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CHALLENGES AND IMPLICATIONS OF EPA'S PROPOSED NATIONAL AMBIENT AIR QUALITY STANDARD FOR GROUND-LEVEL OZONE AND LEGISLATIVE HEARING ON S. 638, S. 751, AND S. 640

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

JUNE 3, 2015

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ONE HUNDRED FOURTEENTH CONGRESS
FIRST SESSION

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CHALLENGES AND IMPLICATIONS OF EPA'S PROPOSED NATIONAL AMBIENT AIR QUALITY STANDARD FOR GROUND-LEVEL OZONE AND LEGISLATIVE HEARING ON S. 638, S. 751, AND S. 640

WEDNESDAY, JUNE 3, 2015

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The committee met, pursuant to notice, at 9:32 a.m. in room 406, Dirksen Senate Building, Hon. James Inhofe (chairman of the committee) presiding.

Present: Senators Inhofe, Barrasso, Capito, Crapo, Boozman, Sessions, Fischer, Rounds, Sullivan, Boxer, Carper, Whitehouse, Merkley, Gillibrand, Booker, and Markey.

OPENING STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. Our meeting will come to order.

We are going to have myself and the Ranking Member, Senator Boxer, give our opening statements and then refer to members by the order they come. That will mean you will be going first, Mr. Olson, in explaining what your legislation is and the same for the rest of the members as they come in.

The first hearing I ever held as Chairman of the Clean Air Subcommittee was in February 1997 on the ozone standard. It was the first of seven hearings held on what was then referred to as "the single largest environmental regulation ever proposed."

Today, we are again conducting oversight of the EPA and the proposed ozone standard, which is set between 65 and 70 parts per billion. We will hear directly from officials responsible for implementing and administering EPA's new standard.

We like to hear from people in the field who are going to be responsible for upholding all these brilliant things we do here. We want to welcome Judge/Executive Gary Moore, from Boone County, Kentucky; County Commissioner Mike McKee, from Uinta County, Utah; and Kanti Srikanth, Director of Transportation Planning for the National Capital Region Transportation Planning Board.

We are also here to examine three pieces of legislation. The first bill, sponsored by Senator Thune and Senator Manchin, requires 85 percent of the counties that have not met the 2008 standard to achieve it before EPA can lower the standard further. Congressman

Pete Olson, who has introduced the House version of this bill, is also with us today.

Additionally, Senator Flake is introducing two bills. The first extends EPA's existing timeline to review NAAQS to every 10 years. The second amends the Exceptional Events rule, which States rely on when events out of human control contribute to ozone readings exceeding the allowed level. All three of these are commonsense, good government bills that strengthen the NAAQS setting process while advancing the trend of improved air quality.

EPA's ozone proposal is the most expensive regulation in history with projected costs of $1.7 trillion and 1.4 million lost jobs. Up to 67 percent of counties fail to meet the proposed lower standards, which means if this rule goes forward, they will face a legacy of EPA regulatory oversight, stiff Federal penalties, lost highway dollars, restrictions on infrastructure investment, and increased costs to businesses.

The costs and burdens associated with expanding roads and bridges will be exponential. Further concerning is that EPA's proposal does not even account for high levels of naturally occurring ozone present or transported in many parts of the Country, which is why pristine national parks like the Grand Canyon and Yellowstone would be placed in nonattainment status.

Looking at my home State of Oklahoma, significantly, not a single county violates the current standard, but under this new standard, all 77 of my counties in Oklahoma would be out of attainment as you can see on this map. Currently, we are in attainment in every county. That is what would happen in my State of Oklahoma.

We have spent a significant amount of time and valuable State resources to comply with the 2008 standard, but will have to spend an additional $35 billion to meet EPA's new standard should this become reality. Each household will lose an average of $900 a year, and the State will lose 35,503 jobs with $18 billion in lost GDP. Every State is facing similar losses.

In 2011, EPA proposed a standard remarkably similar to the one we are discussing today. The President rejected it then because, as he said, our economy could not handle the burden of its substantial price tag. Has our economy really improved so much in the last few years that we can easily absorb a $1.7 trillion price tag? I would say no.

Even Steve Beshear, the Democratic Governor of Kentucky, agrees. He has pledged to reduce carbon emissions in his State by 80 percent by 2050. Yet, he wrote President Obama and asked him to keep the ozone standard where it is because of the detrimental impact it would have on Kentucky job creators and manufacturers.

That is kind of interesting, isn't it, because you have the Governor, who is 70 years old, who said we will comply by 2050 with the standard in terms of emissions. He would be 105 years old, so it is easy to say you will comply with that. Everyone keep that in mind.

I have always stood in favor of clean air. I was an original cosponsor of the 1990 Clean Air Act Amendments and Clear Skies, but this proposal, like many of the EPA's recent proposals, will have negligible environmental benefits.

It is based on questionable health benefits and comes with unequivocal economic costs. Instead of creating a new regime of costly, job-killing mandates, the EPA should focus its efforts on helping counties that have not yet met the 1997 and the 2008 standards. A new standard at this time is not only irresponsible, but also impractical and economically destructive.

Senator Boxer.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

The first hearing I ever held as Chairman of the Clean Air Subcommittee was in 1997 on the ozone standard. It was the first of seven hearings held on what was then referred to as "the single largest environmental regulation ever proposed." Today we are again conducting oversight of the EPA and the proposed ozone standard, which is set between 65 and 70 parts per billion. We will hear directly from officials responsible for implementing and administering EPA's new standard. I want to welcome Judge-Executive Gary Moore, from Boone County, Kentucky; County Commissioner Mike McKee, from Uintah County, Utah; and Kanti Srikanth who is the Director of Transportation Planning for the National Capital Region Transportation Planning Board.

We are also here to examine three pieces of legislation. The first bill, sponsored by Senator Thune and Senator Manchin, requires 85 percent of the counties that haven't met the 2008 standard to achieve it before EPA can lower the standard. Congressman Pete Olson, who has introduced the House version of this bill, is also with us today. Additionally, Senator Flake is introducing two bills. The first extends EPA's existing timeline to review NAAQS to every 10 years. The second amends the Exceptional Events rule, which States rely on when events out of human control contribute to ozone readings exceeding the allowed level. All three of these are commonsense, good government bills that strengthen the NAAQS setting process while advancing the trend of improved air quality.

EPA's ozone proposal is the most expensive regulation in history with projected costs of $1.7 trillion and 1.4 million lost jobs. Up to 67 percent of counties fail to meet the proposed lower standards, which means if this rule goes forward, they will face a legacy of EPA regulatory oversight, stiff Federal penalties, lost highway dollars, restrictions on infrastructure investment, and increased costs to businesses. The costs and burdens associated with expanding roads and bridges will be exponential. Further concerning is that EPA's proposal does not even account for high levels of naturally occurring ozone present or transported in many parts of the country, which is why pristine national parks like the Grand Canyon and Yellowstone would be placed in nonattainment status.

Looking at my home State of Oklahoma, not a single county violates the current standard, but under this new standard, the whole State will be in violation. We have spent a significant amount of time and valuable State resources to comply with the 2008 standard, but will have to spend an additional $35 billion to meet EPA's new standard. Each household will lose an average of $900 a year, and the State will lose 35,503 jobs with $18 billion in lost GDP. Every State is facing similar losses.

In 2011, EPA proposed a standard remarkably similar to the one we're discussing today; fortunately, the President rejected it then because, as he said, our economy couldn't handle the burden of its substantial price tag. Has our economy really improved so much in the last few years that we can easily absorb a $1.7 trillion price tag? I would say no and even Steve Beshear, the Democrat Governor of Kentucky, agrees. He has pledged to reduce carbon emissions in his State by 80 percent by 2050, yet he wrote President Obama and asked him to keep the ozone standard where it is because of the detrimental impact it would have on Kentucky job creators and manufacturers. I'd like to submit that letter for the record.

I have always stood in favor of clean air—I was an original cosponsor of the 1990 Clean Air Act Amendments and Clear Skies—but this proposal, like many of the EPA's recent proposals, will have negligible environmental benefits, is based on questionable health benefits and comes with unequivocal economic costs. Instead of creating a new regime of costly, job-killing mandates, the EPA should focus its efforts on helping counties that have not yet met the 1997 or the 2008 standards. A new standard at this time is not only irresponsible, but also impractical and economically destructive.

I look forward to hearing from our witnesses and thank my colleagues for their leadership on this issue.

Thank you.

OPENING STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. OK. Here we go. The debate in this committee continues. It is a healthy one, by the way.

Today we examine the critically important steps that the Obama administration is taking to strengthen the ozone standard, which will save lives and protect the health of our children and families. You never heard that from my chairman. He does not talk about the impact of smog on our families and I will.

We know that ground-level ozone, often referred to as smog, is extremely harmful to human health. It is not a debatable point. Everyone agrees.

It is hard for me to believe that in this Environment Committee, we would be looking at not making further steps that are required under the law to protect our families from smog. We know too much exposure to smog leads to cardiovascular disease, respiratory ailments like asthma, emphysema, and premature death. That is all known.

It is our youngest and oldest generations, as well as those who spend the most time outdoors, who are the most vulnerable to the impacts of smog pollution. According to the Environmental Protection Agency, there are nearly 26 million people in the U.S. who have asthma.

I always say to my colleagues, when you visit a school to talk to the kids, ask them how many have asthma or know someone with asthma. I guarantee you 60 percent will raise their hands because we know there are 7.1 million children in our Nation who have asthma.

The National Ambient Air Quality Standards are the backbone of the Clean Air Act. They set the maximum level of an air pollutant, such as ozone, that is safe for us to breathe. Everyone has a right to know that the air they breathe is safe, because if they cannot breathe, they cannot go to school, they cannot work, they get sick, they go to the emergency room, and they do not have the quality of life they have a right to have.

The Clean Air Act requires, by the way, brought to you by a Republican President a long time ago and updated by a Republican President, requires that these standards be set solely on the best available health science.

To ensure the health impacts of air pollution continue to be addressed, EPA is required to review the standards every 5 years. No matter what my Republican colleagues may try to claim today, scientists overwhelmingly agree that EPA needs to adopt a stricter standard to protect the health of the American people, especially our children and the elderly. We have known since 2008 that the current ozone standard is too weak to protect the health of our families.

Last year, EPA proposed updating and strengthening the ozone standard from 75 parts per billion to a more protective range, between 65 and 70 parts per billion. It is also considering an even more protective standard of 60 parts per billion.

The EPA is doing what it must do. Otherwise, they will be hauled to court. They have to make sure our families are protected.

I have great news for those of you who want to see EPA continue to do their job. Just yesterday, the U.S. Court of Appeals for the District of Columbia Circuit found that the EPA has complied with the Constitution in enforcing the ozone standards. Say what you might say, they are on the side of the Constitution. They are on the side of the public health.

Here is where we stand. We have a number of bills before us that will decimate this rule. That is their purpose. I do not question my colleagues who have written these bills, but I would urge them to check out the number of kids in their States and the number of senior citizens who will have problems if we do not clean up the ozone.

The American people strongly support a tighter ozone standard. Last November, the American Lung Association found that 68 percent of voters nationwide support strengthening the ozone standards, including 54 percent of Republicans.

How out of step can you be than to move forward with a bill that is going to stop us from protecting the health of our families? You are out of step. You are out of touch. Get real about it. These bills will have a negative effect.

I am going to stop there, I am sure you are happy to know, and welcome all of our witnesses, regardless of their point of view.

I want to extend a very special welcome to one of our witnesses, Larry Greene, the Executive Director of the Sacramento Air Quality Management District. Larry, thank you so much.

California is on the front lines in the battle against air pollution. He will testify about the tremendous successes our State is having in implementing new air pollution standards.

With that, I would ask to put the rest of my statement in the record. Thank you very much, Mr. Chairman, for your kindness and allowing me to be your counterpoint.

[The prepared statement of Senator Boxer follows:]

STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR
FROM THE STATE OF CALIFORNIA

Today's hearing will examine the critically important steps that the Obama administration is taking to strengthen the ozone standard, which will save lives and protect the health of our children and families.

We know that ground-level ozone, often referred to as smog, results in dangerous air pollution that is extremely harmful to human health. It can lead to cardiovascular disease, respiratory ailments like asthma and emphysema, and premature death. And it is our youngest and oldest generations—as well as those who spend the most time outdoors—who are the most vulnerable to the impacts of smog pollution. According to the Environmental Protection Agency (EPA), there are nearly 26 million people in the U.S. who have asthma, including 7.1 million children.

The National Ambient Air Quality Standards are the backbone of the Clean Air Act, and they set the maximum level of an air pollutant, such as ozone, that is safe for us to breathe. Setting an appropriate standard is crucial to protecting the health of millions of Americans. Everyone has a right to know that the air they breathe is safe—and right now, the science says it is not.

The Clean Air Act requires that these standards be set solely on the basis of the latest available health science. To ensure the health impacts of air pollution continue to be addressed, EPA is required to review the standards every 5 years to make sure they are up to date. Despite what some of my Republican colleagues may try to claim today, scientists overwhelmingly agree that EPA needs to adopt a stricter standard to protect the health of the American people, especially our children and

the elderly. We have known since 2008 that the current ozone standard does not provide the necessary health safeguards.

Last year, EPA proposed updating and strengthening the ozone standard from 75 parts per billion to a more protective range, between 65 and 70 parts per billion. It is also considering an even more protective standard of 60 parts per billion.

And the EPA is doing its job to protect public health. Just yesterday, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's determinations concerning which regions in the U.S. have met its existing ozone standard. The Court found that EPA had complied with the Constitution, had reasonably interpreted the Clean Air Act, and in many cases exceeded its obligation to engage in reasoned decisionmaking.

I often say, if people can't breathe, they can't go to work or school. Ozone pollution has been proven to cause thousands of lost school days and work days each year, as well as an increased number of asthma attacks and bronchitis cases, and more emergency room visits and hospital admissions.

The American people strongly support a tighter ozone standard. Last November, the American Lung Association found that 68 percent of voters nationwide support strengthening the ozone standards, including 54 percent of Republicans.

We will also discuss three bills today that would have negative impacts on our air quality and public health. These bills would delay the health protections of the ozone standards, block implementation of an ozone standard altogether, or create new loopholes for how air pollution data is assessed.

I will continue to work with my colleagues to fight any efforts to undermine our environmental laws that protect the most vulnerable populations. No one's health should be threatened by the air they breathe, especially our children's.

I would like to extend a special welcome to one of today's witnesses, Larry Greene, the Executive Director of the Sacramento Air Quality Management District. California is on the front lines in the battle against air pollution, and he will testify about the tremendous successes our State has had in implementing new air pollution standards.

For example, in 1976, there were 166 days when health advisories were issued in Southern California to urge people with asthma and other people with lung sensitivities to stay indoors. In 37 years, the number of smog-related health advisories issued in Southern California dropped from 166 days in 1976 to 1 day in 2013. And in March of this year, a peer-reviewed study by researchers at the University of Southern California found that reducing air pollution leads to improved lung development and respiratory function in school-aged children.

Environmental safeguards have improved our quality of life and made our children safer and healthier, and we need to continue down this path. I look forward to hearing the testimony of today's witnesses.

Senator INHOFE. Thank you, Senator Boxer.

As we stated earlier, as they come in, the sponsors of the legislation will be heard to explain. Maybe they disagree with Senator Boxer as to the purpose of your legislation and if so, feel free to say so.

I will recognize you, Mr. Olson. Thank you for coming across the campus.

STATEMENT OF HON. PETE G. OLSON, U.S. REPRESENTATIVE FROM THE STATE OF TEXAS

Representative OLSON. Thank you, Chairman Inhofe, Ranking Member Boxer and committee members for allowing me to speak to you this morning.

I have worked on Capitol Hill, this side, for 10 years, two on active duty in the Navy, four for Senator Phil Gramm, and four as John Cornyn's first Chief of Staff. I know your time is precious. I will be very brief.

I will describe the bills I have introduced about ozone with support from your fellow colleagues here in the Senate.

My hometown of Houston, Texas has a great story to tell about ozone. When I moved there in 1972, we had the highest ozone levels in America. Hard work and lots of money have put us on track

to be in full attainment for ozone in the next few years. We have driven down the field and are about to kick the field goal to win, but EPA is moving the goal posts.

Nature produces ozone, so levels can only go so low. Much of the factors adding to our ozone are out of our control. We have ozone coming from China or annual crop burnings in Mexico.

EPA calls ozone we cannot control "background ozone." They admit that half of the ozone in America is beyond our control. Yet, EPA's new proposed standard for ozone is approaching background levels.

Many parts of our Country, farms and ranches, have very little ozone they can control. EPA tells them the tools needed to comply are, again, "unknown." Healthy air and healthy water are priority one.

Impossible rules help no one and they can hurt. The Texas manufacturing sector employed 875,000 and generated over $200 billion in GDP a few years ago. The proposed new ozone standards will stop growth and jobs will be lost. This will not be limited to Houston. The whole Nation will feel the pain.

That is why I teamed up with Republican conference chairman, John Thune, to introduce the CASE Act, the Clean Air, Strong Economies Act. The CASE Act simply requires EPA to determine the impact of new clean air standards on the economy and jobs. It also allows States to achieve current standards before changes are made.

The other bill I want to discuss is the CLEER Act, the Commonsense Legislative Exceptional Events Reform Act.

Jeff Flake has introduced the same bill here in the Senate. As ozone standards are lowered, spikes and emissions beyond our control can push an area out of attainment. My home State has been waiting for 4 years for EPA to respond to a request for the massive fires near Bastrop in 2011.

EPA has admitted the Exceptional Events Rule needs reform. The CLEER Act is a step in that direction.

Thank you for your time and your consideration.

Senator INHOFE. Thank you very much.

I know that Senator Thune will be here to talk about the same legislation. Are you handling both legislations from Senator Thune and Senator Flake on the House side?

Representative OLSON. Yes, sir.

Senator INHOFE. It is very nice to have you here.

Senator Flake.

OPENING STATEMENT OF HON. JEFF L. FLAKE, U.S. SENATOR FROM THE STATE OF ARIZONA

Senator FLAKE. Thank you, Mr. Chairman, Ranking Minority Member and all the members. Thank you for allowing me to come here and talk about the CLEER Act and the ORDEAL Act.

As Pete mentioned, with the CLEER Act, we are looking to simply bring some commonsense to the EPA's approach.

My family has been in Arizona since 1878 when it was a territory. The dust storms we are talking about rolled through the territory at that time, they do today and will long after my family is gone.

Senator INHOFE. And go straight from there to Oklahoma.

Senator FLAKE. That is right. It is much like tornadoes in the Midwest or elsewhere or hurricanes. It is simply a natural event. The problem is the EPA simply will not treat it as such.

The CLEER Act will simply ease the regulatory burden of States, including arid States like Arizona, from these exceptional events.

When these dust storms occur, they cause a spike in the particulate level and this blip will have a dramatic regulatory impact on the States. They will be found in noncompliance, even though, as I mentioned, it is no fault of their own. Due to Federal air quality standard regulations, it leads to penalties like loss of Federal transportation dollars.

Faced with repercussions they did nothing to cause, States dedicate vast amounts of manpower, countless work hours, and considerable financial resources to reviewing these events that, as I mentioned, they do not control.

For example, the Arizona Department of Environmental Quality, the Maricopa County Air Quality Department, and the Maricopa Association of Governments in 2011 and 2012, spent about $675,000 and 790 staff hours to prove that the spike in PM 10 levels was caused by a dust storm and not by pollution. Again, they spent $675,000 and 790 staff hours just to say it was a dust storm.

Historically, EPA's reviews under this exceptional event rule have been arbitrary, cumbersome and costly. They have lacked an appeals process. We are simply saying let us introduce a little common sense. The CLEER Act would simply require a rulemaking and that decisions on such events be based on the preponderance of evidence. It would accord deference to the State's own findings of such when such an event happened.

It would also require the EPA to review States' exceptional events documentation within a reasonable time period. As Pete mentioned, you wait and wait and wait for the EPA to actually review this. They drag it out and as I mentioned, there is no appeals process.

As if being wrapped around this regulatory axle is not enough, Arizona will soon face the already stringent air quality standard for ozone. That is why I have introduced the ORDEAL Act.

When the EPA reduced ozone standards in 2008, as we know, counties across the Country that were in nonattainment were forced to enact further expensive and complicated compliance plans. Now relying on what I think we all can accept are some dubious scientific bases, the EPA has proposed lowering the ozone emissions standards even more to 65 ppb while accepting comments, as mentioned, to lower it even further to 60 ppb.

