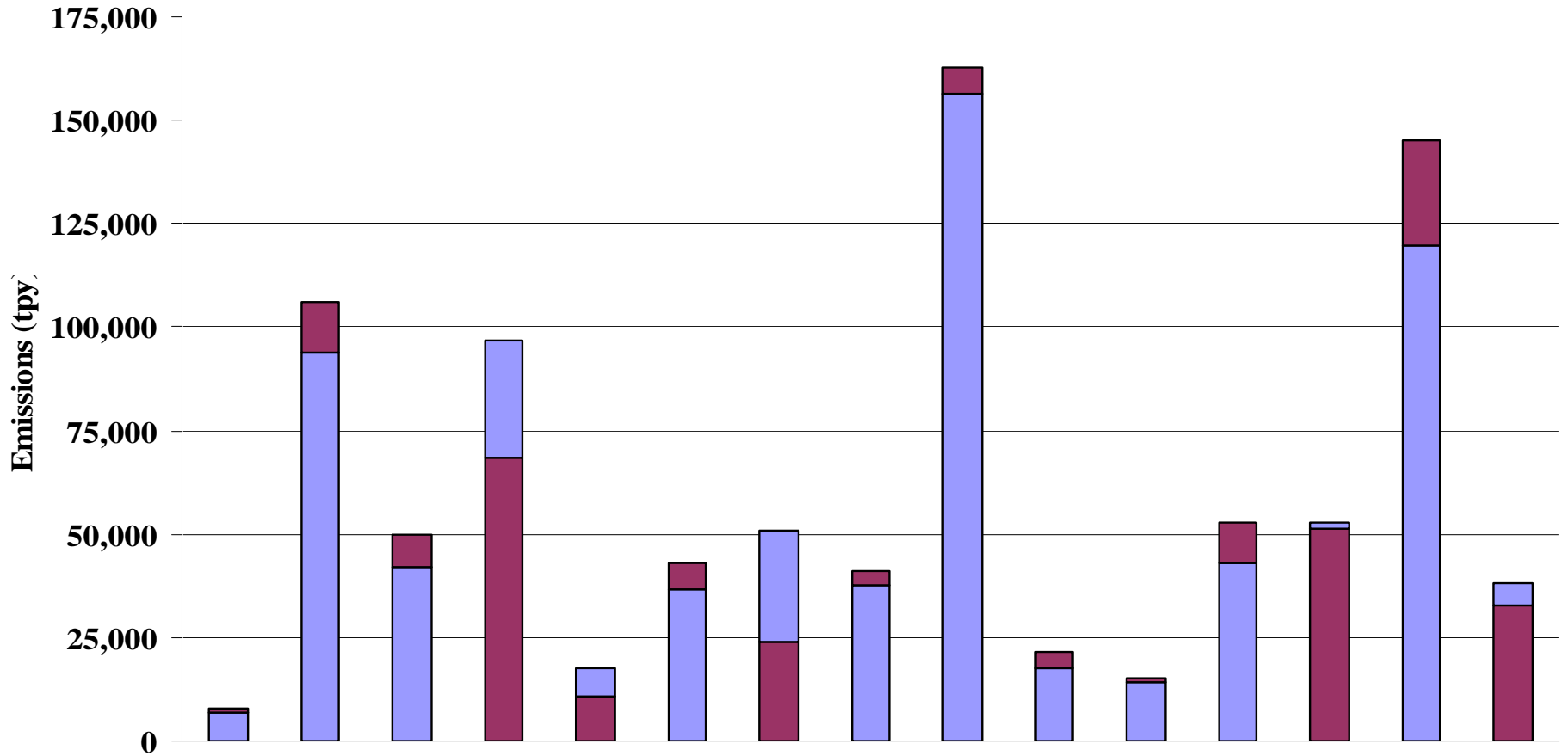
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■ 2002-Point	6,809	93,752	42,120	97,011	17,597	36,879	50,722	37,436	156,668	17,587	14,021	42,838	52,969	119,645	38,208
■ 2018-Point	7,777	106,113	49,632	68,476	10,813	43,055	24,041	40,825	162,705	21,687	15,268	52,953	51,355	145,100	32,895
■ 2002-Area	5,531	2,677	8,314	6,559	2,916	3,299	12,954	6,559	5,748	9,932	10,167	3,581	7,388	17,902	49
■ 2018-Area	6,044	3,410	9,772	7,499	2,721	3,432	14,194	15,753	5,856	8,422	11,667	3,587	8,667	23,109	2

