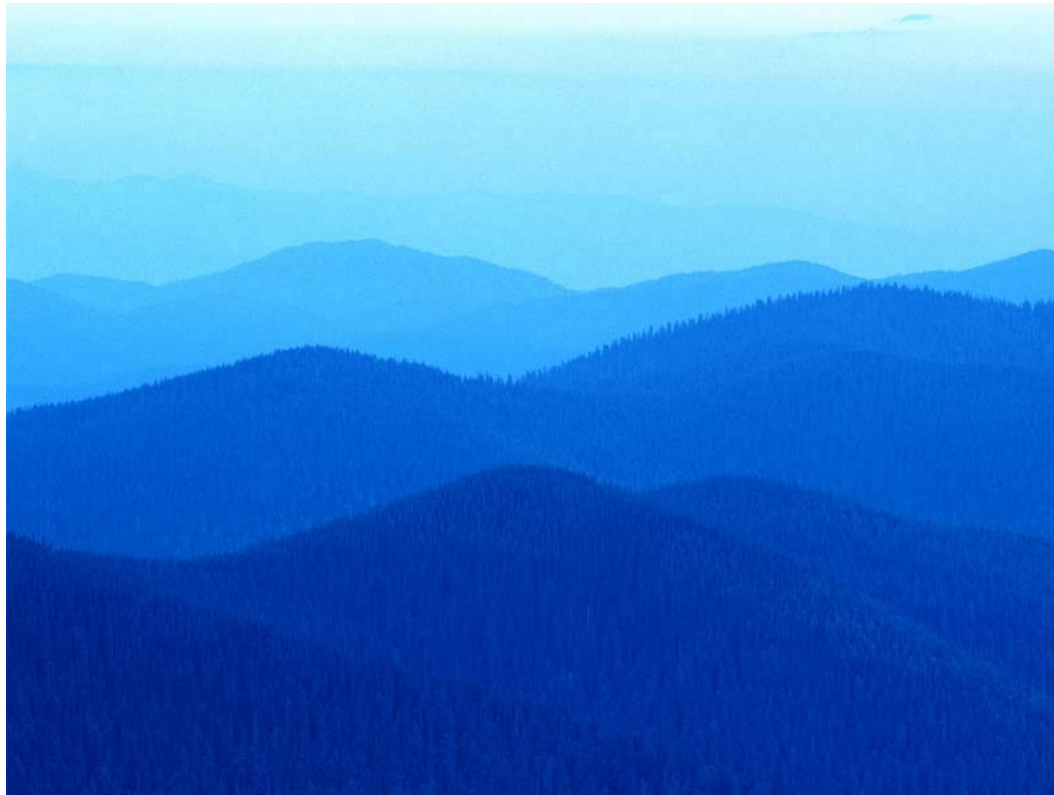


# EPA Technical Analysis of NO<sub>x</sub> Combustion Controls in the West



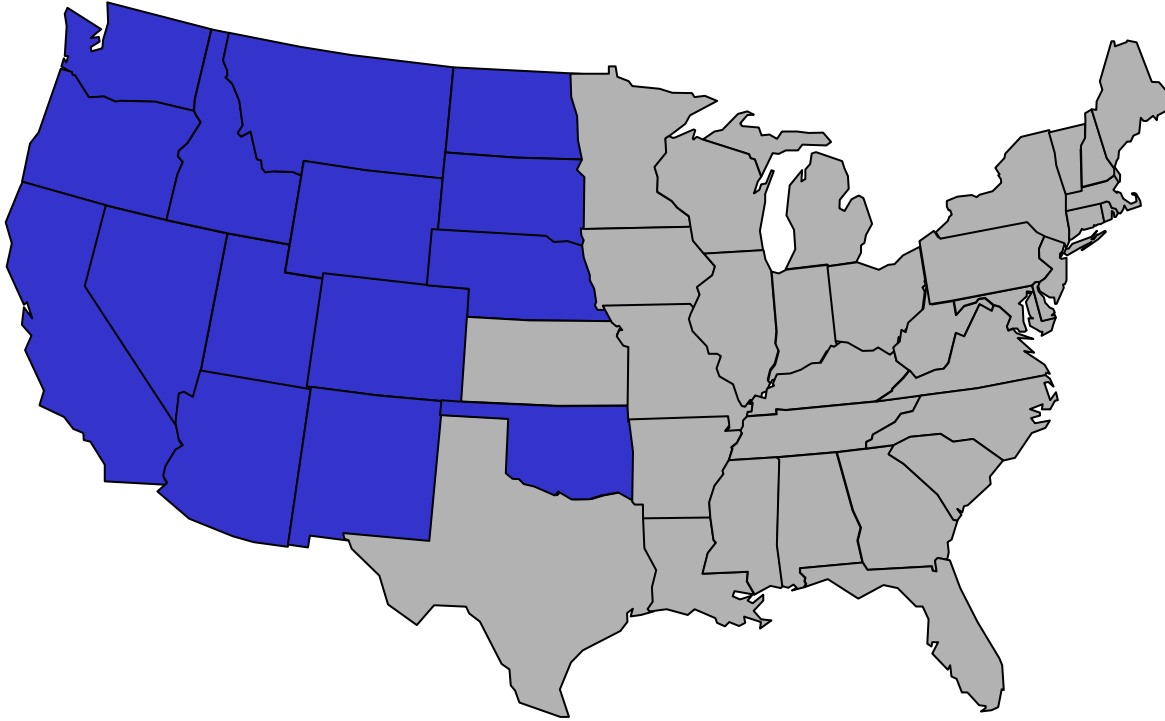
The results of applying state of the art combustion controls to EGUs in the 15-western states

May 2004, John Robbins



# Baseline NOx Emissions in the 15 Western States

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## Baseline Nox Emissions

Coal-fired units:

676,165 tons

0.39 lb/mmbtu

Oil & Gas units:

51,320 tons

0.076 lb/mmbtu

Overall total tons and average rate:

727,485 tons

0.301 lb/mmbtu

Note baseline emissions calculated using 3-year average of heat input (2000 - 2002) from EPA Acid Rain database.

# Effect of applying State of the Art Combustion controls on all coal-fired units.

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## Baseline Nox Emissions

Coal-fired units:

676,165 tons  
0.39 lb/mmbtu

Oil & Gas units:

51,320 tons  
0.076 lb/mmbtu

Overall total tons and average  
Nox rate:

727,485 tons  
0.301 lb/mmbtu

## Control Case

Coal-fired units:

424,852 tons (35% reduction from baseline).  
**Total Nox reduction = 251,312 tons.**  
0.244 lb/mmbtu

429,150 tons (34% reduction from baseline).  
**Total Nox reduction = 247,014 tons.**  
0.246 lb/mmbtu with \$1,300/ton limit