By some estimates, as I am certain the committee is aware, the proposal of the lower ozone level may be the most expensive regulation in history, as the Chairman mentioned, costing as much as $1.7 trillion. Lowering ozone standards from 75 ppb to 65 ppb would cost a whopping $140 billion annually.

EPA's own science advisors disagree on the very basis of this regulation. Simply put, the lowering of the ozone standard is unnecessary. U.S. air quality has been improving for the past three decades. Since 2000, air quality has improved by 18 percent due to lower ozone levels.

We all recognize, as Pete said, we would love to have lower ozone levels. A lot of that is natural and occurs naturally. We all accept that you could not lower it to 45 ppb. That would be just unreasonable. There are some standards that are reasonable and some standards that are not.

It is not that we all do not want the same goal of cleaner air. We just have to figure out what that standard is.

As mentioned, there is a 5-year review process. The ORDEAL Act would give States flexibility and time to implement their own innovative and proactive measures. The bill, most importantly, would extend all air quality standards review, including ozone, to a 10-year timetable instead of the current 5-year period. That would give a little leeway and allow States and all of us to breathe a little easier.

Thank you for your time.

Senator INHOFE. Thank you, Senator Flake.

Senator Thune, before you came in, we commented that Congressman Olson is introducing similar legislation to all three pieces we are hearing today. You are recognized to explain yours.

OPENING STATEMENT OF HON. JOHN THUNE, U.S. SENATOR FROM THE STATE OF SOUTH DAKOTA

Senator THUNE. Good morning. Thank you, Mr. Chairman Inhofe and Ranking Member Boxer for giving me the opportunity to speak in front of the committee this morning.

I want to thank all the members for the chance to talk about a bill I have introduced called the CASE Act. It is a bipartisan bill introduced with Senator Manchin that would prevent the staggering blow that a lower ozone standard would deliver to the economy at a time when many of our industries are seeking to turn the corner.

After an area is deemed in nonattainment with the smog standard, communities face stiff Federal penalties, increased business costs, restrictions on infrastructure investment and lost highway dollars.

When businesses are restrained by regulatory overreach, they cannot expand, jobs are put at risk and innovation is stifled. Areas in nonattainment or even those in marginal attainment will face steep challenges in promoting economic development or attracting new businesses.

In fact, it was for these exact reasons, regulatory burdens and regulatory uncertainty, that the Obama administration withdrew a similar proposal in 2011. The cost of a lower smog standard has hardly lessened and the hit this could have on manufacturing and other economic sectors nationwide would be unprecedented.

The bipartisan CASE Act strikes a balance between economic growth and environmental progress by requiring the EPA to first focus on the most polluted areas that are in nonattainment with the current standard before it can implement a lower one.

We have made great progress in cleaning up our air and pollution levels are at an all time low. However, 40 percent of Americans live in the 227 counties that have not yet met the 75 ppb standard set in 2008. The CASE Act would require 85 percent of these counties to achieve compliance with the existing 75 ppb

standard before the EPA can impose a stricter regulation like the one proposed in November.

The EPA needs to focus its efforts on areas already struggling with attainment where smog remains a consistent problem. We should first tackle smog where it is the worst, in places like Los Angeles and not go after regions like the Great Plains where there clearly is not a smog problem.

The EPA contends that a lower standard will benefit public health, yet most of these benefits will come from reductions of other criteria pollutants like particulate matter which are already subject to their own regulations.

Moreover, the EPA would be well served to acknowledge that it has not yet sufficiently implemented the existing 2008 standard and prioritized its efforts to combat smog in the most polluted areas.

The CASE Act would also require the EPA to consider the cost and feasibility of a lower standard which it currently does not consider. At a standard of 65 ppb, approximately 75 percent of the projected costs are attributed to unknown controls or technologies and emission reduction strategies that have yet to be developed. Hinging a regulation of this magnitude on unknown controls could hamper economic growth with staggering costs for years to come.

I want to thank you for the opportunity to come before this committee and introduce the CASE Act today. I hope you will agree that this bipartisan bill is a reasonable way forward to prioritize smog in the most polluted areas while not imposing undue costs on the American economy and work force.

Mr. Chairman, I appreciate the opportunity to present this legislation and encourage its consideration.

Thank you.

Senator INHOFE. Thank you, Senator Thune. I thank all three of you.

You are certainly welcome to stay but we will excuse you now. We will now be hearing from witnesses.

In my opening statement before you came in, Senator Thune, I pointed out that Oklahoma is in a situation where we are in total compliance today but with the passage of this, all 77 counties would be out of attainment.

Senator BOXER. Mr. Chairman, if I could just thank the colleagues before you leave. I just wanted to make a point.

You were very eloquent about you do not want to pay the price for pollution that comes from elsewhere. There is a whole set of exceptional event rules that the EPA has which they are updating. I hope you will take a look at it because that might satisfy you. You make a very important point.

They say "They have ways to exclude the impacts of other pollution." I just wanted you to know that.

Senator INHOFE. Thank you, Senator Boxer.

Senator BOXER. Thank you.

Senator INHOFE. We would ask all the witnesses to come to the table.

Mr. Kanathur "Kanti" Srikanth is Director, National Capital Region Transportation Planning Board, Metropolitan Washington Council of Governments. Michael McKee is Chairman of the Uinta

County Commission. The Honorable Gary Moore is Judge/Executive, Boone County, Kentucky and President, National Association of Regional Councils. Gregory B. Diette, MD, MHS, is Professor of Medicine, Epidemiology and Environmental Health Science, Johns Hopkins University. Larry Greene is Executive Director, Sacramento Metropolitan Air Quality Management District. It is nice to have all five of you here.

We will go ahead and start. We do have a request from one of our members who happens to be the leader of the Senate who wants to participate in the introduction of one of you. We will stop when he comes in.

We will recognize you now, Mr. McKee.

STATEMENT OF MICHAEL McKEE, CHAIRMAN, UINTA COUNTY COMMISSION

Mr. MCKEE. Mr. Chairman, and members of the Committee, I am Michael McKee and I serve as the Chairman of the Uinta County Commission located within the Uinta Basin in eastern Utah.

I am honored to testify before the Committee today to discuss the issues we face in controlling ozone levels in the Uinta Basin, especially the unique occurrence of high winter ozone levels.

Only two places in the Nation experience high levels of winter ozone: the upper Green River Basin in Wyoming and the Uinta Basin in Utah. High winter ozone levels are a result of a complex mix of geographic, meteorological, and emission conditions.

Primarily, winter ozone levels rise when snow cover and multi-day temperature inversions occur. An inversion is what occurs when high level warmer air traps low level cold air inside the Basin. Snow reflects the sunlight back up to the cloud cover and this becomes the perfect mix to allow pollutants close to the surface to build and react to produce ozone. In the absence of these conditions, exceedances of EPA's ozone standard have not been observed.

Although it is clear that our oil and gas industry contributes to ozone precursors through the release of NO_x, VOC and formaldehyde, those same releases do not create high levels of ozone absent precise weather conditions.

The county, the State of Utah, the Ute Tribe and industry have spent several years and millions of dollars to study, monitor, and model winter ozone. After all of this work, what we know for sure is that we need several more years of scientific research and monitoring to ensure that investments we make are effective and that we have a precise model in order to formulate an appropriate regulatory structure.

We are currently under the threat of nonattainment under current EPA ozone standards. However, not the State, the EPA, nor the county understand what measures would be effective to reduce elevated winter ozone episodes.

Even if EPA were to force the Uinta Basin into nonattainment, absent several additional years of scientific studies, monitoring, and modeling, a State implementation plan would unlikely be effective, yet would devastate our economy by implementing a regulatory scheme at great cost to industry and perhaps with few results.

The proposed lowering of the ground level ozone standard would of course make our situation nearly impossible to avoid nonattainment status, yet would do nothing to improve our air quality.

The Clean Air Act simply does not contemplate the multifaceted nature of winter ozone nor does it provide the necessary tools to deal with the issue.

Uinta County wants to improve our air quality. That is not a debate. Our oil and gas industry is willing to make major investments to reduce emissions controls but will only do so if these investments are recognized and credited by EPA.

In the case of the Uinta Basin, we need more scientific resources dedicated toward the problem and we need flexibility to implement regulatory actions to determine the most effective controls to improve our air quality.

The oil and gas industry is responsible for 60 percent of our economy and 50 percent of our jobs. We need this industry to stay in the Uinta Basin to feed our economy and provide the resources necessary to tackle our ozone problems. Under non-attainment, the industry and their investment will simply relocate to other areas if not to other countries.

Mitigating winter ozone requires new authorities and opportunities for collaboration between State, tribal and local governments.

A lower ozone standard does not improve our air quality. It simply ties our hands and prevents Uinta County and areas from the west where we have high elevations opportunities to find creative solutions.

I would ask the committee to explore new authorities and look to successful efforts that have actually improved air quality. I would draw the committee's attention to the Early Action Compact process that the EPA implemented in early 2000 and was very successful but litigation forced the agency to withdraw the program.

The Early Action Compact program allowed several communities to comply with ozone standards in a very short time. The program allowed communities and States to enter into agreements with the EPA to implement actions in a creative fashion that proved to be very effective and the majority of communities that participated in the program were able to lower ozone levels to within the Federal standard.

The program required the achievement of milestones, reporting to the EPA, completion of emissions inventories, modeling, and control strategies. Flexibility is a key component to allow communities to implement solutions to air quality issues that are unique to their area.

We believe that an authority similar to the Early Action Compact program with provisions that contemplate the complexities of winter ozone is an appropriate mechanism for communities to improve its air quality without destroying its economy.

We all want to improve our air quality. A lower ozone standard does not achieve that goal. It actually makes it more difficult to achieve. We oppose increasing ozone restrictions and standards and request the committee to explore new tools in our efforts to improve our air quality. We look forward to working with the Committee toward that end.

I thank you for the opportunity to testify today and thank you for this opportunity. I would be happy to answer any questions or provide additional information.

[The prepared statement of Mr. McKee follows:]

U. S. Senate Committee on Environment and Public Works
Chairman Jim Inhofe

Challenges and Implications of EPA's Proposed National Ambient Air Quality Standard for Ground-Level Ozone and Legislative Hearing on S. 638, S. 751, and S. 640

Testimony of Uintah County Commissioner Michael McKee, Chairman
Uintah County, Utah
Wednesday, June 3, 2015

Mr. Chairman, and Members of the Committee, I am Michael McKee and I serve as the Chairman of the Uintah County Commission located within the Uinta Basin in eastern Utah. I am honored to testify before the Committee today to discuss the issues we face in controlling ozone levels in the Uinta Basin—especially the unique occurrence of high winter ozone levels.

Geographically, the Uinta Basin is true to its name, we are surrounded by mountains on all sides with some exceeding 13,000 feet in elevation but with cities and towns at about 5,000 feet in elevation. Uintah County is a 4,487 square mile area but with only about 34,000 people occupying this vast area, yet, we struggle in some years to comply with current federal ozone standards in the winter time. At the same time, we also have a complex air shed. The Ute Tribe resides in the Uinta Basin and therefore we have a jurisdictionally shared air shed that is managed by both the State of Utah and the EPA on behalf of the Ute Tribe.

Winter Ozone in the Uinta Basin

Only two places in the nation experience high levels of winter ozone: the upper Green River Basin in Wyoming and the Uinta Basin in Utah. High winter ozone levels are a result of a complex mix of geographic, meteorological, and emission conditions. Primarily, winter ozone levels rise when snow cover and multi-day temperature inversions occur. An inversion is

essentially high level warmer air trapping low level cold air inside the Basin. Snow reflects the sunlight back up to the cloud cover and this becomes the perfect mix to allow pollutants close to the surface to build and react to produce ozone. In the absence of these conditions, exceedances of EPA's ozone standard have not been observed.

Other factors such as high levels of background ozone and naturally occurring emissions also add to our winter ozone equation. Imported ozone and high elevations, as experienced throughout the west, contribute significantly to high ozone episodes in the Basin—making it that much more difficult to comply with existing Federal standards. Elevation is a much stronger predictor of where winter ozone will occur than the proximity to NOx and VOC. Monitoring sites at lower elevations tend to have higher ozone levels within the Basin and those areas over 2000 meters above sea level tend not to experience ozone exceedances, even during the strongest inversion episodes. Several years of scientific monitoring and modeling thus far reveal that winter ozone in the Basin is principally derived from formaldehyde and other similar compounds. Formaldehyde can be released directly into the atmosphere or can be formed through chemical reactions of NOx and VOC.

Although it is clear that our oil and gas industry contributes to ozone precursors through the release of NOx, VOC, and formaldehyde, those same releases do not create high levels of ozone absent precise weather conditions. The County, the State, the Ute Tribe and industry have spent several years and millions of dollars to study, monitor, and model winter ozone. After all of this work, what we know for sure is that we need several more years of scientific research and monitoring to insure that investments we make are effective and that we have a precise model in order to formulate an appropriate regulatory structure.

Clean Air Act Compliance

The EPA under current ozone standards of 75 parts per billion are already threatening to place the Uinta Basin into nonattainment status for ground level ozone. Yet, given the complex nature of winter ozone, the State, the EPA, nor the County understand what measures would be effective to reduce elevated winter ozone episodes. Even if EPA were to force the Basin into nonattainment, absent several additional years of scientific studies, monitoring, and modeling, a State Implementation Plan would unlikely be effective yet would devastate our economy by implementing a regulatory scheme at great cost to industry and perhaps with few results. The proposed lowering of the ground level ozone standard would of course make our situation nearly impossible to avoid nonattainment status—yet would do nothing to improve our air quality.

The Clean Air Act simply does not contemplate the multifaceted nature of winter ozone nor does it provide the necessary tools to deal with the issue. The citizens of Uintah County want to improve our air quality—that is not a debate. We have worked with our oil and gas industry and they are willing to make major investments in emissions controls but are hesitant to do so without certainty that the investments will be effective and that they will credited for these investments if a State Implementation Plan is necessary following a nonattainment determination. In the case of the Uinta Basin, we need more scientific resources dedicated toward the problem and we need flexibility to implement regulatory actions to determine the most effective controls to improve our air quality. We need the oil and gas industry to stay in the Uinta Basin to not only feed our economy but to help provide the resources necessary to tackle our ozone problem. If we go into non-attainment, the industry will simply relocate to areas where the additional costs associated with emissions controls are not required and a struggling economy will go into a tail spin with few resources available to dedicate toward air quality improvement.

A lower ozone standard will place the Basin into nonattainment immediately. Nonattainment under the Clean Air Act will push my county into a regulatory structure that is ill equipped to actually improve air quality but only requires the maintenance of poor air quality. Winter ozone is not as simple as taking cars and trucks off the road in the summertime as in many metropolitan areas. We have a complex problem that requires new authorities and new approaches and opportunities for collaboration between the State, the Ute Tribe, the EPA, and the affected county governments. A lower ozone standard does not improve our air quality; it simply ties our hands and prevents Uintah County from continued scientific investments and creative solutions.

I would ask the Committee to explore new authorities and look to successful efforts that have actually improved air quality in areas experiencing high ozone levels. I would draw the Committee's attention to the Early Action Compact process that the EPA implemented in the early 2000's and was very successful but litigation forced the agency to withdraw the program. The Early Action Compact program was very successful and several communities were able to comply with ozone standards in a very short time frame. The program allowed communities and states to enter into agreements with the EPA to implement actions in a creative fashion that proved to be very effective and the majority of communities that participated in the program were able to lower ozone levels to within the Federal standard. The approved compacts required the achieving of milestones, reporting to the EPA, completion of emissions inventories, modeling, and control strategies. The compacts provided for future growth and required involvement of the public. Flexibility is a key component to allow communities to implement solutions to air quality issues that are unique to their area. We believe that an authority similar to the Early Action Compact program with provisions that contemplate the complexities of winter ozone is an appropriate mechanism for communities such as mine to improve its air quality

without destroying its economy. We all want to improve our air quality—a lower ozone standard does not achieve that goal—it actually makes it more difficult to achieve. I request the Committee to explore new tools in our efforts to improve our air quality and we look forward to working with the Committee toward that end.

I thank you for the opportunity to testify today and I will be happy to answer any questions you may have or provide additional information.

Senator INHOFE. Thank you, Mr. McKee.

I think I failed to say we are going to try to stay within our 5-minute limit. Your entire statement will be made a part of the record.

Mr. Srikanth.

STATEMENT OF KANATHUR "KANTI" SRIKANTH, DIRECTOR, TRANSPORTATION PLANNING BOARD, METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS, ON BEHALF OF THE ASSOCIATION OF METROPOLITAN PLANNING ORGANIZATIONS

Mr. SRIKANTH. Good afternoon, Mr. Chairman.

I want to thank Chairman Inhofe and Ranking Member Boxer for this opportunity to provide testimony.

I am testifying today on behalf of the Association of Metropolitan Planning Organizations. I would like to submit my entire testimony for the record.

I am here to present a practitioner's perspective on the implications of changes to the existing ozone standards and the potential issues for transportation planning and programming in metropolitan areas.

I have no position on where the standards should be set. Wherever it is set, the MPOs in the Country will have to comply with it and my MPO, I am sure, will comply with it.

I am the staff director of the National Capital Transportation Planning Board which is the metropolitan planning organization, called MPOs, for the Washington, DC region.

As you know, MPOs are required to develop transportation plans and programs for metropolitan areas as a condition of receiving Federal transportation funds. If an MPO is located in an area that has been designated as nonattainment of EPA's air quality standards, the MPOs are also required to do something called transportation conformity analysis in order to receive transportation funds from the feds.

I would like to note that my MPO has not taken an official position on the range of the proposed ozone standards.

Senator INHOFE. I am going to ask, if you do not mind, as I mentioned earlier, if you would hesitate for a moment and allow Senator McConnell to introduce our guest from Kentucky. Would that be all right?

Mr. SRIKANTH. I would be pleased to.

Senator INHOFE. Thank you.

Senator McConnell.

Senator MCCONNELL. Thank you, Mr. Chairman.

I am sorry to interrupt your comments. I appreciate Chairman Inhofe giving me a chance to come by and introduce a friend of many years, a very important public servant in our State, Judge Gary Moore. Gary, I do not know if you have already testified or not.

Judge Moore is the current Judge/Executive of Boone County. In our State, that is like the CEO of the county, like the County Executive they have in Maryland. He was first elected in 1998. In his time as a public servant, he has achieved much success on behalf

of the people of Boone County through the application of consistent, conservative policies.

Judge Moore was raised in Pendleton County where his father served as sheriff. Years of watching his father enforce the law and serve the people of his county instilled in Gary a commitment to public service and community involvement.

In addition to serving as the Boone County Judge, he is the current President of the National Association of Regional Councils and serves in the leadership of the National Association of Counties.

Judge Moore is here today to discuss the possibility that EPA may lower the national ambient air quality standards for ground level ozone.

The National Association of Manufacturers issued a report stating this regulation could be the costliest in U.S. history. This regulation would have a serious, detrimental effect on jobs, electricity prices and could have the most devastating impact yet on Kentucky coal jobs.

For these reasons, I am proud to support my colleague, Senator Thune, in his efforts to stop this regulation by co-sponsoring the Clean Air Strong Economies Act.

Judge Moore is uniquely qualified to speak on these matters given his leadership roles in both the National Association of Regional Councils and the National Association of Counties. He has a broad perspective on how this proposed rule would affect not just Boone County but counties across the Nation, rural, suburban and urban.

He will be able to give a real world perspective on what this proposed rule will mean to folks across the Country who have to deal with the consequences.

I am pleased that my friend, Judge Moore, is here today to share his timely thoughts on this rule.

Mr. Chairman, I really appreciate the opportunity to come by and say a few words about my friend of longstanding. I am sure he will make a positive contribution to your session today.

Thank you.

Senator INHOFE. I am sure he will.

Thank you very much, Senator McConnell.

Mr. Srikanth, you may continue and take a little extra time. I apologize for the interruption but I told you that was going to happen.

Mr. SRIKANTH. My pleasure. No problem. Thank you.

As I was saying, my MPO has not taken a position on the proposed range of standards for ozone. The Metropolitan Washington Air Quality Committee, the regional air quality planning committee for this area set up under the Clean Air Act, has taken a position.

Its position is that the committee supports the range of proposed ozone standards between the 65 ppb and 70 ppb as being more protective of human health and the environment. The committee also notes that the standard will pose a fresh challenge to the metropolitan Washington region and believes that it is imperative that the EPA help States and local governments meet the new standards by providing assistance and adopting national rules as part of a national strategy to address air pollution.

A new ozone standard lower than the current level for this region will mean this region will not be in attainment of the new standard. According to the most recent 3-year average measurements in the region, most of the region's monitors will be exceeding the standards proposed by the EPA.