Point Source 2002 & 2018 NO_x Emissions By State



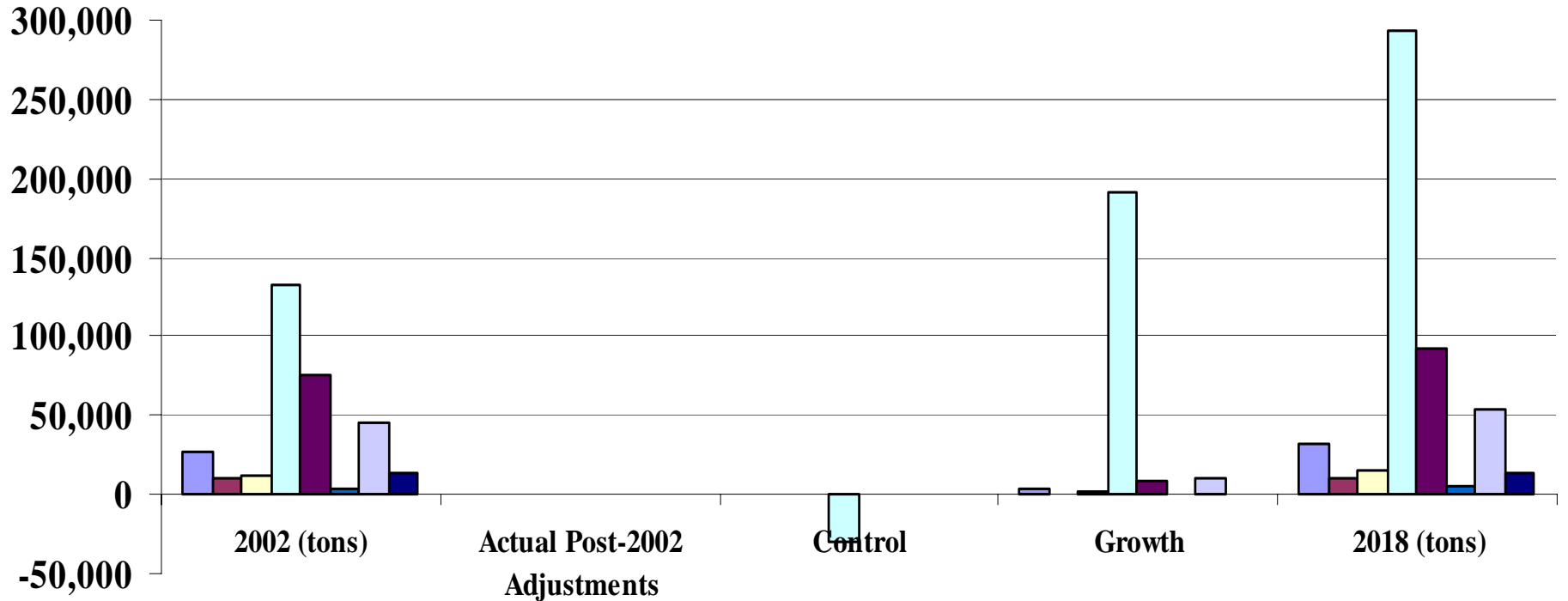
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% Change	-9%	+21%	+5%	-5%	+21%	+17%	+15%	-25%	+5%	+27%	+19%	+7%	+13%	+12%	+6%

Point Source 2002 & 2018 SO₂ Emissions By State



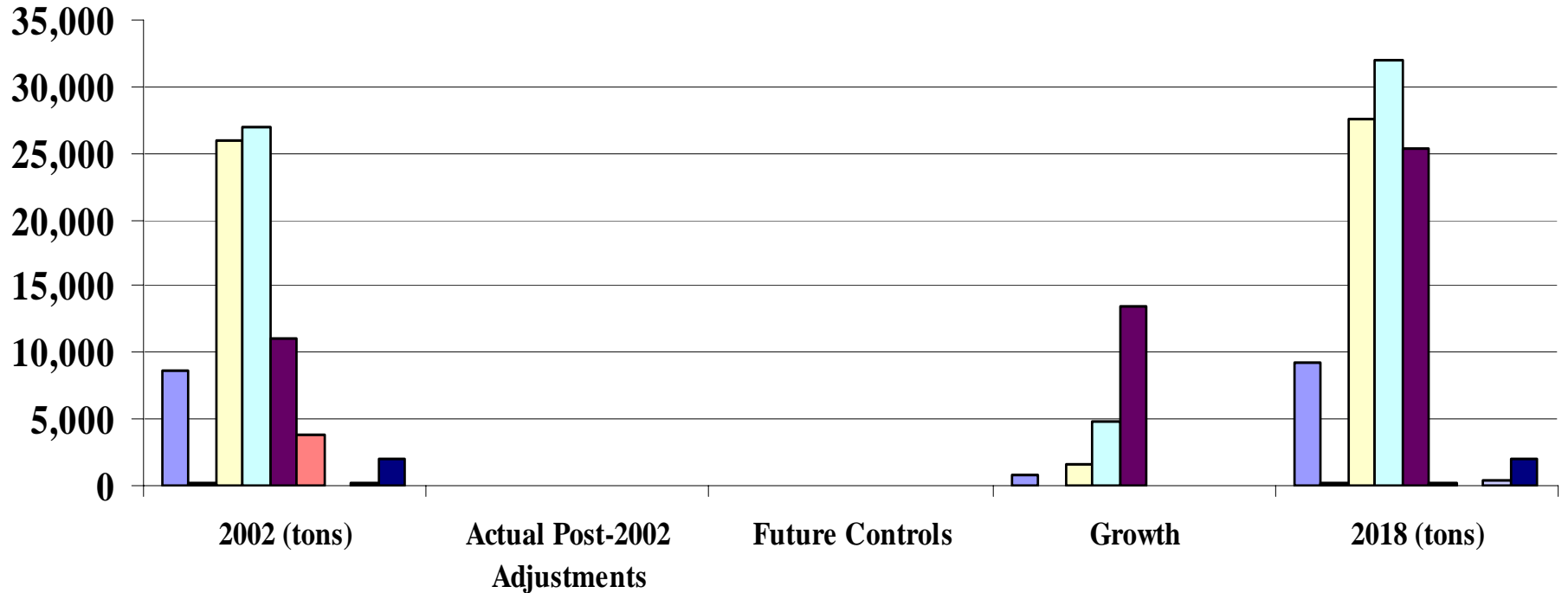
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% Change	+14%	+13%	+18%	-29%	-39%	+17%	-53%	+9%	+4%	+23%	+9%	+24%	-3%	+21%	-14%