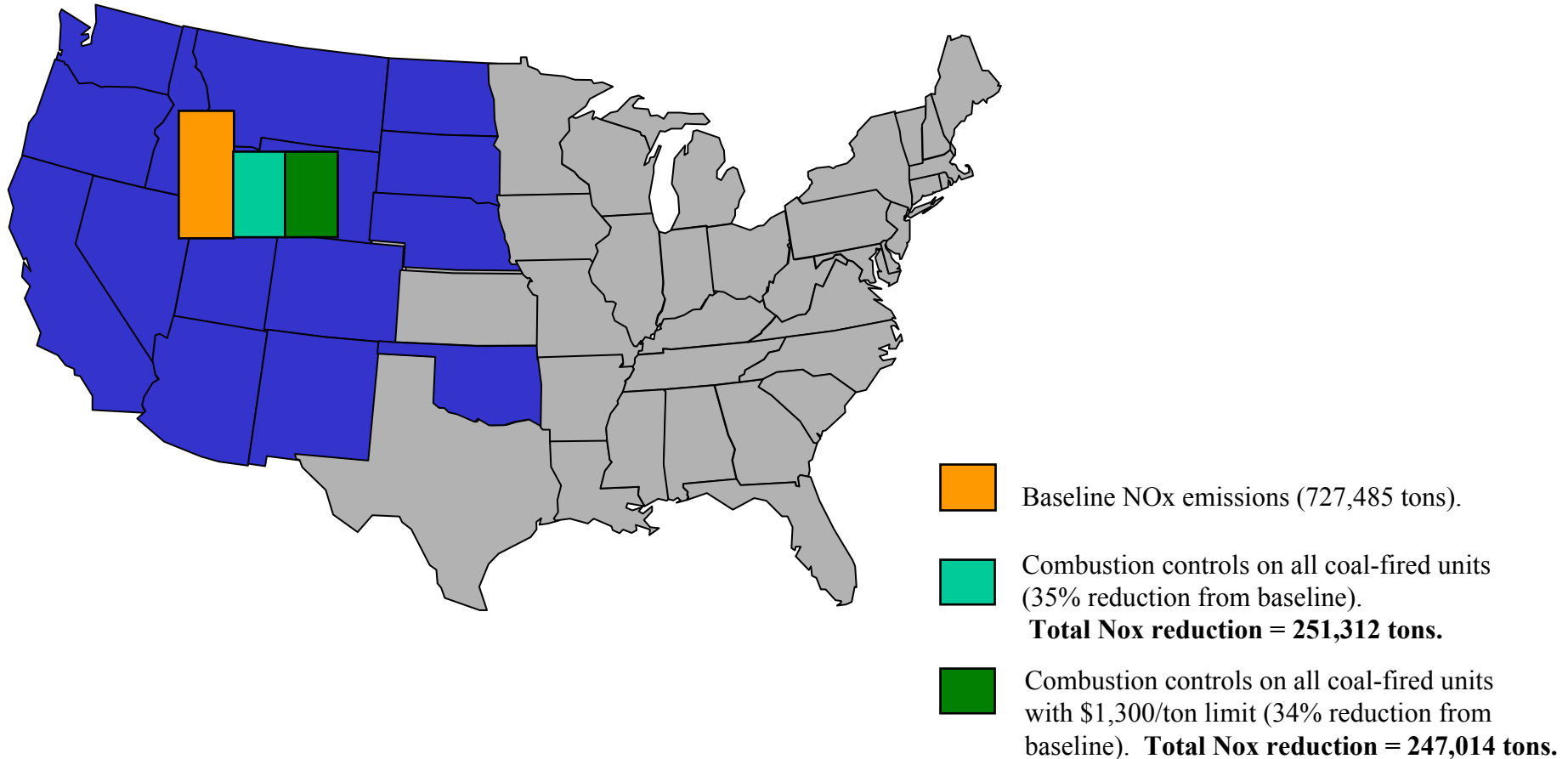
Oil & Gas units:

51,320 tons  
0.076 lb/mmbtu

Overall total tons and average Nox rate:

476,172 tons / 0.197 lb/mmbtu  
480,470 tons / 0.199 lb/mmbtu with \$1,300/ton limit

# Effect of SOA Combustion Controls on All Coal-Fired Units in the West



Note baseline emissions calculated using 3-year average of heat input (2000 - 2002) from EPA Acid Rain database.

# Control Costs by Unit Type

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Boiler type	Combustion Control Type	Cost range (\$/ton)	Av. \$/ton	Nox rate range (lb/mmbtu)	Avg. Nox rate (lb/mmbtu)
44 dry bottom wall-fired	LNB+OFA	\$200 - \$9400	\$904*	0.132 – 0.393	0.236
52 tangentially fired	LNB+OFA	\$87 - \$1280	\$316**	0.113 – 0.339	0.194
5 other types	other	\$223 - \$1867	\$743	0.15 – 0.44	0.366
7 cyclones	coal reburn	\$753 - \$2811	\$1182	0.41 – 0.58	0.486

**Overall average cost/ton = \$439**

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107 units out of total population of 127 received new controls.

Total NOx reduced = 251 ktons

\* includes 5 units over \$1300/ton including one at \$9400. Excluding this unit, average drops to \$733/ton.

\*\* includes 1 unit over \$1300/ton

LNB = Low Nox Burner

OFA = Overfire Air