These readings also indicate that the metropolitan Washington area would need to reduce significant amounts of ozone precursors to comply with the new standards. The transportation sector will certainly have to do its part in achieving these reductions.

My MPO has been conducting transportation air quality conformity analyses since the Clean Air Act amendments of 1990. It is currently classified as marginal, nonattainment of the EPA's 2008 ozone standards which is set at 75 ppb.

The MPO also annually spends something in the range of $6 million to implement a host of programs explicitly designed to reduce emissions in this region. As a planning exercise, the MPO sets aside 15 percent of its annual budget to conduct the air quality conformity analysis.

The National Capital Region has significantly reduced emissions over the years. It has attained all of the previous ozone standards and it is on track to attain the 2008 ozone standards within a year or so.

This has really been made possible due to a number of Federal control programs supplemented by local land use and transportation investments. These are outlined in my testimony.

The critical thing here is without Federal control programs, the region would have had a difficult time attaining those standards. We are very thankful for that.

With all of the actions this region has taken, current analyses show that while the emissions will continue to reduce into the future, beyond 2025, transportation emissions are going to remain steady.

The Federal assistance will be very critical, especially in this region which does experience significant amounts of transport ozone coming into this region. The Federal assistance should encompass control programs that address the transport in a timely manner.

I would also note the Federal assistance should provide some certainty that the timely realization of emission reductions from other EPA programs is made available to regions such as ours.

Additionally, the effects of Federal involvement can help by harmonizing and simplifying some of the conformity regulations within the existing law. As always, increased transportation funding to help projects that help reduce emissions is always welcome and needed.

In conclusion, I believe the examination of current ozone standards is needed from the public health perspective. Federal assistance to States, localities and metropolitan areas to help attain the standards is also needed.

I thank you for your time and the opportunity to speak before this committee. I will be happy to answer questions at the appropriate time.

[The prepared statement of Mr. Srikanth follows:]

TESTIMONY OF

KANATHUR SRIKANTH
DIRECTOR OF TRANSPORTATION PLANNING
NATIONAL CAPITAL REGION
TRANSPORTATION PLANNING BOARD
METROPOLITAN WASHINGTON
COUNCIL OF GOVERNMENTS

ON BEHALF OF THE

ASSOCIATION OF METROPOLITAN PLANNING ORGANIZATIONS

BEFORE THE

U.S. SENATE ENVIRONMENT AND PUBLIC WORKS COMMITTEE

June 3, 2015
Washington, D.C.

Association of Metropolitan Planning Organizations
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June 3, 2015

Mr. Chairman and Members of the Committee, I am Kanathur Srikanth, Director of Transportation Planning for the National Capital Region Transportation Planning Board (TPB), the Metropolitan Planning Organization (MPO) for the Washington, DC region. I am appearing today at your invitation and on behalf of the Association of Metropolitan Planning Organizations (AMPO) of which I am an active member, serving as a member on its Policy Committee and the Air Quality Group.

First I would like to thank Chairman Inhofe and Ranking Member Boxer for holding this hearing to review critical issues surrounding the proposed revisions to the 8 hour National Ambient Air Quality Standards (NAAQS) for ground level ozone and potential implications of the proposed revisions on regional transportation planning.

I understand the Committee is discussing the state and local implications and implementation challenges of the Environmental Protection Agency's (EPA's) proposed ozone standards across the United States. I am here to present a practitioner's perspective on how lowering the existing 8 hour ozone standard could impact transportation planning activities in metropolitan areas and on some of the potential implementation challenges. I will attempt to present the potential challenges for MPOs in general based on the efforts by and experiences of my own MPO, known as the National Capital Region Transportation Planning Board (TPB).

EPA issued a notice of proposed rulemaking (NPRM; Dec. 17, 2014), proposing to set the level of the 8-hour ozone standard to within the range of 65 to 70 ppb, reducing it from the current level of 75 ppb. In its proposed rulemaking, the EPA also solicited comment on setting the level of the ozone standard below 65 ppb, to as low as 60 ppb.

Federal transportation legislation requires that an MPO be designated for each urbanized area with a population of more than 50,000 people in order to carry out the metropolitan transportation planning process, as a condition of federal aid. About 405 MPOs operate in the United States. MPOs with a population greater than 200,000 are known as Transportation Management Areas (TMAs), and about 150 TMAs operate within the United States. The TPB for the National Capital Region is a TMA with a population of over 5M people covering about 3,000 square miles. The National Capitol Region is one of the large urban MPOs that will be affected should the EPA act to lower the 8 hour ozone standards.

The National Capital Region TPB has not taken an official position on the range of the proposed ozone standard. However, the Metropolitan Washington Air Quality Committee, the regional air quality planning body for this area established in 1992 under Section 174 of the Clean Air Act Amendments of 1990, of which the region's state and local environmental and transportation agencies are members, has taken an official position on the proposed ozone standard and has communicated this information to the EPA. The letter to the EPA notes: "Metropolitan Washington Air Quality Committee supports the range of the proposed ozone standard, 65-70 parts per billion (ppb) as being more protective of human health and the environment. ..... MWAQC believes that this proposal is the next logical step in a long term effort to improve air quality. The new standard will pose a fresh challenge to the metropolitan Washington region..... it is imperative that EPA help the states and local governments meet the new standards by providing assistance and adopting national rules as part of a national strategy to address pollution – particularly as it relates to pollution that does not originate in our region." A copy of the Metropolitan Washington Air Quality Committee's letter to the EPA is included as part of my written testimony to this Committee.

Additionally the Association of MPOs, AMPO, has communicated its position to the EPA on the proposed changes to the ozone standards. AMPO's position notes: ".....AMPO support(s) the need to protect public health, we are concerned that the proposed rule will dramatically expand the number of areas subject to transportation conformity requirements, including many areas in

which local governments have limited, if any, ability to reduce ozone levels through changes in transportation plans and projects." A copy of AMPO's letter to the EPA's docket is included as part of my detailed testimony to this Committee.

From a practitioner's perspective and with specific reference to the National Capital Region and its MPO, I provide the following observations on the implications and potential implementation challenges associated with changes to the 8-hour ozone standards.

At the MPO level, a designation of nonattainment results in the implementation of transportation conformity requirements as per Section 176(c)(2) of the Clean Air Act. Under the Clean Air Act, air quality conformity analyses must be conducted to ensure that transportation plans and programs conform to the area's state implementation plan for a particular federal air quality standard. Federal rules require that these analyses be approved before any new transportation plan or program can be adopted by an MPO. MPOs in nonattainment and maintenance areas must demonstrate conformity of their transportation Plans and Programs at least once every four years. An amendment to add a regionally significant project to the plan or program, or changes to an existing project in the plan or program would also trigger a conformity analysis.

For areas such as the Metropolitan Washington, D.C. area, where plans undergo regionally significant changes on a frequent basis due to the complexity, growth rates, and sheer size of the area's transportation systems, MPOs must conduct these analyses on at least an annual basis. The TPB's current budget includes about $2M for activities directly related to air quality analysis which represents about 15% of its total budget. A conformity analysis is a highly technical undertaking that uses considerable amounts of data, time, the use of a broad range of growth estimates, and the application of several different computer models. The development of the supporting data and assumptions used in conformity analyses involve numerous interagency consultation meetings, public hearings, and engagement of MPO board members. Results of the

conformity analysis must thoroughly vetted to ensure results are appropriate, representative, and informative.

Today, 227 counties are designated as nonattainment for the 75 ppb standard. EPA's analysis shows that the number of counties designated as non-attainment could rise to 358 under a 70 ppb standard and to 558 under a 65 ppb standard. Many of these localities have not previously been designated non-attainment and as such have not previously been subject to transportation conformity requirements. The MPOs in these areas would need to budget significant amount of time and money to develop air quality conformity analyses supporting their transportation plans and programs in order to continue receive federal transportation funds. EPA's analysis indicates that many of these areas would be able to attain the new standards with the help of existing and proposed federal control programs.

A stricter ozone standard would result in the need for additional reductions in ozone precursor emissions. The Metropolitan Washington region is currently classified in as a marginal non-attainment area for the of the EPA's 2008 8 hour primary ozone standards. The region anticipates demonstrating attainment of the 2008 standard by end of this year. Current air quality modeling analyses indicate that for the National Capital Region, additional precursor reductions would need to be implemented to meet lower health-based thresholds beneath 75 ppb. The magnitude of reductions as well as the time frame needed to achieve these reductions will depend on the level of the new standard.

For example, the latest three year average (2012-2014) of ozone measurements in this region indicate that 7 of the 10 monitors have recorded values higher than 70 ppb, the upper end of EPA's proposed range, and that all 10 monitors have recorded values higher than 65 ppb, the lower end of EPA's proposed range. Ozone concentrations monitored within the Metropolitan Washington, D.C. area would need to decrease 6 ppb to 11 ppb to comply with a new lower standard. For a moderate nonattainment area, the likely compliance deadline for the new standard is 2023.

The National Capital Region has made great strides in improving its air quality. The Region has attained the 1990 ozone NAAQS (120 ppb); the 1997 ozone NAAQS (80 ppb); and anticipates attaining the 2008 ozone NAAQS (75ppb) in the coming year. Emissions reductions achieved in this region to date have been possible due to a combination of federal control programs[1] and regulatory and voluntary actions at state and local levels.

Locally, the National Capital region has taken actions on the transportation network and land use fronts to help reduce automobile travel and automobile emissions including:

- focusing its job and household growth in Activity Centers (areas that take about 9% of the land area but will host 76% of new jobs and 58% of new population).
- investing heavily in transit systems (more than 60% funding in TPB's plan is for Transit; 2/3 of activity centers will be connected by High Capacity Transit).
- strongly promoting non-motorized modes of travel (forecast increase in walk/bike trips almost same as increase in single occupant automobile trips), and
- implementing a number of regional travel demand management programs aimed at reducing automobile trips and vehicle miles travelled as a means of reducing automobile emissions of ozone precursors since the mid-1990s and costs about $6M annually.

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[1] Past federal emissions control programs have been a significant contributor. Some of the major federal controls include:

Engine Standards, On-Road
- Federal Motor Vehicle Emission Control Program (Tier I)
- NLEV-National Low Emission Vehicle Program
- Tier 2 Vehicle and Gasoline Sulfur Program
- Enhanced Vehicle Emissions Inspection and Maintenance
- Reformulated Gasoline
- Heavy-duty Highway Engine Rules

Engine Standards, Off-Road
- Nonroad Diesel Emissions Program
- Emission Standards for Locomotive and Marine Engines
- North American Emission Control Areas (Off North American Coasts)

Electric Generating Unit (EGU) Programs-Federal
- NOx Budget Trading Program/NOx SIP Call
- Cross-State Air Pollution Rule
- Cross State Air Pollution Rule (CSAPR).

The results of these significant planning efforts are that vehicle miles traveled per capita is forecasted to decrease by about 3% and growth in vehicle trips and vehicles miles traveled is forecasted to grow at rate that is less than growth in population and jobs.

Even with all of these programs and efforts, the forecasts in ozone precursor emissions from the transportation sector beyond 2025 are forecast to remain steady unless new federal vehicle and or fuel control programs are implemented. There are a number of factors for this.

First local transportation control measures in the National Capital Region have been voluntary, typically affecting only a small portion of the sector being targeted and thus producing smaller amounts of emissions reductions. Federal control programs, on the other hand, have broad applicability, can produce substantial amounts of emissions reductions and typically are much more cost-effective than voluntary local controls.

For example, current estimates of the region's travel demand management programs show that this program decreases nitrogen oxide (NOx) emissions by about 0.4% by 2025 and 0.6% by 2030. While these travel demand programs provide multiple other important benefits including improving roadway safety, reducing energy consumption, decreasing traffic congestions, and therefore should continue to be implemented and enhanced, the program does not result in a large percentage decrease in ozone precursor emissions. In contrast, emission reduction estimates for Tier 3, the latest federal emission control program for on road vehicles, are approximately 19% by 2025 and by 28% by 2030.

Second the anticipated growth of the Metropolitan Washington DC region is another factor that influences the amount of vehicular emission reductions this region can achieve via voluntary programs. In the next 25 years – which includes the period when the region would have to comply with new ozone standard - the regional forecast suggests that population will increase by approximately 1.3M people and the area will add approximately 1.2M more jobs. The regional

forecasts estimate an additional 4M vehicle trips and 40M more vehicle miles travelled per day without additional transit and related investments.

Third, transportation funding constraints is another important factor that impacts the region's ability to realize additional significant amounts of on-road emissions in a timely manner to improve air quality and comply with any tougher ozone standards. Within the transportation sector in this region, funding to pursue or accelerate other improvements aimed at reducing vehicular travel and automobile emissions is constrained. Of the approximately $250B the region anticipates spending on transportation in the next 25 years, 83% is for maintenance, operations and state of good repair. Only 17% is available for capacity expansion of the highway and transit systems, and no governmental funding exists for a comprehensive system of infrastructure to support consumer acceptance of emerging and alternative fuel technologies such as electric vehicles.

In light of the above challenges to reducing on road vehicular emissions, federal efforts to assist states and MPOs reduce emissions and achieve national air quality standards should be an integral part of a broad strategy to meet new ozone NAAQS. At a minimum, federal efforts should encompass the development of new multi-sector control programs to help attain future ozone standards expeditiously. These new control programs should address interstate transport mandates in a timely manner. Failure to address such outstanding issues as interstate transport places undue burdens on transportation planning organizations within nonattainment areas. Minimum federal efforts should also include:

- timely enactment of implementation rules and guidance for all new standards;
- thorough review and update of the existing transportation conformity regulations so that transportation planning and air quality planning efforts may be harmonized;
- streamlining and simplifying the conformity process for areas that EPA's analysis indicates will attain the new ozone standard based solely on existing federal control programs; and
- increased transportation funding and flexibility in use of the funds for both planning and project implementation.

Local land use solutions and investment in transit and non-motorized travels to reduce vehicle miles of travel, while successful and necessary for many reasons including improving air quality, are however limited in terms of their ability to provide significant additional ozone precursor emission reductions in a timely manner and are also affected by improvements in vehicle emissions and fuel economy standards. As ozone standards are lowered, additional emission reductions from the on road and non-road sector will be critical to attaining those standards. In order to achieve significant reductions from the on-road sector, federal efforts and participation are imperative. Without adequate planning, funding and federal support, Metropolitan Planning Organizations could face difficulties in demonstrating conformity of its transportation plans and programs to the new emissions standards, leading to potential disruption in flow of federal transportation funds to the areas.

Working together, federal, state, regional and local environmental and transportation agencies must develop coordinated actions and be provided adequate resources to implement the timely actions needed to harmonize the dual goals of reducing ozone emissions to improve air quality and meeting the transportation needs of our communities.

Thank you for your time and the opportunity to speak before this committee.

Metropolitan Washington Air Quality Committee

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March 4, 2015

Administrator Gina McCarthy
Environmental Protection Agency
1200 Pennsylvania Ave. NW
Mail code 28221T
Washington, DC 20460
Docket ID No. EPA-HQ-OAR-2008-0699

Dear Administrator McCarthy:

On behalf of the Metropolitan Washington Air Quality Committee (MWAQC), I am writing to comment on the proposed revisions to the National Ambient Air Quality Standards (NAAQS) for ozone. MWAQC was designated in 1992 under Section 174 of the Clean Air Act (CAA), to develop regional air quality plans for attaining Federal air quality standards in the Washington region. We have done so successfully over the past twenty three years. This assignment is carried out through a partnership among the States of Maryland and Virginia and the District of Columbia, and the region's local governments in the non-attainment area.

MWAQC supports the range of the proposed ozone standard, 65-70 parts per billion (ppb) as being more protective of human health and the environment. We are pleased that EPA's recommended standard is consistent with the Clean Air Scientific Advisory Committee's (CASAC) recommendations made in 2014. MWAQC believes that this proposal is the next logical step in a long term effort to improve air quality.

The new standard will pose a fresh challenge to the metropolitan Washington region. On the worst days of summer, transported pollution concentrations can exceed the levels proposed for the standard. MWAQC has and will continue to adopt all feasible control programs at the local level, however, it is imperative that EPA help the states and local governments meet the new standards by providing assistance and adopting national rules as part of a national strategy to address pollution – particularly as it relates to pollution that does not originate in our region.

Thank you for taking our concerns into consideration as EPA finalizes the new standard in the coming months.

Sincerely,

David Snyder, Chair
Metropolitan Washington Air Quality Committee

cc: MWAQC Members
COG Board of Directors
Governor Hogan, Governor McAuliffe, Mayor Bowser

John Cox, President
Director, Wyoming Department of Transportation

Bud Wright, Executive Director

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March 17, 2015

Environmental Protection Agency
EPA Docket Center (EPA/DC)
Mailcode 28221T, Attention Docket ID
No. OAR–2008–0699
1200 Pennsylvania Ave. NW
Washington, DC 20460

Re: Comments on Proposed National Ambient Air Quality Standards for Ozone

To the Environmental Protection Agency:

The American Association of State Highway and Transportation Officials (AASHTO) and the Association of Metropolitan Planning Organizations (AMPO) welcome the opportunity to submit these comments on the proposed National Ambient Air Quality Standards (NAAQS) for ozone, which was published by the Environmental Protection Agency (EPA) in the Federal Register on December 17, 2014. (78 Fed. Reg.75234).

While AASHTO and AMPO support the need to protect public health, we are concerned that the proposed rule will dramatically expand the number of areas subject to transportation conformity requirements, including many areas in which local governments have limited, if any, ability to reduce ozone levels through changes in transportation plans and projects. As explained further below, we urge EPA to consider the consequences for transportation conformity requirements when setting and implementing any new NAAQS for ozone.

I. General Comments

In this notice of proposed rulemaking (NPRM), EPA proposes to set the ozone NAAQS at a level between 65 and 70 parts per billion (ppb), reducing it from the current level of 75 ppb. According to EPA's projections, the stricter standard would cause hundreds of additional counties to become designated as non-attainment. Currently, 227 counties are designated as non-attainment for the 75 ppb standard.[1] See **Attachment 1.** Under the NPRM, the number of

[1] See EPA, Green Book, "8-Hr Ozone (2008) Nonattainment Areas" (last updated Jan. 30, 2015), available at http://www.epa.gov/airquality/greenbook/hntc.html. See **Attachment 1.**

counties designated as non-attainment would rise to 358 under the 70 ppb standard and to 558 under the 65 ppb standard.[2] See **Attachment 2.**

As shown in EPA's maps, many of the counties that would become newly designated as non-attainment for ozone are located outside metropolitan areas or are in small metropolitan areas, and have not previously been subject to transportation conformity requirements.[3] The following States - all of which currently have no ozone non-attainment areas - include counties that would violate the 65 or 70 ppb standards according to EPA's projections: Alabama, Florida, Idaho, Iowa, Kansas, Maine, Michigan, Nebraska, Nevada, New Hampshire, New Mexico, Oklahoma, South Dakota, Utah, and West Virginia.[4] In addition, the number of counties in non-attainment would increase in many other States, including Arizona, Colorado, Indiana, Wisconsin, Wyoming, and others.[5]

Notably, many of the areas that would be designated as nonattainment have high background levels of ozone, especially in rural areas and Western states. According to the Regulatory Impact Analysis that accompanies the NPRM, EPA acknowledges that "Background ozone is a relatively larger percentage (e.g., 70-80%) of the total seasonal mean ozone in locations within the intermountain western U.S. and along the U.S. border."[6] The report estimates that seasonal mean background levels of ozone are "greater than 40 ppb" in Colorado, Nevada, Utah, Wyoming, northern Arizona, eastern California, and parts of New Mexico.[7]

Given the high background levels as a percentage of current ambient levels, many areas in the West (and to some extent in other parts of the country as well) will have limited ability to reduce ambient levels of ozone through changes in transportation plans and the associated transportation conformity process. The Regulatory Impacts Analysis acknowledges this difficulty in discussing rural areas in the Southwest: "[M]odeling of additional NOx reductions [beyond those already on the books] within the region provide little incremental benefit suggesting that most of the regional anthropogenic sources impacting ozone at these locations have already been accounted for in the 2025 base case scenario."[8]

For States and MPOs, the change in the NAAQS will have significant practical implications, including administrative burdens and slowdown in project delivery. The administrative burdens result from the need to make transportation conformity findings for ozone in hundreds of counties where those findings are not currently required. Especially in rural areas and small metropolitan areas, these burdens will be significant in comparison to existing budgets for transportation planning. The effect on project delivery results from the additional time required

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[2] See EPA, "Counties Violating the Primary Ground-level Ozone Standard Based on Monitored Air Quality from 2011 - 2013" (undated) available at http://www.epa.gov/groundlevelozone/pdfs/20141126-20112013datatable.pdf.
[3] Id.
[4] Id.
[5] This statement is based on a comparison of the counties currently in nonattainment for the 2008 ozone NAAQS (http://www.epa.gov/airquality/greenbook/hncs.html) and the list of counties identified by EPA as being in violation of the proposed ozone NAAQS (http://www.epa.gov/groundlevelozone/pdfs/20141126-20112013datatable.pdf).
[6] EPA, "Regulatory Impact Analysis of the Proposed Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone" (Nov. 2014), p. 2-16.
[7] Id.
[8] Id. p. 3A-54.

for transportation conformity determinations. While it is difficult to quantify these administrative burdens and delay impacts, we expect that they will be significant.