WRAP Region NOx Area Source Emissions Change 2002 - 2018 (tons/year)



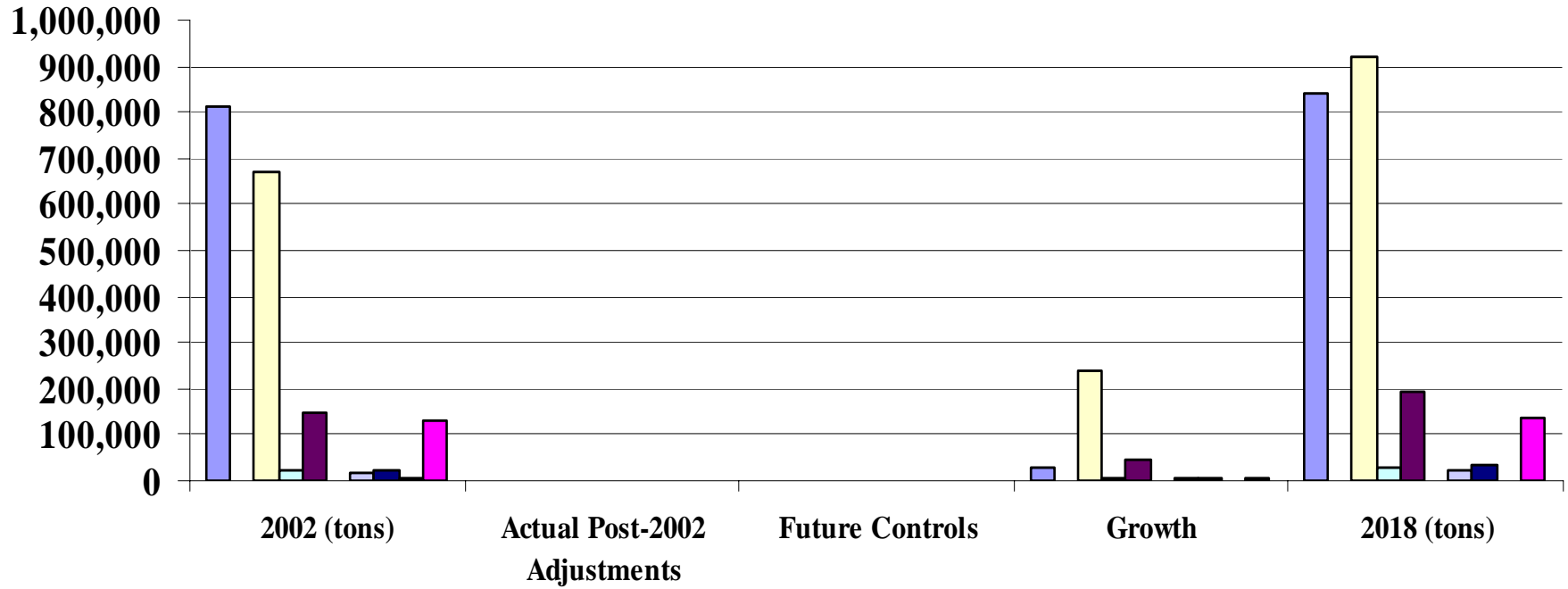
- Commercial/Institutional Heating - Natural Gas
- Industrial Combustion - Bituminous Coal
- Industrial Combustion - Distillate Oil
- Industrial Combustion - Natural Gas
- Oil and Gas Production
- Residential Heating - LPG
- Residential Heating - Natural Gas
- Woodstoves and Fireplaces

WRAP Region SO₂ Area Source Emissions Change 2002 - 2018 (tons/year)



