



# Economic Impacts of a 65 ppb National Ambient Air Quality Standard for Ozone: Updated Estimates

**Prepared for:  
National Association of Manufacturers**

August 2015

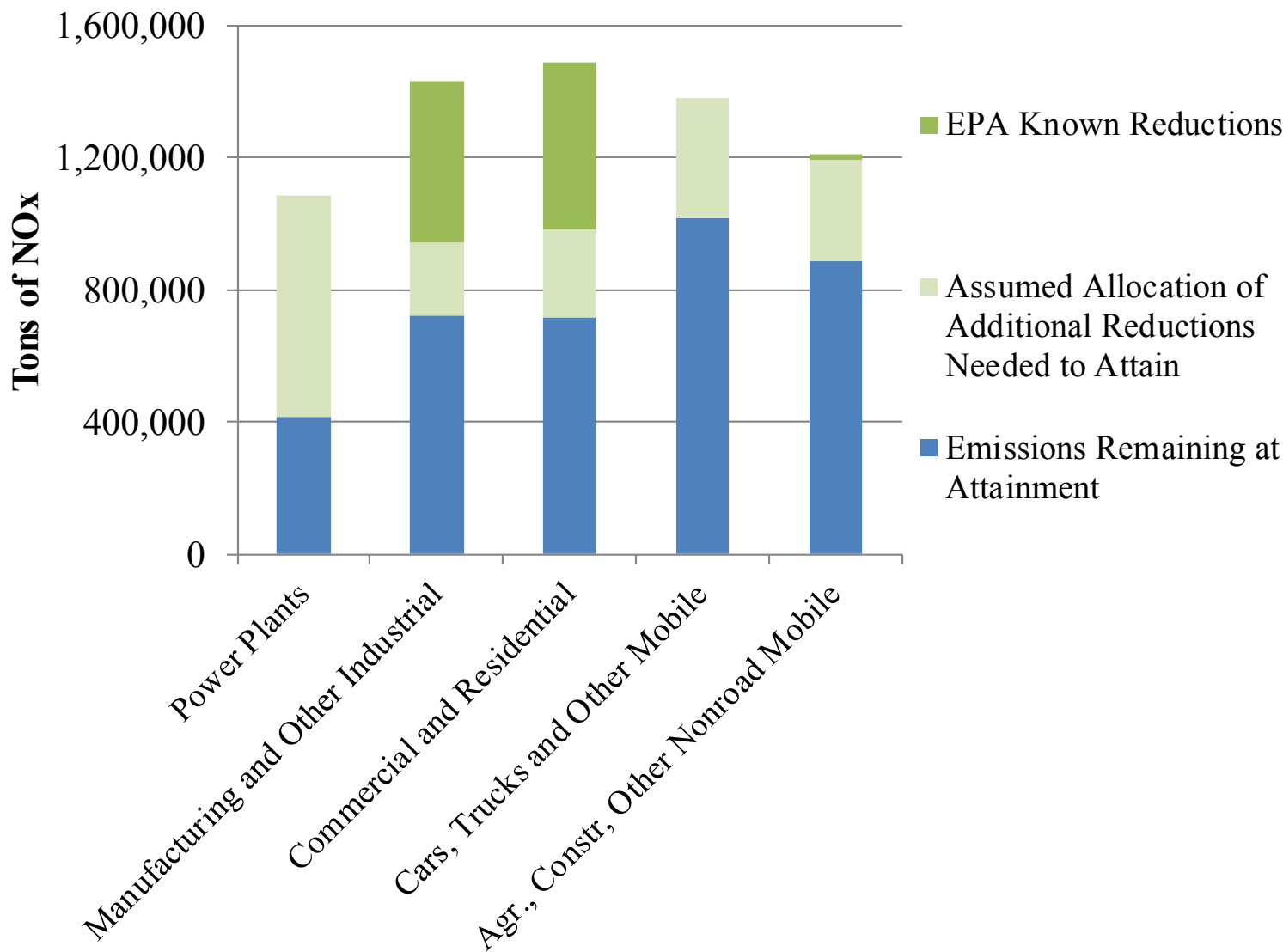
# Background on Updated NERA Estimates of Economic Impacts of 65 ppb Ozone Standard



**NERA**  
ECONOMIC CONSULTING

- A February 2015 NERA report provided estimates of compliance costs and impacts on the U.S. economy if the U.S. Environmental Protection Agency (EPA) were to set a National Ambient Air Quality Standard (NAAQS) for ozone of 65 parts per billion (ppb).
  