Finally, we note that according to EPA's own projections, "the vast majority of U.S. counties would meet the proposed standards by 2025 just with the rules and programs now in place or under way."[9] EPA's analysis includes a "base case" scenario, which assumed implementation of all regulations currently on the books, including new vehicle fuel economy and emissions standards. The analysis found that only 9 counties outside California would violate the 70 ppb standard in 2025, and only 68 counties would violate the 65 ppb standard in 2025.[10] See **Attachment 3.** In other words, the vast majority of counties that will be designated as non-attainment under the NPRM will come into compliance with the proposed standards *without any additional action being taken* - and yet they still would need to undertake a time-consuming and burdensome transportation conformity process.

In short, the proposed change in the ozone NAAQS would trigger the designation of hundreds of additional counties across the country as non-attainment areas, which in turn would require compliance with transportation conformity requirements. The transportation conformity process will impose a difficult - if not impossible - task in places where background levels are so high that there is little that can be done through transportation planning to reduce ambient ozone. And in many other counties, transportation conformity will impose burdens without corresponding benefits, because the areas would meet the new standards without any additional action being taken. EPA should carefully consider these practical implications when exercising its policy discretion to determine the appropriate level for the NAAQS.

II. Specific Comments

In addition to the general comments provided above, we also submit the following specific comments regarding issues addressed in the NPRM.

A. Primary Standard

While the decision on where to set the NAAQS is based on health effects and does not take into account cost of compliance, the NPRM recognizes that the decision involves a "public health policy judgment" by the Administrator and that the Administrator has some discretion to determine the appropriate level.[11] We recommend that EPA set a primary standard at a level that is best supported by the science, taking into account the uncertainty inherent in the available scientific studies regarding health effects of ozone at various levels.

If the standard is lowered, the available scientific evidence provides stronger support for setting the standard close to the upper end of the range being considered (0.070). As stated in the NPRM, "the Administrator judges that the evidence supporting the occurrence of adverse

[9] EPA, "EPA's Proposal to Update the Air Quality Standards for Ground-Level Ozone" (undated), available at: http://www.epa.gov/groundlevelozone/pdfs/20141125fs-overview.pdf.
[10] EPA, "Counties Projected to Violate the Primary Ground-level Ozone Standard Model - Projections for 2025" (undated), available at http://www.epa.gov/groundlevelozone/pdfs/20141126-2025datatable.pdf.
[11] 79 Fed. Reg. 75243.

respiratory effects is strongest for exposures at or above the 70 and 80 ppb benchmarks." (p. 75305).

B. Secondary Standard

The NPRM proposes to set the secondary standard in the range of 65 to 70 ppb, which is the same range proposed for the primary standard. This range correlates to a separate measure, the W126 index value of "W126 index" in a range of 13 to 17 parts per million-hours (ppm-hours). The NPRM also invites comment on an alternative approach, under which the secondary standard would be set based on the W126 index values.[12]

We recommend that the EPA set the secondary standard at the same level as the primary standard, as it is under current regulations, because implementation of transportation conformity and other Clean Air Act requirements in nonattainment areas will be more efficient if the primary and secondary NAAQS are the same.

Moreover, if EPA were to set a different secondary standard, we recommend that the standard use the same measurements (ppb) as are used for the primary standard, so that the monitoring data gathered to assess compliance with the primary standard can also be used to determine compliance with the secondary standard.

C. Exceptional Events Demonstrations

The NPRM notes that several forms of relief are available for areas with high background levels, including exclusion of data affected by exceptional events. The NPRM correctly recognizes that these provisions would become much more important if the NAAQS is lowered, especially if it is lowered to 65 ppb:

> While any prediction of the exact nature of future implementation challenges associated with alternative prospective standards is inherently uncertain, **there is no question that, as the levels of alternative prospective standards are lowered, background will represent increasingly larger fractions of total O3 levels** and may subsequently complicate efforts to attain these standards. For a prospective standard of 70 ppb, the EPA does not believe that background O3 would create significant implementation-related challenges at locations throughout the U.S. and prevent attainment of the NAAQS. However, as the levels of prospective standards are lowered, the areas that would most likely need to use the relief mechanisms discussed in this section as part of attaining the lower prospective levels are rural locations in the western U.S., consistent with the previously mentioned locations where we have estimated the largest seasonal average values of background occur.[13]

[12] 79 Fed. Reg. 75237 ("The EPA also solicits comments on the alternative approach of revising the secondary standard to a W126-based form, averaged over three years, with a level within the range of 13 ppm-hrs to 17 ppm-hrs.").
[13] 79 Fed. Reg. 75383.

We are concerned that it may be extremely difficult for a State to demonstrate - within the time period allowed for making non-attainment designations - that violations result from exceptional events. The process for making an exceptional-event determination is governed by the confusing, burdensome requirements established in the 2007 Exceptional Events Rule, which essentially requires the State to provide scientific proof of a causal relationship between the exceptional event and an exceedance of the NAAQS.[14] EPA has issued interim guidance to clarify the rule, but that guidance itself establishes a lengthy process that would take more than two years to complete, including a period of up to 18 months for EPA review *after* a State has submitted a complete documentation package.[15] EPA has announced its intention to commence a new rulemaking to streamline the Exceptional Events Rule - but the proposed regulations have not yet been issued, and the NPRM for the ozone NAAQS does not commit to a specific schedule for the rulemaking on the Exceptional Events Rule.[16]

Moreover, the schedule proposed in the ozone NAAQS rule for flagging and documenting exceptional events is very tight. The ozone rule would give states twelve months from the time of promulgation to provide any exceptional event demonstration documents to the EPA for events occurring in 2013, 2014, and 2015. This time period coincides with the deadline for states to make designation recommendations to the EPA (another labor-intensive exercise). The EPA's Administrator would then have 12 months to make final designations while concurrently reviewing exceptional event packages.[17] In our view, these deadlines do not allow adequate time for the development and approval of state demonstrations requesting the exclusion of data from the first round of designations under the new standard.

Our concerns about the schedule for making exceptional-event determinations are heightened by the likelihood that - with the lower NAAQS - EPA will be receiving a large number of requests for exceptional-event determinations, increasing the likelihood of delay in EPA's review. The potential for delay may increase even further because, during this same time period, EPA will be undertaking a rulemaking to revise the very regulations (the Exceptional Event Rule) on which these determinations will be based.

If exceptional-event determinations are not made in a timely manner, an area may be designated as nonattainment based on exceedances that are later determined to result from exceptional events. Unfortunately, there is no authority for the EPA to redesignate an area (from non-attainment to attainment) based on changes to past air quality data.[18] Therefore, if an exceptional-event determination is approved *after* EPA's ozone nonattainment designation is

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[14] 40 C.F.R. 50.14.

[15] See EPA, "Interim Guidance to Implement Requirements for the Treatment of Air Quality Monitoring Data Influenced by Exceptional Events" (May 10, 2013), available at http://www.epa.gov/ttn/analysis/exevents.htm.

[16] See 79 Fed. Reg. 75358 (" The EPA expects to propose additional revisions to the Exceptional Events Rule in a future notice and comment rulemaking effort and will solicit public comment on other, non-schedule related, aspects of the Exceptional Events Rule at that time.")

[17] See 79 Fed. Reg. 75353-75358 (describing proposed schedule for exceptional-event determinations under the proposed ozone NAAQS rule).

[18] Section 107(d)(3) of the Clean Air Act governs redesignations of non-attainment areas. It requires that an area demonstrate that it is currently attaining the NAAQS, in addition to meeting other specific requirements, such as having an approved SIP, and demonstrating that the improvement in air quality is due to permanent and enforceable emission reductions resulting from the implementation of the SIP and applicable federal requirements.

made, the nonattainment designation would remain in effect - even if that designation would not have been justified if the exceptional event had been excluded. In effect, significant delays in approving exceptional-event determination may cause areas to be designated as non-attainment when that designation is not actually justified.

To address these concerns, **it will be essential for EPA to ensure that there is a workable, efficient process for making exceptional event determinations.** Therefore, if the proposed NAAQS are adopted, we urge EPA to develop guidance, templates, training materials, and other practical resources to assist States in obtaining expeditious approval for exceptional event determinations. We also urge EPA to consider a more programmatic approach to making exceptional events determinations, which would minimize the need to develop extensive documentation for each individual event.

In addition, we recommend that EPA establish a process for deferring non-attainment designations for areas with pending requests for exceptional-event determinations at the time of the statutory deadline for making non-attainment designations. **Specifically, we recommend that EPA designate as "unclassifiable" any area that has a pending, unresolved request for an exceptional-event determination that is material to the designation decision.** Designation of an area as non-attainment should be made only *after* the request for an exceptional-event determination has been resolved.

D. Methodology for Determining Ambient Levels (Data Uncertainty)

The proposed rule should take into account the uncertainty in monitor data when designating non-attainment areas. The EPA's data quality assurance handbook for air quality monitors identifies the acceptance criteria for ozone measurements as being whether a one-point quality control check for a single analyzer is +/- 7 % compared to a known quantity. That means that a valid measurement as high as 74.9 ppb or as low as 65.1 ppb could potentially be sampling actual ozone concentrations of 70 ppb, and that measurements as high as 69.6 ppb and or as low as 60.5 ppb could be sampling actual ozone concentrations of 65 ppb.

AASHTO and AMPO request that EPA consider a designation approach that accounts for known monitor data uncertainty. AASHTO and AMPO recommend EPA designate areas as "unclassifiable" rather than "nonattainment" if its design value is within the range that could be explained by monitoring equipment measurement uncertainty within the range allowed by EPA for valid ozone measurements (70 ppb ± 4.9 ppb for a 70 ppb standard and 65 ±4.5 ppb for a 65 ppb standard), since this level of uncertainty calls into question whether that design value is actually not attaining the standard and instead suggests that the area "cannot be classified on the basis of available information as meeting or not meeting" the standard. This is an appropriate use of the "unclassifiable" designation that Congress quite deliberately included in designation options.

E. Designation of Non-Attainment Area Boundaries

While the proposed rule did not address the criteria for determining the boundaries of a non-attainment area, the NRPM "solicits comment related to establishing area designation boundaries

for the proposed revised primary and secondary NAAQS, including any relevant technical information that should be considered by the EPA and the extent to which different considerations may be relevant to establishing boundaries for a distinct secondary NAAQS."

AASHTO and AMPO recommend that, when making non-attainment designations, EPA should avoid relying upon a single monitor to designate a broad multi-county area. This consideration is especially important in Western states with large rural counties, which often include federal or tribal lands. EPA should also consider changing how design values are determined. For example, in large multi-county areas with multiple monitors, EPA could choose to average the concentrations across all monitors instead of just using the monitor with the annual fourth-highest daily maximum 8-hr concentration, averaged over three years.

F. Transportation Conformity Requirements in New Nonattainment Areas

As noted above, lowering the NAAQS will likely cause hundreds of additional counties to come into non-attainment. Compliance with transportation conformity will be a significant burden, but in most cases, will not have corresponding benefits, because as the NPRM acknowledges, the vast majority of the counties will come into compliance with the stricter NAAQS levels even if no additional regulatory action is taken.

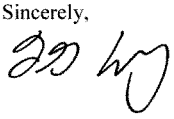
AASHTO and AMPO recommend that EPA use all regulatory flexibilities available within existing law to defer the imposition of transportation conformity requirements on areas that EPA's own modeling shows will come into compliance with the NAAQS without any additional actions being taken. If the transportation conformity requirements cannot be entirely deferred in these areas, EPA should allow a streamlined process for making conformity determinations in those areas, given that additional actions are not needed to achieve the NAAQS or demonstrate conformity.

G. Timing of Implementation Guidance and Regulations

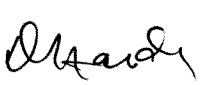
This rulemaking does not include implementation guidance for the new NAAQS, but EPA has requested comment on implementation issues as part of this rulemaking. AASHTO and AMPO urge EPA to issue guidance as early as possible after finalizing the NAAQS in order to minimize any delays involved in transitioning into the new guidance.

Thank you for the opportunity to comment on EPA's proposed NAAQS for Ozone. Should you have any questions, please contact: Shannon Eggleston from AASHTO at 202-624-3649, or DeLania Hardy from AMPO at 202-624-3684.

Sincerely,

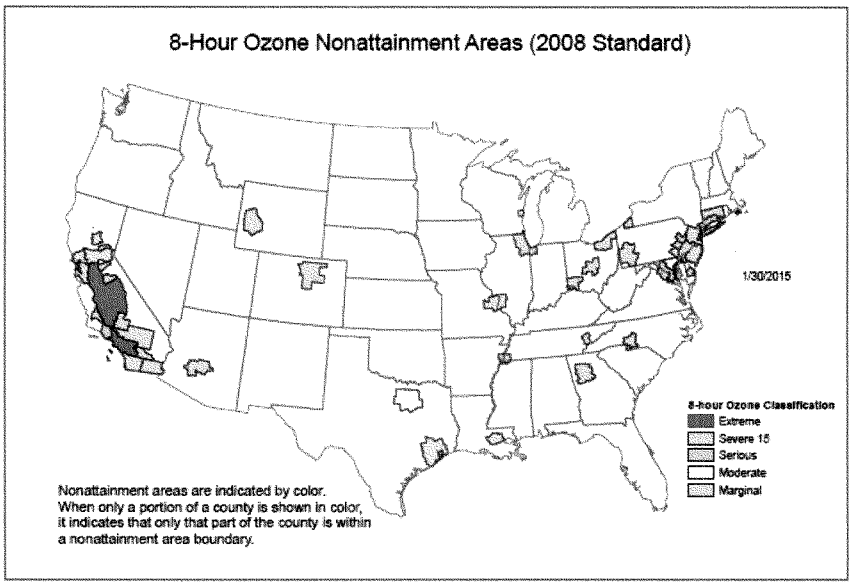


Bud Wright
Executive Director
AASHTO



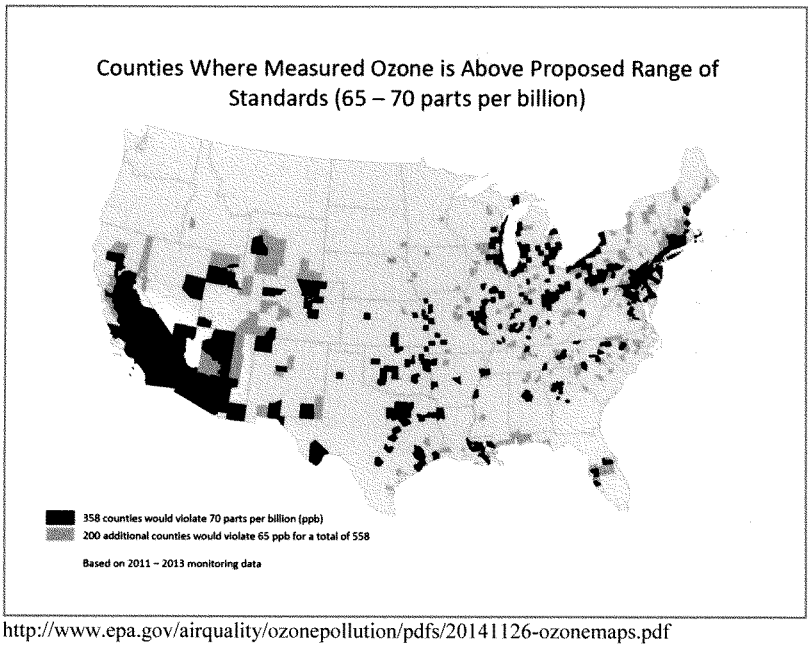
DeLania Hardy
Executive Director
AMPO

Attachment 1: Counties Designated as Non-Attainment for 2008 Ozone NAAQS (75 ppb)



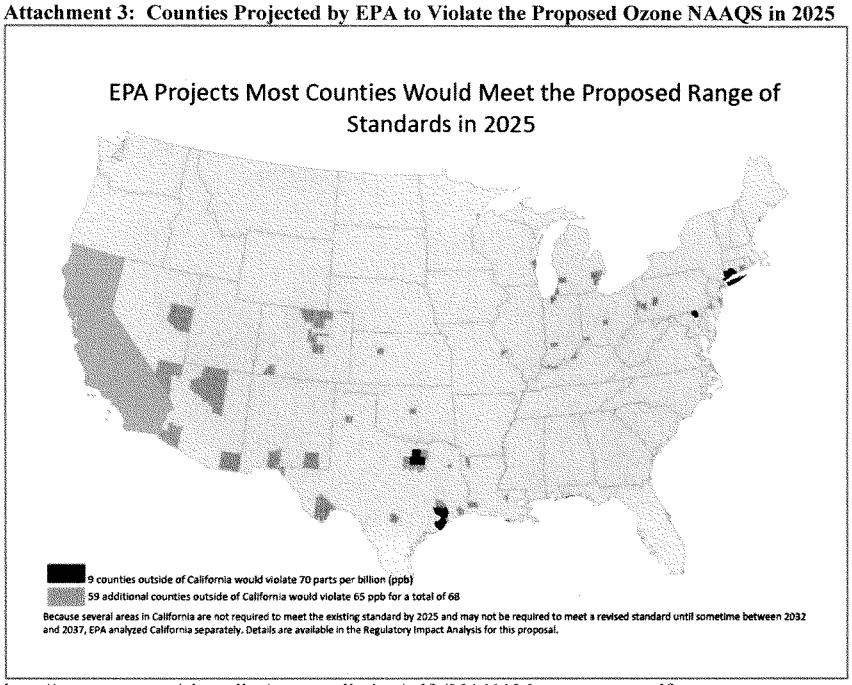
Map is from EPA Green Book on nonattainment areas at:
http://www.epa.gov/airquality/greenbook/map8hr_2008.html

Attachment 2: Counties Projected by EPA to Violate the Proposed Ozone NAAQS Based on Current (2011-2013) Monitoring Data



http://www.epa.gov/airquality/ozonepollution/pdfs/20141126-ozonemaps.pdf

Attachment 3: Counties Projected by EPA to Violate the Proposed Ozone NAAQS in 2025



http://www.epa.gov/airquality/ozonepollution/pdfs/20141126-ozonemaps.pdf

Senator INHOFE. Thank you, Mr. Srikanth.

Mr. Moore.

STATEMENT OF HON. GARY MOORE, JUDGE/EXECUTIVE, BOONE COUNTY, KENTUCKY, AND PRESIDENT, NATIONAL ASSOCIATION OF REGIONAL COUNCILS

Judge MOORE. Thank you, Chairman Inhofe and Ranking Member Boxer, and all the members of this committee, for the opportunity to testify on the impacts of more stringent ozone standards.

I would also like to thank Leader McConnell. What a pleasant surprise. I was not expecting that.

I am Gary Moore, the elected Judge/Executive of Boone County, Kentucky and here today representing the National Association of Regional Councils and the National Association of Counties.

Boone County is a suburban county in the Cincinnati metropolitan region. Throughout my region, I hear concerns about the impact of tighter ozone standards and the effect they would have on local governments' ambient economy. Similar concerns have been echoed nationally by regions and counties of all sizes.

My region is currently classified in marginal nonattainment but we would be in full nonattainment and face additional requirements under the proposed rule. Nonattainment designations impact the economic vitality of local governments, regions and the Nation.

Areas across the Nation face significant challenges under the current ozone standard. NARC and NACo, along with the U.S. Conference of Mayors and the National League of Cities, have requested that EPA fully implement the current ozone standard before issuing a new, more stringent standard.

Today, I will discuss several on-the-ground impacts of more stringent ozone standards on regions and counties nationwide.

First, local and regional governments play a significant role in protecting local air resources, ensuring a strong transportation system and strengthening the local economic development efforts.