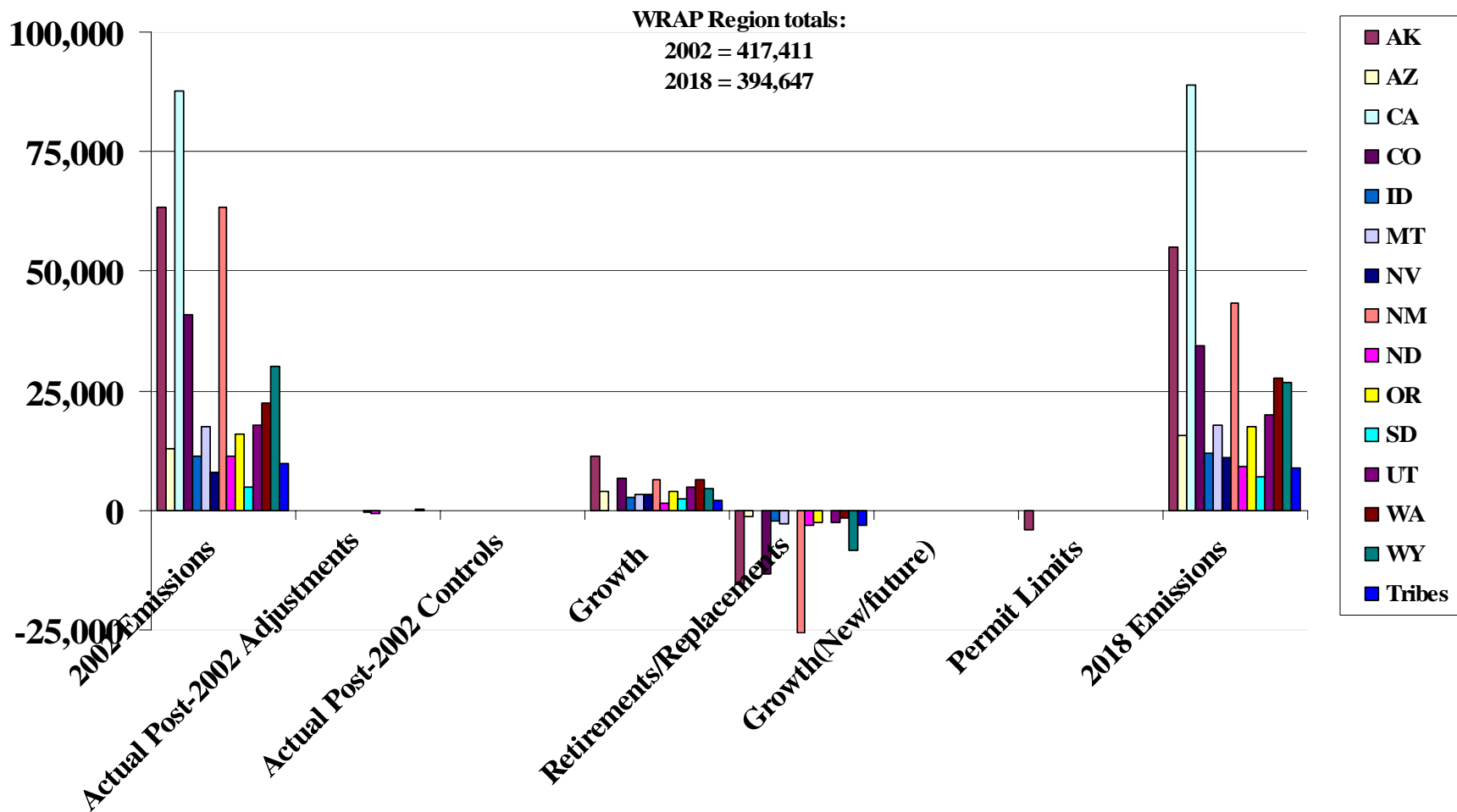
- Commercial/Institutional Heating - Bituminous Coal
- Industrial Combustion - Bituminous Coal
- Industrial Combustion - Residual Oil
- Residential Heating - LPG
- Woodstoves and Fireplaces
- Commercial/Institutional Heating - Natural Gas
- Industrial Combustion - Distillate Oil
- Oil and Gas Production
- Residential Heating - Natural Gas

WRAP Region PM10 Area Source Emissions Change 2002 - 2018 (tons/year)