- NERA has developed updates to assumptions in the context of a subsequent study for the Texas Council on Environmental Quality. This document provides updated values using those updated assumptions for all relevant figures in the February 2015 report (Figures S-3 to S-11) based on these three updates.
  - updated assumptions regarding emission reductions in Texas, Mississippi and Arkansas needed to meet the 65 ppb standard in Texas
  - updated assumptions regarding the composition of “unknown” costs (to separately identify “unknown” costs related to sources other than electricity generating units, or EGUs)
  - updated assumptions regarding the EGUs that would close (as a control measure), excluding EGUs that have stringent NO<sub>x</sub> controls (SCR) in states projected to be high cost (more than \$30,000 per ton).
  
- Other methodologies and data are the same as in the February 2015 report

# Figure S-3: Reductions Necessary to Attain a 65 ppb NAAQS by Categories of Emissions Sources in the 34 Non-Attaining States



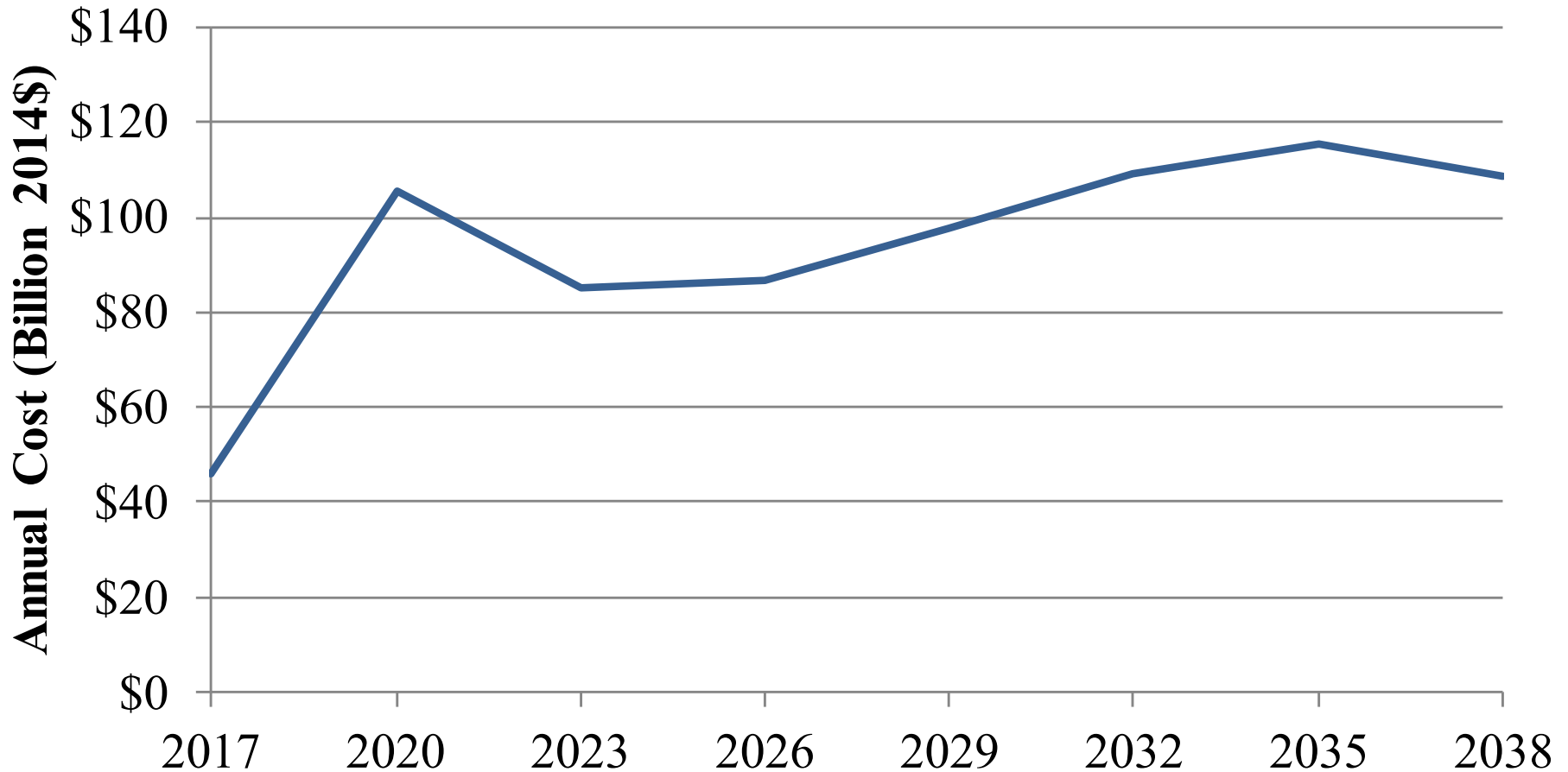
# Figure S-4: Potential U.S. Compliance Spending Costs for 65 ppb Ozone Standard



	Present Value (Billions of 2014\$)			Cumulative
	Capital	O&M	Total	Coal Retirements
Compliance Costs	\$460	\$680	\$1,130	31 GW

Notes: Total is not equal to the sum of capital and O&M due to independent rounding. Present value is from 2017 through 2040, discounted at a 5% real discount rate. Cumulative coal retirements are incremental to baseline. These retirements are primarily due to assumed emission control measures but may also include indirect electric sector impacts of the ozone standards.