Counties and local governments own a large portion of the Nation's public road system. My county alone owns more than 400 public road miles. Many transportation projects would have to be reconsidered if the ozone standard was tightened.

Additionally, areas designated as nonattainment can have a more difficult time in attracting and keeping industries due to the concerns that their permits and other approvals will be too expensive and even impossible to obtain.

Second, a more stringent ozone standard would create unfunded mandates for State and local governments. EPA estimates that hundreds of counties would be impacted by the new ozone standard.

A more stringent standard would be especially difficult for rural countries and small metropolitan areas, many of which have not previously been subject to nonattainment designations. Very limited Federal funding is available to help these regions and counties comply with air quality standards.

Additionally, the Federal Government can withhold Federal highway funds for projects and plans in nonattainment areas which

would negatively impact job creation and economic development for these impacted regions.

In 2008, EPA issued the existing 75 ppb ozone standard. In 2010, a more stringent standard was proposed but EPA later withdrew it over concerns about resulting regulatory burdens and uncertainty.

During this period, however, implementation of the 2008 standard was effectively halted. That process was recently restarted. In February of this year, a few months ago, my county received the implementation guidelines for the 2008 standard. Now here we are again discussing a new standard before we know whether the current standard is working.

This process has created confusion in regions and counties and about where they stand under the current standard which is crucial to gauging the effects of an even more stringent standard.

Due to 2014 court decisions, two separate ozone standards must be met as part of the transportation conformity process. A stricter ozone standard will only complicate matters further.

In conclusion, the health and well being of our residents is a top priority for regions and counties. We urge that EPA fully implement the current ozone standard before issuing a new, more stringent standard.

We look forward to working with members of this committee and the EPA to craft policies and protect public health without inhibiting the economic vitality of our communities.

Thank you again for the opportunity. I am pleased to address any questions you might have.

[The prepared statement of Judge Moore follows:]

WRITTEN STATEMENT FOR THE RECORD

THE HONORABLE GARY MOORE
JUDGE/EXECUTIVE, BOONE COUNTY, KENTUCKY
AND
PRESIDENT, NATIONAL ASSOCIATION OF REGIONAL COUNCILS

ON BEHALF OF THE NATIONAL ASSOCIATION OF REGIONAL COUNCILS AND
THE NATIONAL ASSOCIATION OF COUNTIES

U.S. ENVIRONMENTAL PROTECTION AGENCY'S "DRAFT DOCUMENTS RELATED TO THE REVIEW OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR OZONE"

BEFORE THE
UNITED STATES SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

JUNE 3, 2015
WASHINGTON, D.C.

Thank you Chairman Inhofe, Ranking Member Boxer, and members of the U.S. Senate Committee on Environment and Public Works for the opportunity to testify on the U.S. Environmental Protection Agency's "Draft Documents Related to the Review of the National Ambient Air Quality Standards for Ozone."

I am Gary Moore, the elected Judge/Executive of Boone County, Kentucky, and I serve as the President of the National Association of Regional Councils (NARC) and in the leadership of the National Association of Counties' (NACo) Transportation Steering Committee. I am honored to be invited today to discuss the views of both NARC and NACo.

NACo and NARC represent the nation's 3,069 counties and more than 500 regional councils respectively, and both organizations strongly support the goals of the Clean Air Act and the National Ambient Air Quality Standards that protect our residents from hazardous air pollutants. Local governments across the country are actively working toward meeting these air quality goals, and regions and counties take seriously their role in protecting the public.

About NARC

NARC serves as the national voice for regionalism by advocating for regional cooperation as the most effective way to address a variety of community planning and development opportunities and issues. NARC's member organizations are composed of multiple local governments that work together to serve American communities – large and small, urban and rural.

About NACo

NACo is the only national organization that represents county governments in the United States, including Alaska's boroughs and Louisiana's parishes. Founded in 1935, NACo assists America's 3,069 counties in pursuing excellence in public service to produce healthy, vibrant, safe, and resilient counties.

About Boone County, KY and the Ohio-Kentucky-Indiana Region

Boone County is the northernmost county in Kentucky and part of the Cincinnati-Middletown, Ohio-Kentucky-Indiana metropolitan area. While Boone County is considered suburban, with a population of approximately 130,000 residents, it also contains rural and agriculture areas. The primary economic drivers are air transportation, warehousing, paper industry, and other transportation support industries. Additionally, Boone County is part of the Metropolitan Cincinnati (Ohio) Interstate Air Quality Control

Region (Ohio-Kentucky-Indiana), which is comprised of Boone, Campbell, Carroll, Gallatin, Grant, Kenton, Owen and Pendleton counties in Kentucky, Dearborn and Ohio counties in Indiana and Butler, Clermont, Hamilton and Warren counties in Ohio. Boone County works closely with state and other local governments on a number of projects to improve air quality. However, these projects—and many others across the nation—would be impacted if the current standard for ozone is tightened.

While my region is currently classified as in marginal nonattainment under the 2008 ozone standards, based on 2012-2014 data, the region now meets the 2008 ozone standards of 75 parts per billion. A more stringent standard of 65-70 parts per billion, as EPA has proposed, would put my region back into nonattainment. Not only will a nonattainment designation have a significant impact on my county, but it will affect many regions and counties across the nation.

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Today, I will discuss potential impacts of a more stringent ozone standard in both my region and on regions and counties nationwide.

As an elected official, I am concerned that more stringent requirements for ozone will dramatically increase the number of regions and counties classified as in nonattainment. This will have far-reaching effects on the nation's transportation programs and the economic vitality of local governments, regions, and the nation as a whole. The most recent standard, finalized in 2008, has yet to be fully implemented; this process should be allowed to play out before a new standard is established. **This is why NARC and NACo, along with the U.S. Conference of Mayors and the National League of Cities, have requested that the Environmental Protection Agency (EPA) delay issuing a new, more stringent ozone standard until the 2008 ozone standard has been fully implemented.**

NARC and NACo have identified three key elements that Congress should consider as it debates a more stringent ozone standard:

1. **The Stakes are High for Regions and Counties** — *Clean air is essential for public health and safety, and state, local, and regional governments play significant roles in protecting local air resources. Local and regional governments must balance other essential responsibilities, including maintaining large portions of the transportation system and promoting economic development.*

2. **Regions and Counties Face Significant Direct and Indirect Costs** — *The costs associated with a more stringent ozone standard would be significant for local and regional governments, but the federal*

resources to assist in meeting these requirements are extremely limited. At the same time, EPA's cost estimates fail to fully account for the costs regions and counties will bear.

3. **Regions and Counties are Concerned about the Process** — *Regions and counties work in partnership with federal agencies to improve the nation's air quality. However, EPA's approach to this proposed update has not been a collaborative intergovernmental process. It has been inconsistent and challenging, and a recent court decision has made the transportation conformity process even more confusing.*

***

1. <u>The Stakes are High for Regions and Counties</u>

First, clean air is essential for public health and safety, and state, local, and regional governments play a significant role in protecting local air resources. Under the Clean Air Act, counties and regional governments serve as both the regulator and regulated entity, and we are responsible for ensuring that the Act's goals are achieved and our constituents are protected. Both NARC and NACo strongly support the goals of the Clean Air Act which balances the highest level of environmental protection with the need to maintain economically viable and sustainable communities.

Second, a more stringent ozone standard could impact transportation projects, negatively affecting local governments' economic vitality. Counties and local governments own a large portion of the nation's public road system, and many transportation projects would have to be reconsidered if the ozone standard is tightened. Counties own 45 percent of the nation's public road miles. In Boone County, we own 406 miles of road, more than half of all roads in the county.

Transportation conformity is required by the Clean Air Act[1] for all areas designated as in nonattainment or maintenance[2] for transportation-related criteria pollutants, including ozone.[3] This ensures that federally supported transportation activities - including transportation plans, transportation improvement programs, and highway and transit projects - are consistent with the state air quality implementation plan. Transportation conformity determinations are required before federal approval or funding is given to transportation planning documents and highway and transit projects. When a county

[1] Section 176(c) (42 U.S.C. 7506(c)).
[2] Nonattainment areas fail to meet the standard for one or more of the six criteria pollutants. Maintenance areas were previously in nonattainment but have now achieve the standard.
[3] See 40 CFR Part 93, subpart A.

or region is designated as in nonattainment, it is required to go through the transportation conformity process for its transportation projects. This can be expensive and time-consuming.

Transportation conformity testing in my region involves using the Ohio-Kentucky-Indiana Regional Council of Government's travel demand model and EPA's emission factor model to estimate future emissions from motor vehicles operating on the region's transportation system. Future emissions must be within the motor vehicle emissions budget established by each state. A more stringent ozone standard would likely mean tighter motor vehicle emissions budgets, making it more difficult for the region to demonstrate conformity and delaying or halting much needed capacity-adding projects.

Third, a more stringent ozone standard would stifle local governments' ability to increase economic development within their regions. By EPA's estimates, a 70 parts per billion standard would result in a nonattainment[4] designation for 358 counties; a 65 parts per billion standard would increase that number to 558 counties. Under a 65 parts per billion standard, all but two of the nation's top twenty metropolitan economies[5] would be in areas designated as in nonattainment. These metro areas are essential for the economic strength of their regions, and contribute to the overall strength of the nation's economy.

Areas designated as in nonattainment under the Clean Air Act can have a more difficult time attracting industry to their regions, due to concerns that permits and other approvals will be too expensive or even impossible to obtain. Some companies are changing or delaying plans for building new facilities until they know whether particular areas will be designated as in nonattainment under a more stringent ozone standard, and there is even fear that some of those facilities will move overseas to avoid the added expense and difficulty of the regulatory process.

Sublette County, Wyoming serves as an example of how the new standard could impact economic development activities. Sublette County, a rural county of approximately 10,000 residents, experiences wintertime ozone surges and is currently considered in marginal nonattainment. Since it is comprised of approximately 76 percent public lands, the county is highly dependent on oil and gas development and mining activities to keep its local economy strong. However, on days that ozone levels in the county are high, industrial activity is severely restricted to minimal maintenance activities; this includes county activities as well. If the ozone standard is tightened further, Sublette County will likely be classified as

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[4] Under the Clean Air Act National Ambient Air Quality Standards, areas are classified as nonattainment, attainment, or unclassifiable for each of six criteria pollutants, including ozone.
[5] Baton Rouge Chamber of Commerce analysis, available at http://www.brac.org/brac/news_detail.asp?article=1947, based on Brookings Institution's Metro Monitor, available at http://www.brookings.edu/research/interactives/metromonitor.

fully in nonattainment with severe restrictions on industrial development, which will limit job growth in the county.

Finally, a more stringent ozone standard will make it harder for regions and counties to balance these three essential functions – environmental protection, economic vitality, and transportation infrastructure. Counties and regional governments are responsible for providing core services to their residents and businesses, and play an important role in maintaining the economic vitality of their regions. Consistent job growth and a healthy local revenue base are essential, but a more stringent ozone standard would adversely impact local and regional governments' ability to provide key services to their residents while maintaining economic development efforts.

2. Regions and Counties Face Significant Direct and Indirect Costs

First, a more stringent ozone standard would create unfunded mandates for state and local governments. According to EPA, under this proposed rule a 70 parts per billion standard would cost approximately $3.9 billion per year and a 65 parts per billion standard would cost approximately $15.2 billion annually to implement. Unfortunately, little federal funding is available to assist local governments in meeting Clean Air Act requirements, yet a more stringent ozone standard would have significant cost to regions and counties. With the dramatic increase in the number of nonattainment areas resulting from a more stringent ozone standard, already limited federal funding would be spread across many more areas, making it even more difficult for these areas to achieve the standard.

A more stringent ozone standard would be especially difficult for rural counties and small metropolitan areas, many of which have not previously been subject to the requirements of the transportation conformity process. In addition, at least sixteen states[6] that currently have no counties in nonattainment would be subject to a new conformity process under the EPA proposal; and an even larger number of metropolitan planning organizations would be required to carry out conformity, many of them in small metropolitan areas with limited financial resources. Between these county, regional, and state entities, hundreds of additional governments and planning organizations would be required to expend significant resources under EPA's proposal, with limited federal assistance.

[6] Alabama, Florida, Idaho, Iowa, Kansas, Maine, Michigan, Minnesota, Nebraska, Nevada, New Mexico, New Hampshire, Oklahoma, South Dakota, Utah, West Virginia. Oregon and Vermont may also have counties in nonattainment.

It is also notable that many of the areas that would be designated as in nonattainment under this proposal are in parts of the country that have high "background"[7] levels of ozone. This is particularly true in the western portion of the United States, where background ozone levels are estimated to be greater than 40 parts per billion. As a result, it will be extremely onerous and expensive, if not impossible, for some nonattainment areas to achieve the proposed standard. In the meantime, the nonattainment designation will have a significant impact on the transportation system in these areas and pose a significant administrative burden on many counties in rural and small metropolitan areas that would now be required to develop the capacity to carry out the conformity process.

Second, these costs will be much higher than estimated because EPA did not account for impacts to the transportation system and other costs. As mentioned previously, areas designated as in nonattainment or maintenance for transportation-related criteria pollutants are required to complete the transportation conformity process, which can be costly. The federal government can withhold federal highway funds for projects and plans in areas that are out of attainment, which could have negative effects on jobs and critical economic development projects for impacted regions, even when these projects could have a measurable positive effect on congestion relief.

The cost of a more stringent ozone standard is a concern for some members of the Environment and Public Works Committee as well. Earlier this year, a number of Senators from this committee sent a letter[8] to EPA Administrator Gina McCarthy indicating a number of factors that resulted in estimated implementation costs that are likely far too low. These factors include inaccurate market prices, underestimated costs of unknown controls, and inflated baseline controls, among others. Without taking these factors into account, it is difficult to calculate the true burden on local governments of a more stringent ozone standard.

3. Regions and Counties are Concerned About the Process

First, while we share common goals with EPA regarding air quality, we are concerned about the process it has used to implement a new ozone standard. The process by which these new standards have been proposed has been confusing and counterproductive. In 2008, EPA issued the existing 75 parts per billion ozone standard. In 2010, the agency proposed a more stringent standard, but withdrew it in 2011 due to concerns about regulatory burdens and uncertainty. During this period, however, the

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[7] Referred to as U.S. background ozone, this ozone is defined as the ozone that would exist in the absence of any manmade emissions inside the U.S.

[8] Senators Letter to EPA Administrator Gina McCarthy, March 10, 2015, available at http://www.epw.senate.gov/public/index.cfm?FuseAction=Majority.PressReleases&ContentRecord_id=300bf751-cced-1614-fe30-5c910abf0367.

implementation process on the 2008 standard was effectively halted. That process was recently restarted, and just a few months ago, my county received the implementation guidelines for the 2008 standard. And now we are discussing a new standard before we know whether the 2008 standard is working. It is no wonder these inconsistencies resulted in confusion in regions and counties as to where they stand under the 2008 standard, which is crucial to understanding the effects of an even more stringent standard.

Second, a more stringent ozone standard would add complexity to the already confusing transportation conformity compliance process. In 2012, after EPA finalized the 2008 ozone standard, the agency proposed to revoke the 1997 National Ambient Air Quality Standard for ozone for purposes of transportation conformity requirements. In the proposal, EPA explained that absent a revocation of the earlier standard, areas currently designated as in nonattainment or maintenance for the 1997 standard could be required to implement the conformity program for both the 1997 and 2008 standards, making the already complicated process of calculating how transportation projects impact air quality standards even more confusing. NARC and NACo certainly appreciated the EPA's attempt to assist state and local governments with this proposal.

Unfortunately, the court disagreed with EPA's proposal, and, on December 23, 2014, in *Natural Resources Defense Council vs. Environmental Protection Agency and Gina McCarthy,* ruled that EPA lacked the authority to revoke transportation conformity requirements. **This ruling has created additional confusion and added to the burdensome administrative procedure for state and local governments in the transportation conformity process. A stricter ozone standard will increase this complexity.**

Finally, EPA's own data show that ozone levels are steadily declining as a result of current federal regulatory programs, and a more stringent ozone standard is not necessary. Since 1980, ozone-forming emissions have been reduced by half and average ozone concentrations have dropped 33 percent. In just thirteen years, between 2000 and 2013, ozone emissions dropped by 18 percent. [9]

Additionally, other federal agencies are working proactively to reduce ozone emissions. In 2011, EPA and the National Highway Traffic Safety Administration established greenhouse gas and fuel efficiency standards for new 2014-2018 model year medium and heavy-duty engines and vehicles. In addition to improving fuel efficiency and reducing greenhouse gas emissions, the rule significantly reduces emissions of nitrogen oxides (NO_x). This will result in reductions in ozone.

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[9] U.S. EPA, "National Trends in Ozone Levels," available at http://www.epa.gov/airtrends/ozone.html.

In addition to new fuel efficiency standards, beginning in 2017, the Tier 3 Vehicle Standard will require new vehicle emission standards and lower sulfur content of gasoline. The vehicle emission standards, combined with the reduction of gasoline sulfur content, will significantly reduce motor vehicle emissions of the two main ozone precursor pollutants, nitrogen oxides (NO_x) and volatile organic compounds (VOC).

Conclusion

Chairman Inhofe, Ranking Member Boxer and members of the Senate Committee on Environment and Public Works, the health and well-being of residents is a top priority for regions and counties. We work every day to improve public health, while at the same time ensuring that our communities remain economically strong.

We urge EPA to fully implement the 2008 ozone standard before making any revisions to the existing National Ambient Air Quality Standard for ozone.

NARC and NACo stand ready to work with Congress and the agencies to craft clear, concise, and workable rules. By doing so, we can achieve our shared goals of protecting public health and the environment without inhibiting the economic vitality of our communities.

Thank you again for the opportunity to testify today on behalf of NARC and NACo. I welcome the opportunity to address any questions.

Senator INHOFE. Thank you, Mr. Moore, for that excellent statement.

Dr. Diette.

STATEMENT OF GREGORY B. DIETTE, MD, MHS, PROFESSOR OF MEDICINE, EPIDEMIOLOGY AND ENVIRONMENTAL HEALTH SCIENCE, JOHNS HOPKINS UNIVERSITY

Dr. DIETTE. Thank you, Mr. Chairman, Ranking Member and members of the committee for inviting me here. I appreciate the time to talk to you.

My name is Dr. Gregory Diette. I am a practicing pulmonary or lung doctor at Johns Hopkins University in Baltimore, Maryland. To put it simply, my job is to take care of very sick people with lung diseases including things like asthma, COPD and other lung diseases.

You have my written testimony before you and I just wanted to make a few more points with the time that I have.

First of all, ozone pollution is very bad for the lungs. I think it is pretty obvious to most people but I think it is worth repeating. It is a very potent oxidant and when you inhale it, it irritates the lungs and causes people to have symptoms.

There are multiple research studies throughout the United States and the globe that have shown this. They provide a coherent story about what happens when people inhale ozone.

When you get sick from inhaling ozone, there is a range of things that can happen. One can be as simple as having to take more of the medication you are already taking.

In some cases, it means going to the doctor to have an adjustment and in some cases, to the emergency department of the hospital or the ICU. Worse than that, you can die from it. These are very serious issues in terms of the problems people have.

Second, something I think gets lost sometimes, because we are talking about vulnerable people, is ozone is bad for normal people too. Normal, healthy people are affected by ozone. If a healthy adult inhales ozone, it affects their lung function and causes inflammation in the lungs. If we have time, I will elaborate on why that is so important.

Another issue is that ozone is ozone, so the person who inhales it does not care whether it came from their city, the nearby county or another State. It is still ozone and it is still irritating.

Another point I wanted to make was about public health. I think public health is a concept that sometimes seems like a high level concept and things get lost in translation. Public health is really a collection of stories about individuals who live in America and what their individual story is and how it contributes to the health issue.

If you think about what happens to someone as an individual, a mother of a child in an emergency room wonders if her child is going to survive that asthma attack, wonders if they are going to be discharged from the hospital and wonders whether or not she can afford to take off one more day from work in order to take care of her child, when and if he is discharged to go home.

The issue about the symptoms, somebody talks about something like an asthma attack, can seem very abstract, here is what it

sounds like when somebody describes it. They say, it feels like there is an elephant on my chest, I cannot breathe, I am panicked, I feel like I am going to die. That is the experience people have. It is not subtle; it is very scary.

The last thing I want to address is the state of the science. I think it is very strong and very compelling. It was compelling in the Bush administration when the EPA looked at the ozone standard and proposed a standard of 60 ppb. The evidence was supportive of that standard. It has only gotten stronger since 2006 to now.

We have additional information about the adverse effects of ozone on human health. These come from a variety of types of studies, not just one type of study. The EPA has available to it not one study, not ten studies but literally hundreds of studies performed around the United States and the globe to support this idea.