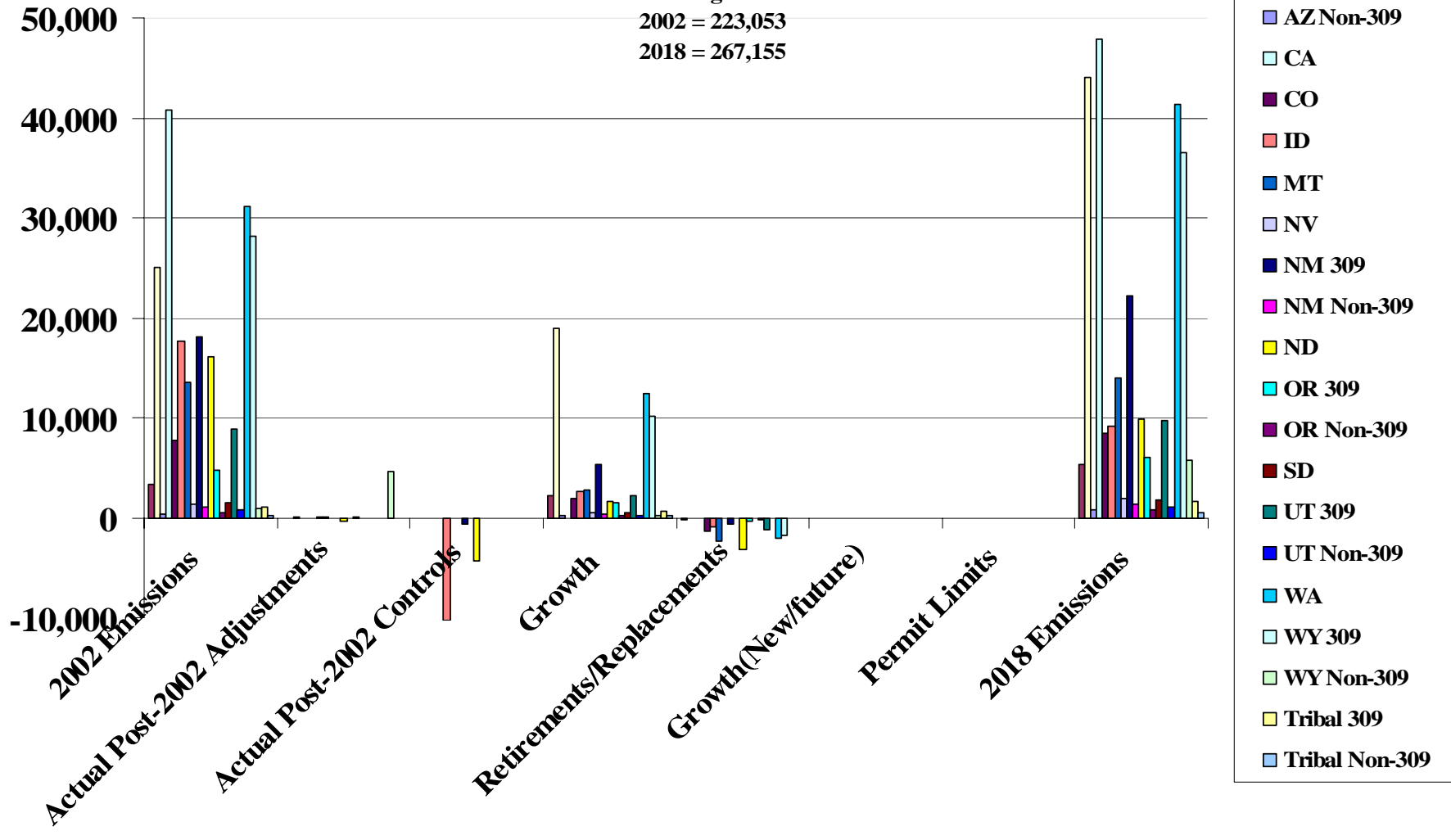
- | | |
|--|--|
| ■ Agriculture Production - Crops | ■ Commercial/Institutional Heating - Natural Gas |
| ■ Construction | ■ Food and Kindred Products |
| ■ Mining and Quarrying | ■ Oil and Gas Production |
| ■ Open Burning - Land Clearing Debris | ■ Open Burning - Residential Household Waste |
| ■ Residential Heating - Natural Gas | ■ Woodstoves and Fireplaces |

WRAP Region NO_x Non-EGU Point Source Emissions 2002 to 2018 (tons/year)



WRAP Region SO2 Non-EGU Point Source Emissions 2002 to 2018 (tons/year)

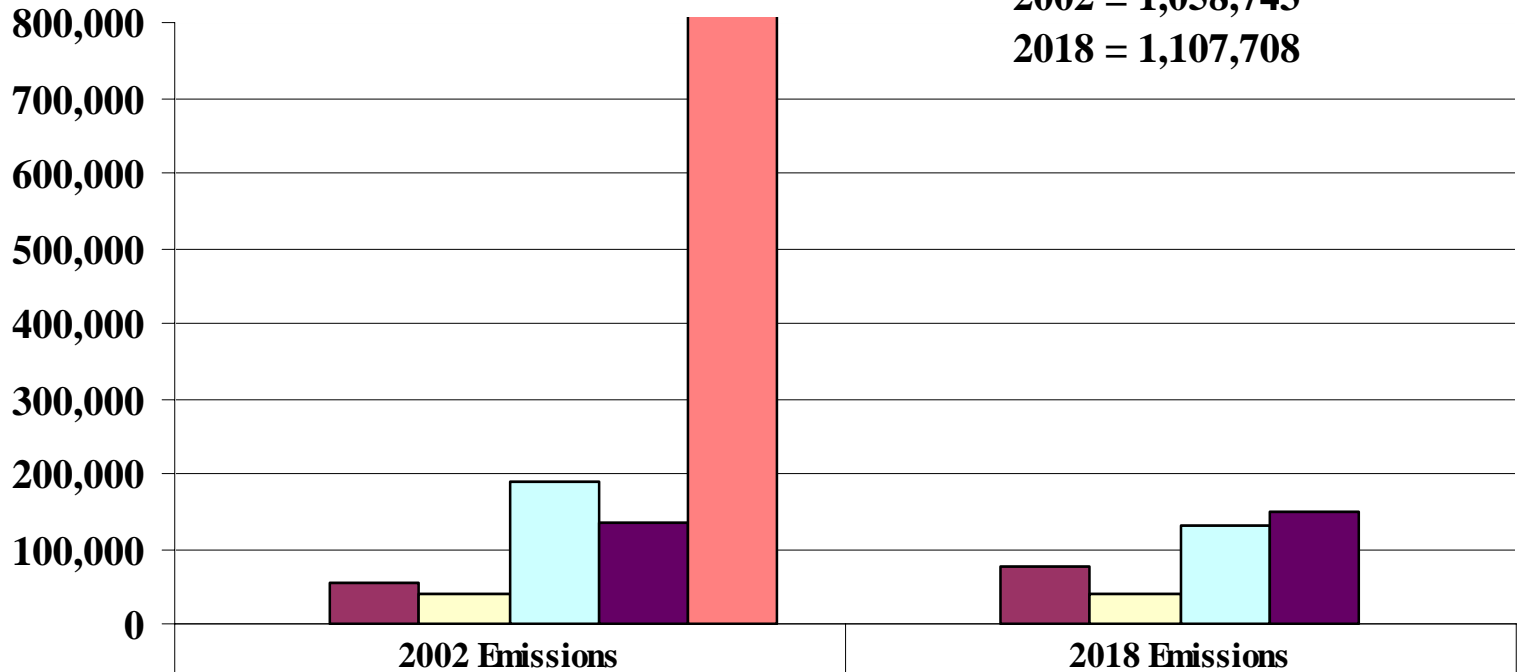
WRAP Region totals:
2002 = 223,053
2018 = 267,155