# Figure S-5: Potential Annual U.S. Compliance Spending Costs for 65 ppb Ozone Standard



Notes: Present value is from 2017 through 2040, discounted at a 5% real discount rate.  
Consumption per household is an annualized (or levelized) value calculated using a 5% real discount rate.

# Figure S-6: Potential Impacts of 65 ppb Ozone Standard on U.S. Gross Domestic Product and Household Consumption



	<b>Annualized</b>	<b>Present Value</b>
GDP Loss (Billions of 2014\$)	\$140/year	\$1,780
Consumption Loss per Household (2014\$)	\$840/year	N/A

Notes: Present value is from 2017 through 2040, discounted at a 5% real discount rate.  
Consumption per household is an annualized (or levelized) value calculated using a 5% real discount rate.

# Figure S-7: Potential Impacts of 65 ppb Ozone Standard on Labor



	<b>Avg.</b>
Baseline Annual Job-Equivalents (millions)	156
<b>65 ppb Case:</b>	
Real Wage Rate (% Change from Baseline)	-0.6%
Change in Labor Income (% Change from Baseline)	-0.9%
Job-Equivalents (Change from Baseline, millions)	-1.4

Notes: Average (Avg.) is the simple average over 2017-2040. “Job-equivalents” is defined as total labor income change divided by the average annual income per job. This measure does not represent a projection of numbers of workers that may need to change jobs and/or be unemployed, as some or all of the loss could be spread across workers who remain employed

# Figure S-8: Potential Impacts of 65 ppb Ozone Standard on Energy Prices



		<b>Avg. Baseline</b>	<b>Avg. 65 ppb Case</b>	<b>Change</b>	<b>% Change</b>
Henry Hub Natural Gas	\$/MMBtu	\$6.22	\$6.36	\$0.14	2.1%
Natural Gas Delivered (Residential)	\$/MMBtu	\$14.25	\$14.72	\$0.47	3.3%
Natural Gas Delivered (Industrial)	\$/MMBtu	\$8.73	\$9.22	\$0.49	5.6%
Gasoline	\$/gallon	\$3.68	\$3.82	\$0.14	3.9%
Electricity (Residential)	¢/kWh	14.9¢	15.1¢	0.2¢	1.2%
Electricity (Industrial)	¢/kWh	9.7¢	9.9¢	0.2¢	2.1%

Notes: Average is the simple average over 2017-2040. Figures in 2014\$.



# Figure S-9: Potential Impacts of 65 ppb Ozone Standard on Output of Non-Energy Sectors (Percentage Change from Baseline)



	<b>Agriculture</b>	<b>Commercial/ Services</b>	<b>Manufacturing</b>	<b>Commercial Transportation</b>	<b>Commercial Trucking</b>
<b>Average</b>	-0.9%	-0.4%	-0.4%	-0.9%	-0.5%
<b>(2017-2040)</b>					

Note: Values are the simple average of percentage change over 2017-2040.

# Figure S-10: Potential Impacts of 65 ppb Ozone Standard on Output of Energy Sectors (Percentage Change from Baseline)



	<b>Coal</b>	<b>Natural Gas</b>	<b>Crude Oil/Refining</b>	<b>Electricity</b>
<b>Average</b> <b>(2017-2040)</b>	<b>-22%</b>	<b>2.4%</b>	<b>-0.8%</b>	<b>-1.3%</b>

Note: Values are the simple average of percentage change over 2017-2040.

# Figure S-11: Potential Impacts of 65 ppb Ozone Standard on Annual Consumption per Household by Region



<b>Region</b>	<b>2014\$</b>
Arizona and Mountain States	-\$700
California	-\$800
Florida	-\$230
Mid-America	-\$630
Mid-Atlantic	-\$1,440
Mississippi Valley	-\$630
New York/New England	-\$1,530
Pacific Northwest	-\$310
Southeast	-\$620
Texas, Oklahoma, Louisiana	-\$1,480
Upper Midwest	-\$480
<b>U.S.</b>	<b>-\$840</b>

Notes: Values are the levelized average over 2017-2040, annualized using a 5% real discount rate.



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