In particular, these studies include necronistic studies, animal studies, toxicology studies, epidemiology studies, natural experiment studies, met-analyses and others.

I think the evidence is sufficient to say the EPA can and must strengthen the standard for the sake of human health.

Thank you very much. I look forward to answering any questions you might have.

[The prepared statement of Dr. Diette follows:]

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Comments from the American Thoracic Society
Presented by Gregory B. Diette, M.D.
Before the Senate Environment and Public Works Committee
on
EPA's Proposed Ozone National Ambient Air Quality Standard
June 3, 2015

Mr. Chairman, Ranking member, my name is Dr. Gregory Diette. I am a pulmonologist in the Division of Pulmonary and Critical Care Medicine at Johns Hopkins University in Baltimore, Maryland. On behalf of the American Thoracic Society I want to thank the Committee for the opportunity to testify regarding the Ozone National Ambient Air Quality Standard proposed by the Environmental Protection Agency (EPA). The American Thoracic Society is a medical professional organization with over 15,000 professionals and patients who are dedicated to the prevention, detection, treatment and cure of respiratory disease, critical care illnesses and sleep-disordered breathing. We pursue our mission through research, clinical care, education and advocacy.

Ozone (O_3) is a potent oxidant that damages the airways and lungs. The American Thoracic Society strongly supports EPA's proposal to strengthen the National Ambient Air Quality Standard for ozone. If anything, we are disappointed EPA did not go further in recommending a stronger standard of 60 ppb.

For several years, the ATS has encouraged the EPA to issue a more protective ozone standard. When the standard was reviewed in 2007 under the Bush Administration, we recommended a standard of 60 ppb based on the available evidence at that time. When the Obama Administration first reconsidered this standard in 2010, we again urged 60 ppb. While the recommended standard endorsed by physician community has not changed during this time, the scientific evidence supporting this recommendation has significantly strengthened. The scientific evidence available seven years ago justifying this recommendation has been supplemented by an even greater understanding of the health effects of ozone exposure, including higher rates of respiratory disease in infants and children, reduced lung function, and increased mortality in adults.

Indeed, there is clear, consistent, and conclusive evidence that we believe should compel EPA to establish an ozone standard no higher than 60 ppb [**1,2**].

It is the second time that the Obama Administration has considered the current ozone standard of 75 ppb. In 2007 The Bush administration established the current standard outside of the range recommended by the independent Clean Air Science Advisory Committee (CASAC) of 60 ppb to 70 ppb [**3**]. In 2010, CASAC reaffirmed its initial recommendation as part of an early reassessment the ozone standard, an effort that was ultimately abandoned in 2011 [**4**]. Since a new scientific assessment was not conducted as part of that review, the current review of the ozone standard is the first to consider new scientific evidence since 2006.

Ozone exposures in the range of 60 ppb to 70 ppb have adverse physiologic effects across the entire age spectrum—from newborn infants to the elderly. While there is also some evidence of health effects of ozone exposure below 60 ppb, the strongest evidence supports the conclusion that serious adverse health effects occur across all ages at levels above 60 ppb.

Highlights of this new body of evidence include several lines of evidence demonstrating dose-response relationships between ozone exposure in the 60-80 ppb range and childhood asthma hospital admissions and emergency room visits. [**6-9**] A new study of emergency department visits by preschool children in Atlanta found that a 30 ppb increase in the three-day average of ozone was associated with an 8% higher risk of pneumonia [**5**].

Suffice it to say, ozone pollution – at levels permissible under the current standard – makes children sick. EPA has the authority and obligation to set a standard that protects children from the adverse health effects of ozone exposure. But it's not just children -- adults are also harmed by ozone exposure.

Research has also shown that for each incremental rise in ozone exposure, severe asthma exacerbations, emergency room visits, and hospitalizations for asthma increase for adults [**9-11**]. Similar associations have been found for adult admissions for chronic obstructive pulmonary disease and [**12, 13**] and pneumonia [**13**]. A population-based cohort study of generally healthy adults found that lung function (FEV_1) was lower after days when ambient ozone ranged from 59 ppb to 75 ppb compared to days with levels under 59 ppb [**14**]. Healthy individuals have normal lung function. Not surprisingly, poorer lung function is associated with greater morbidity in patients who have chronic respiratory diseases and lowers the threshold for exacerbations. Controlled human exposure studies have re-affirmed lung function decrements in healthy adults after exposure to 60 ppb to 70 ppb of ozone [**15, 16**]. Perhaps of greatest concern, there is now stronger evidence of increased mortality in association with higher ozone levels [**17-19**], particularly among the elderly and those with chronic disease [**20, 21**]. These large, multi-city studies found strong and consistent associations with increased risk of premature death, particularly in the warmer months when ozone levels are higher.

In sum, there is accumulating evidence that ozone pollution – at levels permitted by the current standard – is damaging to the human lungs and contributes to disease. We strongly encourage EPA and the Administration to move forward with a strong standard of 60 ppb to protect our nation's health from known health effects of ozone.

While the evidence on ozone and respiratory effects is comprehensive and compelling, recent studies have shown adverse health effects beyond the lung. The Integrated Science Assessment (ISA) has concluded that, "...the evidence is stronger for most every health endpoint, with causal findings strengthened from 'suggestive' to 'likely causal' for cardiovascular effects and total mortality from short-term exposures." In addition, the ISA noted that ozone affects the central nervous system and brain, and comments that a number of recent toxicological studies revealed various changes in neurologic function or histology with long-term exposure to ozone, including changes similar to those observed in neurodegenerative disorders, such as Parkinson disease and Alzheimer disease.

The ISA concluded that, "...the toxicological evidence for the impact of O3 on the brain and behavior is strong, and suggestive of a causal relationship between O3 exposure and effects on the central nervous system. "[**22**]

In summary, research only reaffirms and deepens our understanding of the health effects of ozone exposure. Without question, the current EPA ozone standard fails to protect America's public health. The Environmental Protection Agency and the Administration both have the authority and the obligation to establish a more protective ozone standard. The American Thoracic Society strongly urges EPA and the Administration to finalize a more protective ozone standard of 60 ppb.

I would be happy to answer any questions.

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Senator INHOFE. Thank you, Dr. Diette.

Mr. Greene.

STATEMENT OF LARRY GREENE, EXECUTIVE DIRECTOR, SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Mr. GREENE. Good morning, Chairman Inhofe, Ranking Member Boxer, and members of the committee.

My name is Larry Greene, and I am the Executive Director of the Sacramento Metropolitan Air Quality Management District. Thank you for the opportunity to appear here today.

As a military officer for over 20 years, and now as an Air Quality Director for a similar period, I have always taken seriously my responsibilities to protect public interests, formerly through a national security lens, and currently from a public health perspective.

It is with this background that I would like to provide the committee with comments related to our Sacramento experience with the Federal Clean Air Act.

In California, meeting the requirements of the Federal Clean Air Act has clearly been difficult. California's geography and weather patterns provide optimal conditions for the formation of summer ozone and winter particulate pollution. Whatever the contributing factors, Federal designations are based on real public health threats from dangerous levels of air pollution.

One of the pillars of the CAA is the establishment of the National Ambient Air Quality Standards, which must be supported by sound science and set at levels that protect public health with an adequate margin of safety and without consideration of cost or other implementation issues.

The CAA provides for this by establishing the Clean Air Scientific Advisory Committee and mandating a review and revision, only if deemed necessary, of each NAAQS every 5 years to ensure the standards remain protective of health.

Based on years of direct experience seeing the public health benefits of the Act, we support the Clean Air Act measures. These core principles ensure that public safety is the first filter through which air quality initiatives are measured.

At the same time, we are certainly cognizant of the potential costs of regulatory compliance borne by our local business community. For that reason, we closely evaluate the provisions of EPA implementation rules and guidance documents, provide optimizing comments and have worked hard locally on a range of measures to mitigate and moderate the cost of regulation.

A key measure in reducing monitored ozone and particulate pollution levels has been incentivizing early adoption of cleaner on and off-road equipment. Since 1998, we have provided over $230 million of State and local funds to businesses in the Sacramento region for purchasing clean equipment in advance of regulatory deadlines.

We also collaborate with a range of regional partners, including our metropolitan transportation agency to enhance public transportation alternatives. Other programs help schools purchase cleaner vehicles.

For Sacramento, the result tells the story, and it is a positive one. We have attained the original 1994 1-hour ozone standard. We are on track to attain the 1997, 85 ppb standard by the mandated 2017 attainment date.

With continuing support from State and Federal programs, we anticipate we will submit a State Implementation Plan, or SIP, next year that will demonstrate attainment of the 2008, 75 ppb standard by the target year of 2027. If EPA takes final action to tighten the 75 ppb standard in October, we anticipate that, as with other standards, we will be successful in meeting this public health goal.

The key message is that meeting NAAQS targets takes committed partnership between local, State and Federal agencies. Along those lines, I would like to make a few observations about a new ozone standard, at whatever level it is set.

First, it is important that EPA follow the science and tighten the standards to within a range set by its independent science advisors. Second, the progress we are making to comply with the current 75 ppb standard will bring us that much closer to achieving any new and tighter standard.

Third, the co-benefits from reducing greenhouse gases can help reduce smog forming emissions and other air pollutants. We already see this occurring in California.

Fourth, there are a number of sources for which Federal controls are the most efficient, cost effect and at times, the only avenue available. It is essential that the Federal Government continue to support effective programs for reducing emissions from sources under Federal responsibility.

Finally, if Congress wishes to contribute to our success in achieving clean air and public health goals, we urge you to increase Federal funding to State and local air agencies to support our work and a wide range of areas related to air quality regulations.

With that, I thank you for inviting me to testify on this critically important issue. I am happy to answer your questions.

[The prepared statement of Mr. Greene follows:]

Testimony of
Larry Greene
Executive Director
Sacramento Metropolitan Air Quality Management District
Before the
Senate Committee on Environment and Public Works

Hearing: State and Local Implications and Implementation Challenges of EPA's Proposed Ozone NAAQS
June 3, 2015

Good morning Chairman Inhofe, Ranking Member Boxer, and Members of the Committee. My name is Larry Greene and I am the Executive Director of the Sacramento Metropolitan Air Quality Management District (SMAQMD). Thank you for the opportunity to appear here today to discuss the state and local implications and implementation challenges of EPA's proposed ozone National Ambient Air Quality Standards.

As a military officer for over 20 years, and now as an Air Quality Director for a similar period, I have always taken seriously my responsibilities to protect public interests, formerly through a national security lens, and currently from a public health perspective. After working for one of the largest agencies in the world, the US Department of Defense, I now manage a county-level air quality agency, which is where you might say the "rubber hits the road" in the air quality arena. It is from that perspective that I would like to provide the Committee with comments related to our Sacramento experience with the federal Clean Air Act (CAA), and how its provisions have improved the health of the people of Sacramento County.

The federal CAA is one of the most successful laws—environmental or otherwise—ever enacted. It has prevented hundreds of thousands of premature mortalities and tens of millions of illnesses, many of these in California. In a 2011 study conducted under section 812 of the Act, *The Benefits and Costs of the Clean Air Act from 1990 to 2020*, EPA estimated that the 1990 Amendments to the Act were responsible for preventing 4,300 ozone-related deaths in 2010 and will prevent 7,100 such deaths in 2020.

In California, meeting the requirements of both the federal Clean Air Act and our own California Clean Air Act has clearly been a difficult task. However, it is necessary and important work, the success of which is measured by the continuing reductions in ambient levels of air pollutants, and longer, healthier lives for our citizens.

California's geography and weather patterns provide optimal conditions for the formation of summer ozone and winter particulate pollution. Consequently, we are home to the only two extreme ozone non-attainment areas in the nation—South

Coast and the San Joaquin Valley. The Sacramento region is designated as a severe non-attainment area for ozone—just one step down from extreme in the hierarchy of nonattainment. But whatever the contributing factors, these designations are based on real public health threats from dangerous levels of air pollution, and have directed our efforts over the years toward reducing those threats.

One of the pillars of the CAA is the establishment of National Ambient Air Quality Standards (NAAQS), which must be supported by sound, current science. The CAA provides for this by establishing the Clean Air Scientific Advisory Committee (CASAC) and mandating a review, and revision only if deemed necessary, of each NAAQS every five years to ensure the standards remain protective of health.

I would like to highlight here that, based on years of direct experience, we support the CAA requirement that EPA set NAAQS for ozone and other criteria pollutants at levels that protect public health, with an adequate margin of safety, without the consideration of cost or other implementation issues. Likewise, we support the requirement to reassess the NAAQS every five years to reflect the latest science. These core principles and the statutory framework that surrounds them protect the integrity of the Act and, moreover, ensure that the safety of the public is the first filter through which air quality initiatives are measured.

At the same time, we are certainly cognizant of the potential costs of regulatory compliance borne by our local business community. For that reason, we closely evaluate the provisions of EPA implementation rules and guidance documents, provide comments optimizing the rules and guidance and have worked hard locally on a range of measures to mitigate and moderate the cost of regulation.

A key attainment measure for our region has been incentivizing early adoption of cleaner on and off-road equipment through grant programs to businesses. Since 1998, we have provided over $230 million of primarily state and local funds to businesses in the Sacramento area that agreed to purchase clean equipment in advance of regulatory deadlines. These very popular programs are mostly generated and operated locally and have been critical to our success in reducing monitored ozone and particulate pollution levels.

The program to incentivize early adoption of clean technologies was initially developed at SMAQMD as a local response to the 1-hour ozone standard set in 1994. This program, the Carl Moyer Incentive Program, was later adopted by the State of California as the State Moyer Program and then the Federal Government as the Diesel Emission Reduction Act (DERA). We have also collaborated with a range of regional partners, including our Metropolitan Transportation Agency, in developing initiatives that reduce average vehicle miles traveled (VMT) for light duty vehicles. Other programs help schools purchase cleaner diesel, CNG and even zero emission vehicles, and we are a co-partner locally in the DOE Clean Cities program to bring advanced vehicles and fuels to our public fleets.

For Sacramento, the result of all this work over many years tells the story—and it's a positive one. We have attained the original 1-hour ozone standard set in 1994. We anticipate that we will attain the 1997 85-parts-per-billion (ppb) standard by our mandated 2017 attainment date. With continuing reductions from incentives and supporting state and federal programs, we anticipate we will submit a State Implementation Plan, or SIP, next year that will demonstrate attainment of the 2008 75-ppb standard by the target year of 2027. (See Figure 1)

We also expect that EPA will take final action to tighten the 75-ppb standard in October, as CASAC has recommended. If that occurs, we will do our best to develop an appropriate SIP to attain on time and anticipate that, as with the other standards, we will be successful in meeting this public health goal.

For particulate matter we have had similar success. When the 2002 standard reduced the target 24-hour average from 65 micrograms per cubic meter (ug/m^3) to 35 ug/m^3, we believed we would be required to develop an implementation plan for $PM_{2.5}$. In response to this, we implemented (based partially on a San Joaquin Valley AQMD program) a successful new strategy for episodic control of wood stoves in Sacramento County on days with stagnant air conditions. We have now attained this standard. (See Figure 2) This dramatic success was the result of a carefully designed program involving very significant public outreach and strong support from our business community. Both the Sacramento Metropolitan Chamber of Commerce and the wood stove industry association testified in support of this plan.

The key message in all this is that it took hard work and a committed partnership among local, state and federal agencies to meet the NAAQS at each level. Innovation, new technologies, and well-funded incentive programs all contributed to this success. Thus far, we have been successful and I believe we can continue to be successful in meeting federal requirements.

Along those lines, I would like to make a few observations about a new ozone standard, at whatever level it is set:

- It's important that EPA follow the science and tighten the standard to within a range set by its independent science advisors.

- While meeting a tighter standard will be challenging, we are prepared to take on this important task. Fortunately, the progress we have made and will continue to make to comply with the current 75-ppb standard will bring us that much closer to achieving a new and tighter ozone standard.

- With a new standard comes a new implementation schedule—which will give our county more time to comply, beyond 2030 for the areas with the highest pollution levels. This will allow us to develop additional pollution control strategies, among them those needed to comply with the Clean Power Plan (CPP). A recent study by

Syracuse University notes that there are significant criteria pollutant co-benefits to emission reductions from the CPP. Presuming EPA moves forward with a CPP, the criteria pollutant co-benefits will help us attain and maintain our NAAQS goals. In California, we are already receiving and will continue to receive, very significant ozone co-benefits from initiatives and programs that support state greenhouse gas legislation (e.g. AB 32).

- There are a number of sources that contribute significantly to ozone levels and for which federal controls are the most efficient and cost effective and, at times, the only avenue for regulation. For example, 82 percent of ozone in the Sacramento region comes from emissions from motorized equipment, including trains, planes, and ocean shipping. Therefore, we are very reliant on federal programs to reduce emissions from these sources. It is essential that the federal government continues to pursue effective programs for national emission reductions from motorized sources, as well as stationary sources such as electric generating units, industrial, commercial and institutional boilers, and cement kilns. This also includes federal support for programs for greenhouse gas (GHG) emission reductions, since such programs, as I mentioned previously, provide significant co-benefits in the form of non-GHG emission reductions. Congress' support of innovation and technological advances is essential here. New fuels, energy programs, and transportation methods generally provide air quality benefits and certainly support both new business opportunities and lower energy bills for our citizens.

- My agency, along with sister air agencies across the country, has been very successful working through the National Association of Clean Air Agencies in analyzing the impacts of NAAQS implementation requirements on localities. We have shared these experiences with EPA and are collaborating with the agency to craft solutions responsive to local needs. Some recent successes include: reducing the national backlog of state and local plans to implement our CAA responsibilities; ensuring that projects like EJSCREEN, a new environmental justice screening tool, fairly represent the health risk for local communities; and ensuring that SIP implementation guidance provides adequate flexibility to reflect differing conditions across the US. Additionally, we anticipate much more flexibility in the forthcoming exceptional events rule revisions that EPA is preparing. This kind of collaboration between local, state and federal agencies is key to fulfilling our responsibilities as regulators.

Finally, if Congress wishes to assist states and localities with the implementation of a new ozone standard and contribute to our success in achieving clean air and public health goals, we urge you to provide increases in federal funding to state and local air agencies to support our work to compile comprehensive emission inventories; carry out complex modeling; analyze extensive data; expand and operate monitoring networks; adopt regulations; inspect facilities and enforce regulations, as necessary; address complicated transport issues; issue minor source permits; and inform and involve the public in air quality decisions and issues.

With that, I thank you for inviting me to testify on this critically important issue. I am happy to answer your questions.

Figure 1

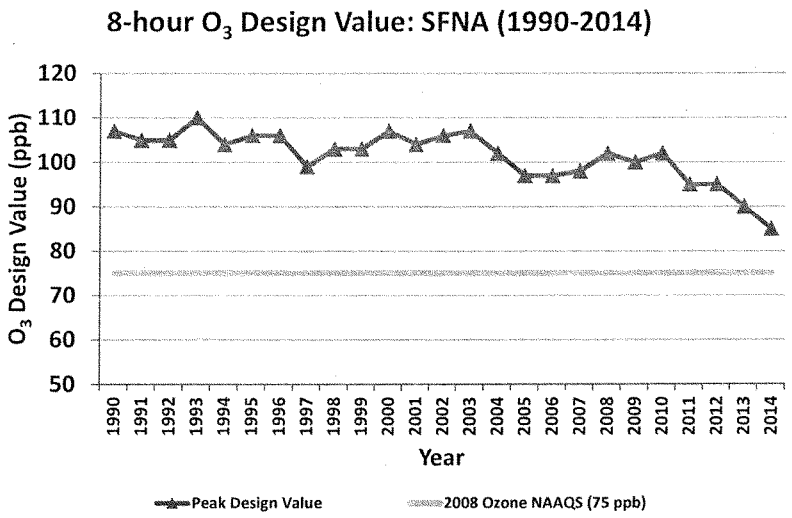
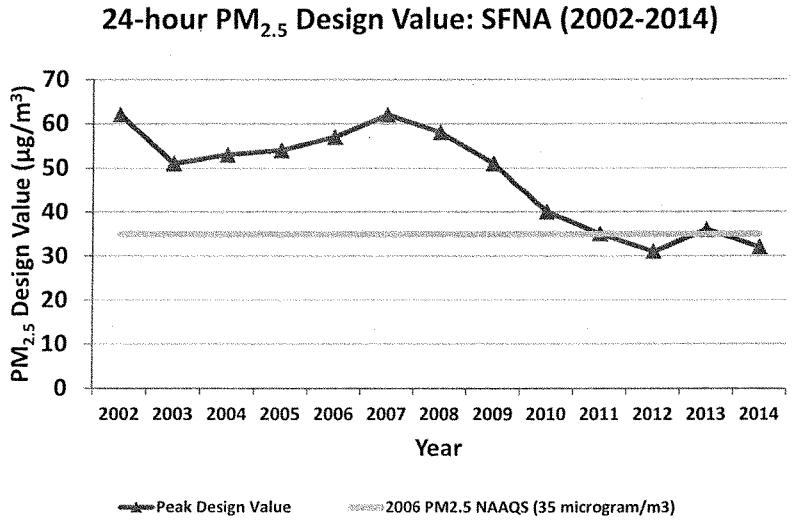


Figure 2



Senator INHOFE. Thank you, Mr. Greene. Thank all of you for your excellent statements.