Non-EGU NOx Point Source Emissions 2002 to 2018

(tons/year)

WRAP Region All Point NOx:
 2002 = 1,058,743
 2018 = 1,107,708



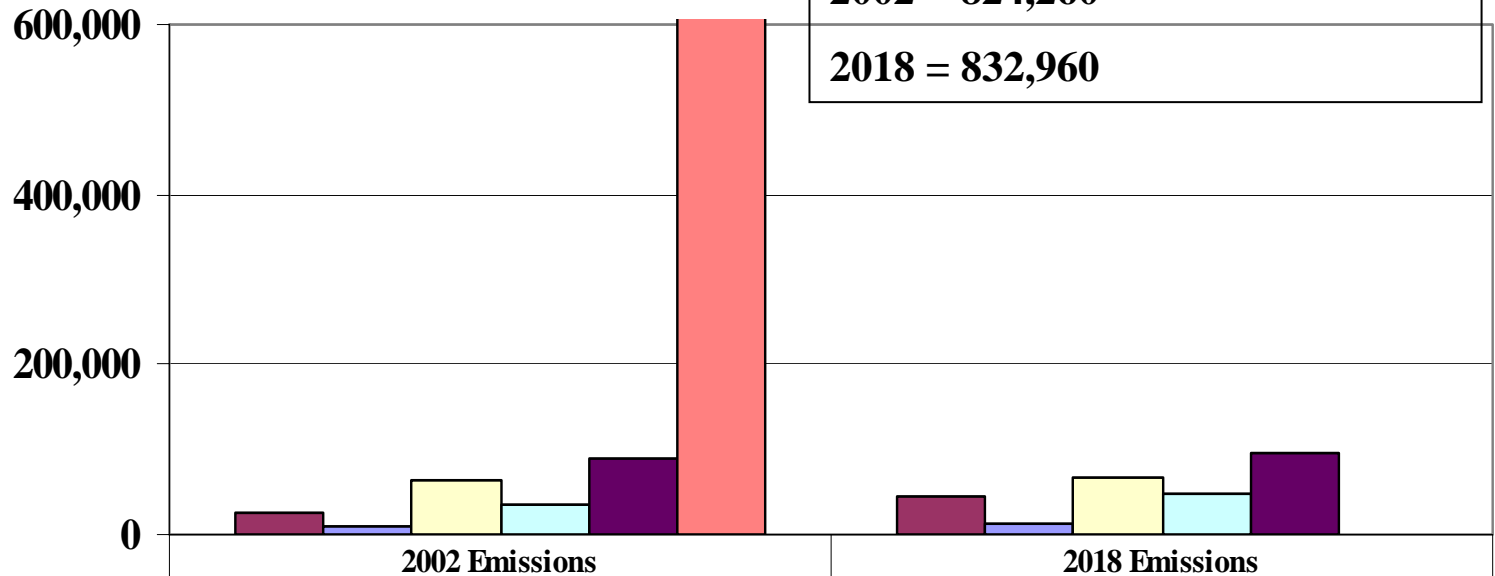
Copper Smelters	538	818
Cement/Lime Kilns	56,061	74,719
Oil/Gas Refining/Dist.	38,522	39,257
Oil/Gas Production	188,134	131,645
All Other WRAP Non-EGU	134,156	148,210
CENRAP Non-EGU	853,567	

Non-EGU SO2 Point Source Emissions 2002 to 2018 (tons/year)

WRAP Region All Point Sources:

