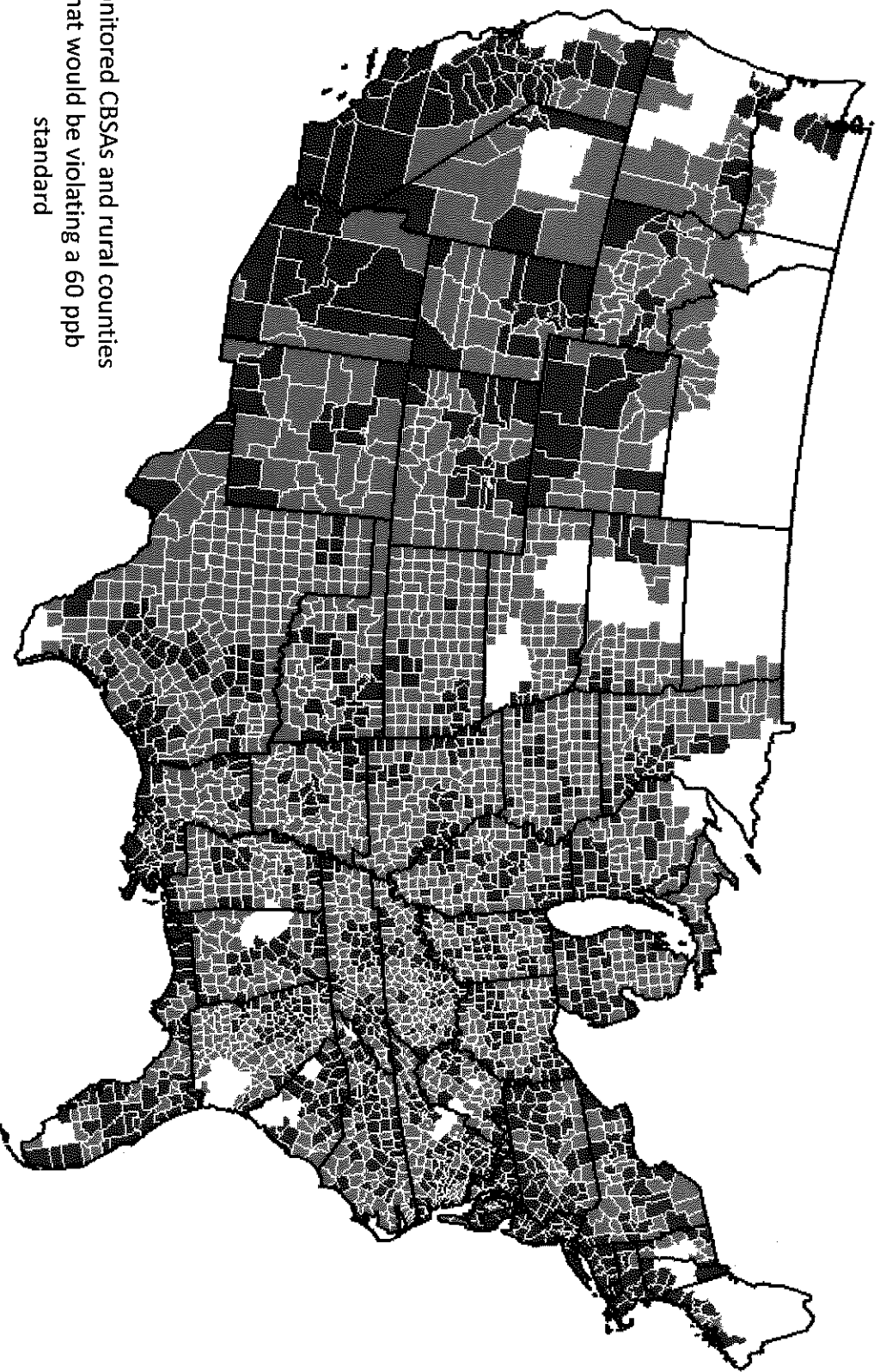


# Ozone NAAQS – Energy Issues

November 18, 2014

# Monitored Areas Exceeding 60 PPB And Un-Monitored Areas Estimated To Exceed 60 PPB Based on Spatial Interpolation



Monitored CBSAs and rural counties  
that would be violating a 60 ppb  
standard

Unmonitored areas that have  
estimated ozone levels that would  
be violating a 60 ppb standard  
(based on spatial interpolation)

# Ozone NAAQS – Energy Issues

One of the Duties of Clean Air Scientific Advisory Committee (CASAC) under the Clean Air Act is:

(5) Advise the Administrator of any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance of the NAAQS.

# Ozone NAAQS – Energy Issues

In addition to the dramatic impacts to the refining sector of a lowered Ozone Standard the downstream sector is also negatively affected by regulatory add-ons of:

- Refinery Sector Rule
- Renewable Fuels Standard
- NSPS for EGU (power plant rule) AND
- Tier 3 implementation

# Ozone NAAQS – Energy Issues

- Lower Ozone NAAQS >>> Pressure on Refineries
- Fuel reformulation has been a key EPA strategy to mitigate ozone
- Any effort to reduce gasoline RVP (Reid Vapor Pressure) will drive refinery emissions increases
  - Baker & O'Brien study examined the impact of *both sulfur and RVP* changes; found the impacts could be severe.
  - The required increase in fuel consumption at refineries causing a 1% - 2.3% increase in GHG emissions would similarly increase NOx emissions.