We will be having a round of 5 minutes in the order that our members have arrived, starting with myself and Senator Boxer.

Judge Moore, you heard testimony from Mr. Greene talking about not just the ozone but also CO_2 and other emissions. Your Governor is a fine person, I know him, and he is committed to CO_2 reductions by 2050.

My observation was that at that time he will be 110 years old, so it is pretty easy to make those commitments. However, I appreciate very much that he has made this commitment and concern and sent this letter to the President of which you are aware.

Gina McCarthy wrote, in a CNN op-ed which I suspect you probably saw, "The agency's air standards will help communities attract new business, new investment and new jobs." Is this your experience in the State of Kentucky?

Judge MOORE. We have seen amazing economic growth and job creation in our county. We believe that can best be done by letting the private sector do what it does best. That is to create jobs. We try to keep regulations and requirements off them that might get in the way.

Our Governor has been a great partner with us. We were just recognized as the No. 1 State per capita in new job creation last year at a recent conference. Our Governor came back home and talked about that.

We work in a bipartisan way to create jobs, build our transportation system, but do that in a responsible way. We were in nonattainment but now we are in moderate attainment. We have done that through good planning.

We have doubled in population in our county since 1990. We have seen new homes, new residential, but also new commercial and industrial development. By planning wisely, protecting our environment and doing that in a way that incorporates multimodal opportunities, more mass transit, bike lanes, pedestrian capacities, we can do that.

To answer your question, these regulations can get in the way of job creation and economic vitality. We feel we are doing quite well in making improvements.

Senator INHOFE. I know you are doing a good job. That was not my question. My question was what these new standards are going to be doing.

I was in the private sector for 20 years. I know what it is like to receive the edicts that come from Washington. That is why we are having hearings like this with people who at home are having to carry out these things.

Your successes are admirable and I appreciate that. If you are looking down the road and having to come up with these new requirements, is that going to create new jobs?

Judge MOORE. No, that would get in the way of new jobs, to answer your question.

Senator INHOFE. Mr. Srikanth, what about your situation? Do you think that would have the effect, as stated, of attracting new business, new investment and new jobs?

Mr. SRIKANTH. My own experience and expertise falls short of economic development in this region. From a technician's perspective, I can say this region has seen significant growth and economic development. It is forecast to grow a lot more.

Federal help and assistance will certainly be critical to complement and accommodate the future growth. The accomplishments of the past alone will not be sufficient to carry us into the future. The future-needed emission reductions will certainly have to have Federal assistance in achieving them.

Senator INHOFE. Do you think with the new standards, there would be a disruption of Federal funds, significant cost increases, and new prohibitions on much needed capacity projects? In other words, you will continue to have good successes. Would this be because of or in spite of the new standards?

Mr. SRIKANTH. My testimony alluded to one of the things with clean air standards of any pollutant, ozone, particulate matter or others, is transportation has to do its part and do the air quality conformity analysis. If it is not done, then Federal transportation funding could be impacted. For areas which will have problems demonstrating attainment, that could impact the timely availability of Federal funding.

Senator INHOFE. Mr. McKee, there was talk in all five of the opening statements about the natural conditions in the States that cause elevated ozone levels. What can States do to control such natural events?

Mr. MCKEE. Really very little, because if you look at the ozone problem, what causes ozone is the closer you get to the stratosphere, the higher those ozone levels are going to be.

In my own area, we are a mile higher, and this is the case in much of the West. In these higher elevations, in particular for summer ozone, there is very little you can do. I do not know that we want to cut down all trees and all vegetation and bury it so that we do not have ozone.

Senator INHOFE. Thank you very much.

Senator Boxer.

Senator BOXER. Thank you.

I wish the whole Country could have seen this panel. You are all so good. There was one star witness, if I could say. You would normally think I would point to my Sacramento friend, who was pretty good, but I have to say Dr. Diette, thank you.

You are not a politician and you are not a bureaucrat. You came here and you told us the impact of smog on the human body. You told us and did it very, very clearly, exactly what happens. You did not do it in some confusing manner.

You said, ozone pollution is bad for the lungs. That is pretty straightforward. We all have lungs. It is bad for the lungs. You said it irritates the lungs, it causes symptoms. When you have ozone, sometimes in cases you can die from it. You said that. You further said that normal people also are impacted by ozone.

What I loved about my second star, Larry Greene, was his point that he served in the military and he views his job as cleaning up the air and similar to that, protecting the lives of people.

It just confuses me that we would argue over this in light of what you said, Doctor, which I do not think anyone at all would ever refute because they are facts.

I would ask unanimous consent to place in the record, if I might, Mr. Chairman, By the Numbers, this shows us the cost of this regulation at the different standard, if it is 70 ppb or 65 ppb. It shows you how many asthma attacks will be prevented, up to 960,000, Mr. Chairman, and 4,300 premature deaths.

Close your eyes and think if it is someone you love whose lives will be saved. There would be a million days when kids would not miss school, 180,000 days when people would not miss work, and 4,300 asthma-related emergency room visits. Doctor, you expressed that well, of a mother or father panicking and leaving work to rush their child to get help. Also, 2,300 cases of acute bronchitis would be avoided among children.

Everybody else, it is going to be hard. Yes, it is going to be hard. You know what? It is hard. When we passed the Clean Air Act, everybody said the same thing that my dear friend, the Chairman said, the same thing my friend the Majority Leader said, and Senator Thune, a staggering blow to the economy. They used the same words in 1970 and when we reauthorized the Act, the same words.

Mr. Moore, Hon. Gary Moore, you are very good at expressing your view and you stand for a lot of people in your State. I agree with that, but honest to God, if you really want to look at what happens when there is no regulation on air, look at communist China, look at communist Eastern Europe. They have no regulations. The state did not want any. They did all the business and there were no regulations. People could not breathe. When that wall came down in Eastern Europe, they knew if they wanted economic growth, they had to clean up the air.

I would ask unanimous consent to place in the record the number of jobs that have been created since we passed the Clean Air Act. Can I do that?

Senator INHOFE. Without objection.

[The referenced information follows:]

The National Ambient Air Quality Standards
EPA'S PROPOSAL TO UPDATE THE AIR QUALITY STANDARDS FOR GROUND-LEVEL OZONE

BY THE NUMBERS

On November 25, 2014, the U.S. Environmental Protection Agency (EPA) proposed to update the nation's air quality standards for ground-level ozone based on extensive scientific evidence. The proposed updates will improve public health protection, particularly for children, the elderly, and people of all ages who have lung diseases such as asthma. The proposal will expand the ozone monitoring season for many states, and update the Air Quality Index to ensure people are notified when air quality is unhealthy. And it will improve the health of trees, plants and ecosystems. States would have time to develop and implement plans to meet revised standards, and existing and proposed federal rules will help by making significant strides toward reducing ozone-forming pollution.

Science-based Air Standards Have a Proven Record of Success

- Setting and implementing national standards for pollution has made the air cleaner for all Americans.
- Since 1970, we have cut harmful air pollution by about **70%** while the US economy has **more than tripled**.
- National average ozone levels have gone **down 33%** since 1980.
- **90%** of areas designated nonattainment for the 1997 ozone standards now meet those standards.

Reducing Air Pollution Delivers Health Benefits for Children and Adults

- An ozone standard in the proposed range of 65-70 parts per billion has public health benefits worth an estimated:
  - **$6.4 to $13 billion** for a standard of 70 ppb, or
  - **$19 to $38 billion** for a standard of 65 ppb.
- These benefits outweigh the costs, estimated at:
  - **$3.9 billion** for a standard of 70 ppb, or
  - **$15 billion** for a standard of 65 ppb.
- Reducing ozone and particle pollution nationwide (excluding California) in 2025 will avoid:
  - **750 to 4,300** premature deaths
  - **320,000 to 960,000** asthma attacks among children
  - **330,000 to 1 million** days when kids miss school
  - **65,000 to 180,000** missed work days
  - **1,400 to 4,300** asthma-related emergency room visits

- **790 to 2,300** cases of acute bronchitis among children

California Benefits and Costs Estimated Separately

- Because several areas in California are not required to meet the existing standard by 2025 and may not be required to meet a revised standard until sometime between 2032 and 2037, we estimated benefits and costs for California separately.
- Meeting a revised ozone standard after 2025 in California will yield annual health benefits of:
  - **$1.1 to $2 billion** for a standard of 70 ppb, or
  - **$2.2 to $4.1 billion** for a standard of 65 ppb.
- These benefits outweigh the costs after 2025 in California, estimated at:
  - **$800 million** for a standard of 70 ppb, or
  - **$1.6 billion** for a standard of 65 ppb.
- Reducing ozone and particle pollution in California will avoid:
  - **110 to 430** premature deaths
  - **99,000 to 210,000** asthma attacks among children
  - **110,000 to 230,000** days when kids miss school
  - **5,500 to 11,000** missed work days
  - **340 to 740** asthma-related emergency room visits
  - **67 to 130** cases of acute bronchitis among children

Existing and Proposed Federal Rules Will Help Reduce Ozone Pollution

- Rules intended to reduce ozone precursors such as NOx and VOCs, along with rules that will reduce these pollutants as a co-benefit of reducing toxic emissions and carbon pollution, will help most parts of the country meet a revised ozone standard.
- This includes federal air rules for power plants like MATS, requirements to reduce the interstate transport of air pollution, and the Clean Power Plan, emissions standards for stationary sources, and Tier 3 vehicle emissions and fuels standards.
- A total of **9 counties** with monitors (excluding California) are projected to violate 70 ppb in 2025 -- down from **358 counties** with monitors that measure ozone above a level of 70 ppb based on 2011-2013 air quality data.
- A total of **68 counties** (excluding California) with monitors are projected to violate 65 ppb in 2025 – down from **558 counties** with monitors that measure ozone above a level of 65 ppb based on 2011-2013 air quality data.

Clean Air Act: Cost-Benefits and the Economy

- Over the last 40 years, our national GDP has risen 207 percent. The total benefits of the Clean Air Act amount to more than 40 times the cost of regulation. For every one dollar we have spent, we get more than $40 of benefits in return.
  Source: Administrator Lisa P. Jackson, Remarks on the 40th Anniversary of the Clean Air Act (Sept 14, 2010)

- In 2010 alone, reductions in fine particle pollution and ozone pollution achieved by the Clean Air Act Amendments of 1990:
  - Avoided more than 160,000 premature deaths;
  - Avoided 130,000 heart attacks (acute myocardial infarction);
  - Prevented millions of cases of respiratory problems like acute bronchitis and asthma attacks, and 86,000 hospital admissions;
  - Prevented 13 million lost workdays; and
  - Avoided 3.2 million lost school days due to respiratory illness and other diseases caused or exacerbated by air pollution.

  Source: EPA, The Benefits and Costs of the Clean Air Act from 1990-2020 (March 2011).

- Since 1970 aggregate emissions of common air pollutants dropped 72 percent, while the U.S. gross domestic product grew 219 percent. Total private sector jobs increased by 101 percent during the same period.
  Sources: EPA, Progress Cleaning the Air and Improving People's Health (accessed June 26, 2014) and Bureau of Labor Statistics, Current Employment Statistics Survey and Calculator (accessed June 26, 2014)

- From 1990 to 2020, the economic value of the benefits from improved air quality and reductions in air pollution will be almost $ 2 trillion and over 30 to 1 return on the $ 65 billion investment in meeting the Clean Air Act's requirements.
  Source: EPA, The Benefits and Costs of the Clean Air Act from 1990-2020 (March 2011).

- In 1990, the average residential retail price for electricity was 10.84 cents per kilowatt hour (KwH) and in 2011 the average price was lower at 10.41 cents per KwH, according to the Energy Information Agency.
  Source: Energy Information Agency, Annual Energy Review (September 2012).

- The Five Major Rules during the Obama Administration with the highest net benefits are air pollution rules and the fuel economy/tailpipe carbon pollution rules.
  Source: OMB, 2013 Draft Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act (accessed Oct. 10, 2013)

Senator BOXER. Thank you very much.

It is very clear that while the aggregate emissions of common air pollutants dropped 72 percent, the U.S. Domestic Product grew 219 percent.

Mr. McKee, earlier this year, a poll in Utah found that 67 percent of voters there stated that air pollution and smog are extremely serious problems facing their State. Are you aware of that poll?

Mr. MCKEE. I am aware of the information.

Senator BOXER. You are aware of the poll. In 2013, ozone levels in one of your counties exceeded the Federal standard on 54 days and concentrations spiked as high as 142 ppb, more than double the level of EPA's rule.

Do you believe air with ground level ozone concentrations of 142 ppb is safe for people to breathe, especially for children?

Mr. MCKEE. Senator——

Senator BOXER. Can you just say if you think it is safe because my time is running out. I want to ask Dr. Diette if you do not answer it.

Mr. MCKEE. If I could real quickly, we have spent millions of dollars. Our group did a study with admissions to our local hospital to see what effect respiratory illness had to do with ozone. They did not see any correlation with admissions.

Senator BOXER. You do not think that 142 ppb is safe?

Mr. MCKEE. We did not see it.

Senator BOXER. What do you think, Doctor?

Dr. DIETTE. One hundred forty-two ppb is an extraordinary value. It is lethal for people with heart disease, lung disease, diabetes and other conditions. It is a lethal dose of ozone.

Senator BOXER. Thank you. That is enough. It says it all.

We are here to make life better for people, not to fight for the polluters, period, end of quote.

Senator INHOFE. Senator Fischer.

Senator FISCHER. Thank you, Mr. Chairman and Ranking Member Boxer.

Judge Moore, in your testimony, you discussed the potential impacts of a lowered ozone standard and state the proposed standard will dramatically increase the number of counties classified in nonattainment.

As you noted, under this proposal, 16 States that currently have no counties in nonattainment would be subject to a new conformity process. This includes my State of Nebraska where 57 out of our 93 counties would be classified in nonattainment. I will note that these are rural, agricultural counties.

Can you speak about the potential costs that State and local governments will face in order to come into compliance and reach that attainment?

Judge MOORE. Yes. Actually, that number, according to our statistics, is if the 70 ppb standard were passed, it would be 358 more counties nationally. At 65 ppb, it would be 558 more counties would be impacted.

We know the challenges that Congress is having with passing a long-term transportation reauthorization. One immediate impact would be in the area of CMAQ funding, congestion, mitigation and

air quality funding for transportation, to help improve our transportation system and congestion.

I suspect that those dollars are not going to increase at the same percentage as the number of counties that will be competing for those dollars. Immediately, the program that is supposed to help nonattainment counties become in attainment will be impacted. Right there is an immediate financial impact.

Road projects, as we continue to try to move our communities forward, rural communities depend on highway improvements to get people to jobs and jobs to the people as well as other services.

More regulation will do nothing but delay projects, if not prohibit them, and increase costs. The impact on economic development is dramatic as well because of these similar challenges.

If we saw transportation spending enhancements along with some of these requirements, it could potentially lessen the impact but it will never meet the additional financial impact these standards would have on local governments.

Senator FISCHER. Do you know if the EPA has considered or accounted for these costs with their analyses of the rule?

Judge MOORE. I have seen their statistics of their estimates and they do not fully capture the total cost that local governments and communities would face.

Senator FISCHER. Like Kentucky, Nebraska's counties and our local governments, they own and maintain a very vast road and transportation system. As I pointed out, the counties that will be affected are very rural counties. In Nebraska, it is not unusual to have one person per square mile in many of these areas.

We already see maintenance projects that undergo what I view as a very cumbersome environmental review process and the costs of time involved which means money as well. These counties and the State cannot afford that.

Can you briefly describe the current review process and what you see as burdens placed on our local governments under the proposed ozone rule for counties in nonattainment?

Again, I would just like to say we all want clean air, we all want clean water, but we also need to recognize costs that are involved in I believe the expansion of the rule where we see areas in nonattainment that have not even met the current rule.

We are talking about an expansion instead of focusing on areas where we need to focus. Let us take care of business. If you could answer that, I would appreciate it.

Judge MOORE. We do care about the health of our citizens, obviously. It is a huge responsibility we have.

By the way, in Boone County, Kentucky, we were recently selected as the healthiest county in the Commonwealth. We are very proud of that statistic. We have done that by developing our community in a responsible way. We are working toward the 2008 standards.

The 2008 standards are having an impact. They are improving. We would like to see it play out and see if that does continue to develop. We believe it will. Let's let the 2008 standards play out.

Specifically to your question as to cost, those rural communities that will be added to the list of nonattainment are the counties that can least afford it. They have smaller budgets. Many times

they have little to no staff to deal with these added requirements. I think you could see a dramatic impact on progress in those counties.

The modeling that is required to be done, in order to construct or improve a highway system, requires substantial modeling. My colleague has spoken to the modeling question. Who is going to pay for that additional cost? It is either going to be on the local taxpayers or added to the cost of the project.

As I stated earlier, there already are not sufficient funds to deal with our transportation needs. If you add delays and costs, you are adding additional responsibility to a system that already is not paying for itself.

I really feel for my colleagues in the rural counties that would be asked to try to meet these new requirements. Let's let 2008 play out and continue to make progress and someday discuss where we go from there.

Senator FISCHER. Thank you, Judge.

Senator INHOFE. Thank you very much.

I would ask unanimous consent that letters from two Democratic Governors, of Virginia and Kentucky, be made a part of the record. Both object to lowered standards.

[The referenced information follows:]

COMMONWEALTH of VIRGINIA

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March 16, 2015

Environmental Protection Agency
EPA Docket Center (EPA/DC)
Mailcode 28221T
Docket ID No. OAR–2008–0699
1200 Pennsylvania Ave. NW
Washington, DC 20460

Dear Administrator:

The Virginia Department of Environmental Quality (VDEQ) appreciates the opportunity to comment on the rule proposed by the US Environmental Protection Agency (EPA) to revise the national ambient air quality standards (NAAQS) for ozone that was published in the Federal Register on December 17, 2014 (79 FR 75234). Our comments address both the proposed revisions to the standards as well as their implementation, and reiterate in part comments[1] provided on previous proposed revisions to the ozone standards.

As the ozone standards are once again being considered, many of the same issues and challenges remain in selecting the most appropriate form and level for these standards. As in previous standard reviews, the EPA should carefully consider all the relevant factors and consequences in setting these standards. The EPA should also rely on sound, defensible science and conclusive evidence to make these decisions.

Virginia has made great progress in improving ozone air quality over the years. Both ambient ozone levels and emissions of the precursor pollutants have been significantly reduced since the promulgation of the current standard. The result of these efforts is evident in the fact that all ozone monitors in the Commonwealth are now in compliance with the standard. This substantial achievement has been the result of coordinated effort at the local, state, and federal levels.

However, there is still work to be done on the current standard. Parts of the Washington, DC-MD-VA metropolitan area are still monitoring ozone levels slightly above the current standard. In addition, the EPA and states have just recently begun the process to identify and address the transport of ozone from one area to another. A strong case could be made that these residual issues should be resolved before a new standard is established.

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[1] Letters dated October 10, 2007 and March 22, 2010 (Enclosure 1)

In general, the Commonwealth of Virginia supports the setting of standards based on sound science and within an open and proactive public process. We believe that the level of the standard should be based on a balanced consideration of the potential risks and the underlying uncertainty in the science. In this context, revisions limited to the upper end of the proposed ranges for the revised primary and secondary standards would be subject to less uncertainty and are therefore supported.

Given the acknowledged uncertainty in the scientific data in the proposal, it is the specific recommendation of the Commonwealth that if the standard must be revised at this time, the primary ozone standard should be set no lower than 0.070 parts per million. This would be the next most logical and supportable step in the longer term effort to improve ozone air quality. Furthermore, Virginia strongly supports the EPA proposal to make the secondary standard the same level and form as the primary. This approach avoids the challenges that would otherwise occur with implementation of a revised form and level of the standard.