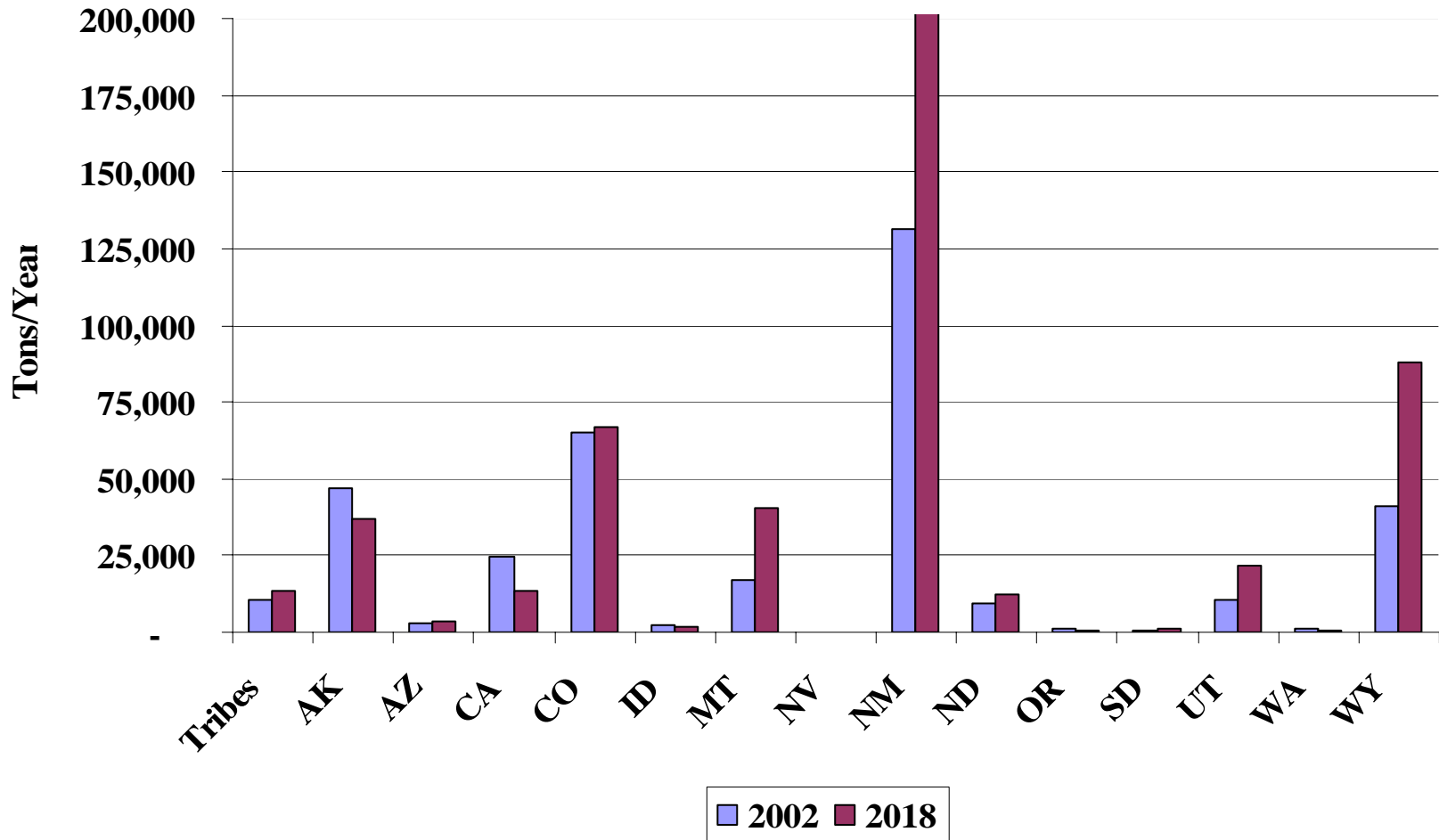
2002 = 824,260

2018 = 832,960



	2002 Emissions	2018 Emissions
■ Copper Smelters	25,044	44,191
■ Cement/Lime Kilns	8,489	12,281
■ Oil/Gas Refining/Dist.	65,051	66,348
■ Oil/Gas Production	36,133	48,431
■ All Other WRAP Non-EGU	88,334	95,900
■ CENRAP Non-EGU	672,072	

Oil & Gas Production & Distribution NOx Emissions



WRAP Region: 2002 Total = 365,000 and 2018 Total = 540,000

WRAP-up: Results of Emissions Inventories

- **What do we know?**

- **Emissions inventories complete – 2002 to 2018 changes estimated**
 - **Change for point and area sources varies up and down by state**
 - **Mobile down noticeably, commercial marine shipping is exception**
 - **Fire scenario forecasts developed, variable by year and location**
 - **Dust and other sources generally held constant, unless change in future estimates can be supported**
 - **Oil and gas emissions data – first try, will continue to improve**
 - **Tribal data becoming more complete**
 - **Complete and comprehensive emissions data available**

- **What are the next steps?**

- **Continue modeling to estimate the air quality impacts of emissions changes, including source apportionment & sensitivity analyses**
- **Results of monitoring, emissions, and modeling analyses integrated into “Weight-of-Evidence” analysis for haze planning**
- **Data & analyses accessible and usable through Technical Support System**