# **Potential Oil & Gas Impacts of a Tighter Ozone Standard – Case Study**

- NERA prepared a report on the potential costs and economic impacts of a 60 ppb ozone NAAQS level
- This presentation focuses on a sensitivity analysis in that study to address potential barriers to natural gas development in the U.S. that could also result from a very stringent ozone NAAQS
- NERA report available at:  
[http://www.nera.com/67\\_8644.htm](http://www.nera.com/67_8644.htm)

# **Oil & Gas Permitting Concerns that May Worsen with Potential Tighter Ozone NAAQS**

Main case of NERA's analysis findings:

- Large increases in gas consumption
- Non-attainment areas are very widespread, and have potential to encompass many gas-supply areas, mostly rural
- Emissions in rural areas often primarily from non-point sources, making it difficult to find many sources for potential Emission reduction credits supply
- Oil & gas activities may start to face NAAQS-related barriers to expansion

- NERA conducted a production sensitivity case to assess how economic impact estimates might be affected under this uncertainty
  - “Main case” assumed no permitting barriers to oil & gas development
  - “Production sensitivity case” assumed significant but not absolute barriers to natural gas development



- The sensitivity case reflects just one possible degree of constraint on further development
  - Lies somewhere between unconstrained and a full ban
  - Does not include any constraint on oil development
- The sensitivity case assumed a similar constraint would apply to all supply regions of the US.

## **Main case for 60 ppb Ozone NAAQS results in projected natural gas supply growth:**

	2017	2020	2023	2026	2029	2032	2035	2038
<i>Natural Gas (Quadrillion Btu)</i>								
Baseline	26.7	29.4	31.3	32.7	33.6	34.6	35.7	36.7
60 ppb Case	26.8	28.9	34.6	37.4	38.1	39.0	40.2	41.2
Change	0.17	-0.6	3.2	4.7	4.4	4.4	4.5	4.5

## **Sensitivity case considered what could happen if U.S. gas supply could not increase due to permitting constraints:**

<i>Natural Gas (Quadrillion Btu)</i>								
	2017	2020	2023	2026	2029	2032	2035	2038
Production Sensitivity	26.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9

***The assumed flat U.S. supply after 2020 implies that some U.S. natural gas development does continue to occur; a complete ban would result in supply declines after 2020***

## Projected average<sup>(\*)</sup> sectoral output changes (relative to Baseline):

	Emissions Reduction Costs Only (Main Scenario)	Sensitivity Case with Constrained Gas Production
<i>Non-Energy Sectors</i>		
Agriculture	-2.2%	-2.7%
Commercial/Services	-0.9%	-1.2%
Manufacturing	-0.6%	-1.3%
Commercial Transportation	-1.9%	-2.4%
Commercial Trucking	-1.1%	-1.5%
<i>Energy Sectors</i>		
Coal	-52%	-52%
Natural Gas	9.2%	-11%
Refining	-1.8%	-2.3%
Crude Oil	-0.1%	0.2%
Electricity	-3.1%	-9.7%

(\*) Note: Average is the simple average over 2017-2040.

Source: NERA report, Figures 19 and 32

## Main Case: Emissions Reduction Costs Only:

## Sensitivity Case including Constraints on Nat Gas Development:

<i>(2013\$)</i>	Annualized	Present Value	Annualized	Present Value
GDP Loss (Billions)	\$270/year	\$3,390	\$360/year	\$4,480
Consumption Loss per Household	\$1,570/year	N/A	\$2,040/year	N/A
		Avg. (2017-2040)		
Baseline Annual Job-Equivalents (millions)		156	Avg. (2017-2040)	
<i>60 ppb Case:</i>				
Real Wage Rate (% Change from Baseline)		-1.2%		-2.0%
Change in Labor Income (% Change from Baseline)		-1.9%		-2.7%
Change in Job-Equivalents (millions)		-2.9		-4.3

Notes: Present value is from 2017 through 2040, discounted at a 5% real discount rate. Consumption per household is an annualized (or leveled) value calculated using a 5% real discount rate. "Job-equivalents" is defined as total labor income change divided by the average annual income per job. This value does not represent a projection of numbers of workers that may need to change jobs and/or be unemployed, as some or all of it could be spread across workers who remain employed, and the average is a simple average over 2017-2040.

Source: NERA report, Figures S-7, S-8, S-13, and S-14

# Findings

- Oil & gas production and refining face potential permitting issues under a tighter ozone NAAQS that could constrain production.
- NERA's production sensitivity case indicates the potential for increased negative impacts of a tighter ozone NAAQS.

# **Implications**

- Sensitivity case should be part of the EPA's RIA
- The potential impacts on refining and oil and gas production are justification to include the current standard in the range of options for comment.