Potential Improvements to 2002 Oil and Gas EI

- **Not any low cost, quick and easy improvements**
- **Ideas categorized as medium/high/very high cost**
- **2002 NO_x EI improvements**
 - Estimate emissions from the pump engines used at conventional oil and gas wells. These are smaller engines not in the current inventory (medium)
 - Adjust from production-based compressor emission factor to well-count based emission factor (large if done on its own/medium if we use results of East Texas/New Mexico work)
 - Drill rigs - eliminate reliance on approximation of duration by getting better information about drilling durations in some of the top development areas. This information could be sought from BLM, State agencies, production companies and/or drilling companies (high)
 - Create state-specific heater emission factors to replace single Wyoming heater emission factor. Heaters are the dominant NO_x source in the wellhead emissions. (medium)
- **2002 VOC EI Improvements**
 - Estimate fugitive emissions (medium)
 - Estimate emissions of routine venting not associated with completions (high)
 - Create state-specific or better dehydration emission factors based on dehydration needs and gas composition (high)
 - Create state-specific or better emission factors for condensate tanks (high)
 - Add condensate truck loading emissions (medium)
- **SO₂ emissions - Not in current inventory - ND had sent some high SO₂ emissions estimates from flaring**

Potential Improvements to 2018 Oil and Gas EI

- **Again, not any low cost, quick and easy improvements**
- **Ideas categorized as medium/high/very high cost**
- **Projections**
 - **Differentiate between infill development and new development (very high)**
 - **See if trend of increasing gas value suggests higher capture of gas (i.e. decreasing VOC emissions) (very high)**
 - **Incorporate into the projections the additional BLM RMP in Wyoming that was identified by WYDEQ after the projections work was done**
 - **Contact BLM and others to check to see if there are any others that were not included (medium)**

Next Steps on 2018 Point and Area EIs – Data Resources

- Ask states and tribes to review and make corrections on the version 1 assumptions used for first 2018 baseline model runs. This action item should establish a time certain for responses, so the RMC can do the final modeling runs for the 2018 baseline. For EGU's these assumptions are in the 11-state spreadsheet. [DOC](#) and [XLS](#) presented at the meeting
- Also, from the WRAP website:
- *WRAP State Summaries:*
 - 2002 Area Sources [XLS](#) (12/06/05)
 - 2002 Point Sources [XLS](#) (12/06/05)
 - 2018 Area Sources, Version 1 [XLS](#) (12/14/05)
 - 2018 Point Sources, Version 1 [XLS](#) (12/14/05)
- *WRAP and CENRAP Sector Summaries:*
 - 2002 and 2018 WRAP and CENRAP Area Sources, Version 1 [XLS](#) (12/14/05)
 - 2002 and 2018 WRAP and CENRAP Point Sources, Version 1 [XLS](#) (12/29/05)
- *2002 and 2018 WRAP Bar Charts* [PDF](#) (12/13/05)
- *Itemized Changes to Emissions (2002 to 2018):*
 1. Area Source Changes, 2002 to 2018, Version 1 [XLS](#) (12/09/05)
 2. Point Source Changes in NO_x, 2002 to 2018, Version 1 [XLS](#) (12/28/05)
 3. Point Source Changes in SO₂, 2002 to 2018, Version 1 [XLS](#) (12/28/05)
- [2002 and 2018 Point and Area Source Pivot Tables](#)

Next Steps on 2018 Point and Area EIs – Control Strategies

- Ask states to finish the BART-eligibility task, and identify or confirm individual facility eligibility at each BART source, using the ERG report and the tables above. This task should also be completed by time certain.**
- It is probable that some level of individual source analyses will be needed for BART and for reasonable progress. Some states lack capacity to do the CALPUFF modeling to determine sources subject to BART and will need some assistance from the regional modeling center to complete this task. Ask individual states where they are on their BART analyses; what are their needs for individual source analyses (CALPUFF), what specific technical questions they need to address. Ask for any modeling protocols (e.g., Colorado.), what other assistance from WRAP and RMC would be most helpful.**
- EGU's are the most prominent stationary source category for SO₂ and NO_x, but other stationary source categories may be significant also. Ask states which non-EGU BART and non-BART sources are important to include in the Control Case analyses. Oil & Gas is one possible category, cement plants, paper, refineries, etc. Application of CEM technology to some categories of non-EGU's could be problematic.**

Next Steps on 2018 Point and Area EIs – Control Strategies

- The 309 states will be revisiting the SO₂ milestones, and how that is eventually done is still up in the air. Two of the 309 states, AZ and NM have indicated an interest in developing further an alternative NO_x program as a companion to the SO₂ milestone approach. The level of interest among other states for this is unclear, though several states are already on the path of individual BART analyses, and may not be interested in WRAP evaluating the NO_x cap alternatives. Dual regulatory approaches for SO₂ and NO_x could be awkward.**
- Evaluation of different ways to establish caps for NO_x and SO₂ could be undertaken. Among the issues here is the basis for setting EGU NO_x milestones on EPA presumptive limits or WRAP's principle of combustion controls only. If the NO_x cap gambit turns out not to be feasible, the investment would be relatively low and the technical work could be applied in establishing reasonable progress goals.**

Next Steps on 2018 Point and Area EIs – Control Strategies

- The proposed approach to developing point and area source NO_x and SO₂ emissions targets for regional haze reasonable progress is to start by hosting discussions individually with each state on how to address each of these issues, particularly for the BART-related status and needs assessments.**
- There are probably some additional items to add or to restate, which would start by articulating the questions and issues in an agenda for state conference calls. Ask the states to use a short period of time to get their information together, assemble the right staff, then host one or more conference calls individually.**