The EPA science advisory committee (CASAC) has identified two key areas needing further analysis for future reviews of the ozone standards. The first identified need is for more robust scientific research on both the health and welfare impacts of ozone at lower concentrations. The second issue that was identified is the issue of background ozone levels that are made up of both naturally occurring ozone and ozone that is generated internationally. Both these issues are becoming increasingly important in standard reviews as potential standard levels become more difficult and costly to achieve.

The following recommendations are provided regarding the standard implementation process:

- The EPA must continue to develop and implement timely, reasonable, and cost-effective regional and national emission control strategies to assist the states in meeting a lower ozone standard.
- The EPA must provide timely implementation rules and guidance for the new standard.
- The EPA must provide flexibility and extended timelines for rule implementation.
- The EPA must continue to support and expand innovative programs such as the voluntary "ozone advance" program to serve as possible alternatives to regulatory mandates.

Additional detailed technical comments are provided in Enclosure 2 to this comment letter.

Once again, thank you for the opportunity to comment on the proposed rulemaking. If you have any questions about these comments, please feel free to contact me or the DEQ Air Division Director, Michael Dowd at (804) 698-4284 or Michael.Dowd@Deq.Virginia.gov.

Sincerely,

David K. Paylor

David K. Paylor

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November 21, 2014

The Honorable Barack H. Obama
President of the United States
The White House
1600 Pennsylvania Avenue, NW
Washington, D. C. 20502-0001

Dear Mr. President:

I am writing concerning the anticipated Environmental Protection Agency's (EPA) proposed rule related to the ground-level ozone standard. I appreciate the great challenge that EPA faces in setting health-based standards. As you are aware, protecting the health of Kentuckians is of critical importance to me. However, I must share with you the concern I have that the new ozone standard could create a hardship for many of our communities.

I understand the Clean Air Science Advisory Committee has recommended that the EPA adopt a standard within the range of 60-70 parts per billion (ppb). Any point within that range would be below the existing standard of 75 ppb, and any such reduction would have a significant impact.

The impact of the new standard will vary depending whether or not the standard is reduced from the current 75 ppb and how extreme the reduction is. For example, if 60 ppb is promulgated as the new standard, all 29 of the air monitors that Kentucky operates will exceed the standard. If the highest end of the range is selected, nonattainment will be limited to major metropolitan areas. Currently at 75 ppb only one metropolitan area exceeds the standard. This is of critical importance because if a lower standard is selected, counties in Kentucky that have never before experienced the ramifications of a nonattainment designation may be forced into that position.

I must remind you that other EPA rules either finalized or proposed have been touted for their direct or indirect impact of reducing ozone precursors. The Corporate Average Fuel Economy and Tier 3 standards will affect ozone-forming pollutants from the mobile sector. The Clean Power Plan, which was proposed on June 2 of this year, is expected to reduce 407,000-428,000 tons of nitrogen dioxide in 2030 as reported by the EPA. Thus, there are already extant or proposed ancillary standards that will significantly lower ozone-producing criteria pollutants. Therefore, my advisors recommend the ozone standard should remain unchanged for the time being.

There are many environmental rules driving up costs in Kentucky that will negatively impact the economy. A new ozone standard does not have to contribute to these costs. Kentucky is a manufacturing state. For example, Kentuckians produce many of the vehicles and much of the aluminum and steel manufactured in the U.S., and our manufacturers rely on low-cost electricity to produce these products. I, therefore, ask you to retain the current ozone standard which will continue to protect the health of our citizens without burdening our communities with costly nonattainment compliance programs. The growth of our economy is dependent on it.

Sincerely,

Steven L. Beshear

cc: Gina McCarthy, Administrator
United States Environmental Protection Agency

Senator INHOFE. Senator Merkley.

Senator MERKLEY. Thank you very much, Mr. Chairman.

Thank you all for your testimony. I want to clarify a couple points I found interesting in the discussion.

The first is related to the challenge of complying with potential new standards. It is my understanding that the areas of the Country that have the biggest challenge with ground level ozone would have until 2037, 22 years from now, to comply.

I do not know who would like to respond to that. I just want to clarify that is the case, because I do not think that has really been highlighted in the conversation. Mr. Greene.

Mr. GREENE. The worst areas would probably be San Joaquin and South Coast. They would get substantial time and I believe that is correct, sir.

Senator MERKLEY. Certainly that is a factor in the cost. Virtually all of my home State is in compliance with the new standards. Yet, the cost estimates done by the National Association of Manufacturers said it would take Oregon $8 billion to comply. How would it take Oregon $8 billion to comply if Oregon is already in compliance with the standards? Can anyone explain how those costs would be incurred?

I see no answer. If the estimates are so grossly off for my home State, how much are they off for the rest of the Country? The estimates from NAM are so different from the estimates from EPA that I think we need additional insight from third parties to get an understanding of this.

My understanding is from the EPA side, the health care savings would far exceed the cost to our economy and health care costs are a cost to the economy. Certainly that is something that makes sense.

I was interested in the question of the pollution from China. I have been over to China a couple of times. Anyone who has visited for any length of time, you are probably going to have days you can hardly see the length of a football field. It is not fog, it is pollution.

They had a recent documentary called "Under the Dome" that highlighted the vast impact on the health of the citizens of the Country. It is equal to smoking something close to two packs a day of cigarettes. Our diplomats are reluctant to be there. It does make sense that some of that pollution is making it to the U.S.

While looking that up, the best estimates I could find, the biggest impact in southern California is in lower elevations, 3 ppb to 8 ppb and in higher elevations, 15 ppb. Most of that arrives in the spring, not in the summer when California has the greatest compliance challenge.

Mr. Greene, is that correct?

Mr. GREENE. That is correct. It occurs in the spring and that conforms with the numbers I have seen on California.

Senator MERKLEY. I tried to find some sense of the contribution from Mexico. I did see the charts that showed no correlation between the areas of the U.S. most adjacent to Mexico or weather patterns that brought that pollution into the U.S. Does anyone have any insight to the direct impact from Mexico? Mr. Greene.

Mr. GREENE. Senator, I do know that our southern districts in California do have some significant impacts from Mexico, particu-

larly dust. You would imagine that counties or areas right next to each other would exchange some pollution across the border.

Senator MERKLEY. Is there a particular time of year that really affects compliance? Is it storms that blow north or certain winds that bring that dust into the U.S.?

Mr. GREENE. I would not know that answer, sir.

Senator MERKLEY. The thing I find interesting is the health testimony. Thank you very much, Doctor, for your testimony. Asthma is a significant concern among my citizens. The other health impacts are substantial.

I like the idea of our planning being based on the science of health impacts. Doctor, could you clarify again, am I understanding from what you are saying that there is a significant difference on health between the current standard and the proposed standard, that there would be a substantial improvement, reduced health costs and improved quality of life?

Dr. DIETTE. All of those things are true. One of the reference points that has come up from time to time is about being currently in attainment with the present standard, for example, 75 ppb. For example, the Chairman mentioned that his State, every county, was in compliance.

If you look at another resource, the American Lung Association's website, they have a state of the air statement about different counties. You would see in Oklahoma, for example, every county would get a grade F but for one, which would get a grade D. That is because that is based on science, not regulation.

The science has advanced. Our interpretation of the science has advanced at a much faster pace than the regulation has. People are being harmed by it. It is very clear. I think that is the standard about which we should be thinking, the one that is fully protective of human health as opposed to the legacy of another era.

Senator MERKLEY. Thank you very much.

Thank you, Mr. Chairman.

Senator INHOFE. Senator Capito.

Senator CAPITO. Thank you, Mr. Chairman. I thank the Ranking Member and I want to thank the panelists.

Mr. Srikanth, I wanted to ask you to explain to me the threat of conformity in terms of the threat of conformity lapses which could effectively shut off Federal highway funds due to the stringency of the standard.

Both in D.C. and around the Country, smaller, more rural MPOs will have significant burden on these MPOs. Can you explain to me the conformity issue? You brought it up in your statement, but could you flesh it out a bit more for me, please?

Mr. SRIKANTH. I would be happy to, Senator Capito.

The transportation conformity is associated with the Clean Air Act. Metropolitan planning organizations have to follow the rules put out by the EPA on how to conduct this.

One of the key drivers of the transportation conformity rule is when an area is designated as not being in attainment of a standard, they are required to submit what is called a State Implementation Plan, a plan on how that area will attain the standard.

That document, the State Implementation Plan, will identify the amount of emissions from different sectors, from power plants, area

sources and transportation. The amount of emissions for transportation listed in the State Implementation Plan is often referred to as the emissions budget.

A metropolitan planning organization's long-term transportation plan is required to be developed in order to get Federal funds. The emissions from all of those projects, at a minimum of 20 years into the future, have to be below these levels in the State Implementation Plan. If it is not, then the plan will not be approved.

The plan has a time limit. If the plan remains not approved, then the plan would lapse. If the plan lapses, the Federal transportation funding will not be provided until the plan is corrected.

Senator CAPITO. To your knowledge, has that occurred under the standards we have now? Do you know of anyone across the United States who has not been in conformity and had their Federal highway dollars withheld?

Mr. SRIKANTH. We have had instances. I will have to get back to you on specifics. I think my colleagues might be able to recall specific jurisdictions. Atlanta certainly comes to my mind.

Senator CAPITO. Judge Moore, are you aware of any of that?

Judge MOORE. From a couple of my colleagues, I believe Atlanta would also be an example of where that has happened.

If I may also comment, the recent court ruling is requiring, in many cases, that modeling of conformity not only be applied to the 2008 standards but also the 1997 standards. You would have to meet both.

If new regulations were passed, there may be three different standards and models that some regions would have to run in order to make sure we were compliant and eligible for Federal funds. There is also that confusion and the overlap that MPOs and regions are facing.

Senator CAPITO. I would have to add myself to that confusion. Certainly drawing up three implementation plans would be costly.

I think one of you mentioned the amount of your budget dedicated strictly to this issue, a quarter of the budget you are using to measure and make sure you are measuring properly.

I heard a comment that people are advocating for no regulation. I have not really heard that in this committee and I have not heard it from any of the testimony today. I certainly do not believe that to be true.

When you look at what is going on in terms of ozone and put on top of that the Clean Power Plan and EPA possibly looking at redoing their emissions plan for methane, particularly in the western States, we have a lot of oil and gas in the State of West Virginia, it begins to become a burden.

If we have to do three implementation plans and devote all the resources to that, it begins to lack the thing I think Senator Flake was calling for, basically common sense here. Let us move with common sense.

Mr. McKee, could you comment on all of the different moving parts that EPA is going to be putting forward if they are successful with the regulatory environment we see right now?

Mr. MCKEE. We certainly find it difficult in the area where we are, and as I stated, in the West, because particularly with the low-

ering of the ozone standard itself, much of the United States will not be able to meet attainment.

If you go down to 70 or 65 ppb, as you realize, ozone itself does not just happen. It is a mixture with VOCs and NO_x and that comes together. It just does not happen on its own. As I talked about the trees and vegetation, it is somewhat of a decaying of those products that in summertime elevates those standards.

Then the higher elevation we have, the more difficult it is to be able to correct that. It is very possible, even absent all emissions, we would have significant areas in the United States that would still be in nonattainment.

Senator CAPITO. Thank you very much.

Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Senator Capito.

Senator Whitehouse.

Senator WHITEHOUSE. Thank you, Mr. Chairman.

I would like to make a few points that I do not think have been made yet.

The first is that the present regulation is one that was conceived in scandal. To set the present standard, the Bush administration EPA, under Administrator Johnson, departed from the consistent recommendations of his agency scientists, public officials and the agency's own Scientific Advisory Committee.

The standard then set was inadequate to protect the public, especially children and the elderly, from the harmful effects of ozone pollution from asthma and lung disease. Indeed, it was so inadequate that EPA's own Clean Air Scientific Advisory Committee took the unique step of writing to the then-Administrator to state that they "do not endorse the new primary ozone standard as being sufficiently protective of the public health."

They went on to say that EPA's decision "fails to satisfy the explicit stipulations of the Clean Air Act that you ensure an adequate margin of safety for all individuals, including sensitive populations." That was the finding of the Clean Air Scientific Advisory Committee at the time.

Since then, Dr. Diette, as the science on this gotten clearer or less clear?

Dr. DIETTE. It has become increasingly strong. There are additional studies in multiple regions of the Country and throughout the world that have strengthened the evidence base. They have also been conducted in the era when the current standard has applied, so it is in an era where there are lower concentrations of ozone and people are still finding substantial signal for health issues.

Senator WHITEHOUSE. We also know overall that, at least at the 70 ppb standard, the estimated health care savings and benefits, the estimated environmental savings and benefits, the estimated economic savings and benefits from that rule could add as much as $13 million, whereas the costs would only be $3.9 billion. It creates a $10 billion immediate benefit according to those calculations.

The third thing I would like to point out is on the path of Rhode Island. Rhode Island is a downstream State. We are often out of compliance on ozone. We have days in the summer when, as you are driving in to work, what you hear on the radio is the announcer

saying today is a bad air day in Rhode Island. Children should stay indoors. Elderly should stay indoors. People with lung or breathing difficulties should stay indoors.

It looks like a beautiful day but it is ozone. Where does the ozone come from? It comes from power plants in the Midwest.

Judge, your State of Kentucky has 22 smoke stacks that are higher than 500 feet. When you build those high smoke stacks, you shoot the pollution, the SO_x and the NO_x, according to the GAO study, 56 percent of the boilers attached to tall stacks lack scrubbers to control sulfur dioxide and 63 percent do not have controls to trap emissions of nitrogen oxides. As Mr. McKee just pointed out, those are the precursors to ozone.

You build high smoke stacks, you eject the stuff out of your State, and it goes up into the heat and into the atmosphere. It creates ozone and our kids in Rhode Island have to stay indoors on an otherwise good day.

I do not see how that is fair. I do not see how there is any way in the world Kentucky is ever going to pay attention to that problem when the harm is taking place in Rhode Island.

It is really important, Mr. Chairman, that this be a rule that protects States that are not just pollution-emitting States. We are a downstream State that pays the price of 22 tall smoke stacks.

Let me ask one last question about altitude. We have heard from Mr. McKee a couple of times about the problem of being a high altitude State. Dr. Diette, could you react to that? What is the reality of that?

Dr. DIETTE. I think there is a lot to know about altitude and regional transport of some of the pollutants. In some cases, pollutants are generated near where they are found and in some cases, they are transported from a distance.

If you think about places like some parts of Utah, for example, where there are thermal inversions, there are pollutants created there that cannot escape into the upper atmosphere. Sometimes that is what happens. Other times, there is transport from a distance and also ends up there.

I wanted to remark about a point you made because we say it so often that I think it is really remarkable. As you talked about telling kids to stay indoors on a day when there is transport of ozone into their State, that is a remarkable statement.

It is a remarkable thing to have to tell your entire population, today is not a safe enough day for you to go outside and play. If you go outside and play, you have to wait until the sun is down, you have to wait until it is dark when maybe it is safe or not. It is an unbelievable message.

When my patients come to me and say, what can I do about my asthma, one of the things I can say is, I can keep giving you more medications. They say, what about pollution, what can I do and I say, there is nothing you can do. The free market does not change that. You cannot buy a different product and not be exposed to pollution.

This process here, which is the only way to control it in the United States, is to do it at the Federal level and try to keep the pollution from reaching them.

Senator WHITEHOUSE. Thank you very much.

Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Senator Whitehouse.

Senator Rounds.

Senator ROUNDS. Thank you, Mr. Chairman.

Doctor, I appreciated your comments. I have a grandson who has a challenge with asthma. This is something I think all of us care about.

Some of the information you laid out for us today indicates that 140 ppb would be fatal. Could you work a bit backward from there? I am assuming 100 ppb is still perhaps not fatal but absolutely critical in nature and one that should be attained, a fair statement?

Dr. DIETTE. That is a great question. I thank you very much for it.

It is not simply a threshold. The reason I reacted to 110 or 120 ppb is that is an extraordinarily high value. It is a value that would set off alarm bells for a region. That is one of the days we would be talking about not having the kids go outside. There is a dose response effect, so we see it even at much lower concentrations than that.

Arbitrarily, investigators choose things like 5 ppb or 10 ppb as an increment but very small increments, even in the lower range, can affect health, even during low increments.

Senator ROUNDS. What do we call the lower ranges? What are the numbers you have seen studied in terms of lower ranges of ozone?

Dr. DIETTE. I think the best evidence I have seen comes in the 60 ppb and higher. There has been a lot of attention to that range between the current standard of 75 ppb and 60 ppb which is the proposed lower bound of the new standard.

Senator ROUNDS. The reason I ask is that I have a study I would like entered in the record, Mr. Chairman.

[The referenced information was not received at time of print.]

Senator ROUNDS. It is a reference out of Atmospheric Environment done by Mr. Emery back in 2011 in which he indicates that a significant amount of the geographic area in the western part of the United States actually has a background of about 70 ppb, apparently not caused by us but simply background.

I am curious, in your studies looking at the sound science side of this, is it even attainable, is it even possible to get to something under a 70 ppb when in those States in which literally there seems to be some pretty sound evidence that is a natural background level?

Dr. DIETTE. I think you have brought up an important issue which is, what is the background concentration? For one, it is not measurable. You cannot measure it directly, because we do not have the time and the space where there is not manmade contribution to the ozone concentration. The only thing you can do is estimate.

There are different estimates and most of the estimates I have seen are between 20 and 40 ppb. In terms of background, we are talking about a couple of phenomena. Some definitions include transport into an area where it is being measured for another area and others are that being generated by things that have nothing to do with man.

For example, a forest fire, if man had nothing to do with it, that is going to happen anyway, or lightning strikes, things of that sort.

Seventy parts per billion sounds really high. That is not a value that I have seen reproduced otherwise. I would probably defer to my other colleagues here about what it takes in order to attain standards since that is their expertise and not mine.

Senator ROUNDS. I am curious. We have used references in terms of the number of packs of cigarettes per day and so forth that an individual would utilize.

If you were to take a reference, if 100 ppb of ozone was comparable to a pack a day, is there relevance to saying it is very important that we bring down ozone from very, very high levels in those areas where there is significant and direct and acute damage being caused?

Are we putting our resources and attention into the right locations by saying we want to work to get everybody to 65 ppb or 60 ppb when in essence we could be saving a lot more lives if we were to focus on those areas such as those in California which have very, very high numbers? Where is our best bet for saving the most lives?

Dr. DIETTE. You raise a bunch of very important and interesting points. One of the issues I have heard here is ideas such as we should get everyone into attainment first before lowering the other people who are already in attainment.

As a health care provider, that strikes me as very unusual. To me, the analogy would if we had a new drug that could cure asthma, we would say, you are not going to get it yet because all the people who can benefit from the existing drugs do not have them yet. That is the way it sounds to me.

It sounds as if we are going to keep people who could benefit from benefiting while we are waiting for other people who are not benefiting already to catch up. It seems very strange to me from a health care standpoint. I would not advocate it for my patients.

Senator ROUNDS. Let me go to Judge Moore for a second. You did not get an opportunity to respond and I thought perhaps you would like to.

When we start talking about NO_x and the references with regard to the creation of ozone in your particular State where you have power plants, are you currently in compliance with those standards? What would be your thoughts in terms of the reference our friend from Rhode Island made?

Judge MOORE. Thank you for the opportunity. I did want to respond.

Our county is a suburban county. We are not a smokestack county. We are in moderate nonattainment currently because of emissions that are flowing into our county from other parts of the Country.

I think Senator Whitehouse helped make our case that you are putting regulations on counties that really cannot control the ozone level in their counties. Those rural counties that maybe are reaching levels under a new standard that would require additional costs and regulations, you are putting those requirements on them when it is not going to have an immediate impact or possibly a long term impact on the issue.

I would also differ with him on smokestacks. I think he is referring to Kentucky Coal and Energy, coal-fired power plants. I do believe there are clean coal technologies that are working and moving forward. The 2008 standards put substantial requirements upon those power companies to make sure they meet the 2008 standards.

Again, we would come back to let's let that play out. Improvements are being made. Let's continue to make those improvements before we put regulations on communities that are not going to have an immediate impact.

Senator ROUNDS. Thank you.

Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Senator Rounds.

Senator Gillibrand.

Senator GILLIBRAND. Thank you, Mr. Chairman.

I want to thank our witnesses for testifying today. This is an important topic for my State. There are few, if any issues, more important than the health of our children and the air they breathe every day.

Now that it is summer, more children will be spending more time outdoors. We know how active young people are when they are outdoors, playing sports, games, and activities. You also know children's lungs and immune systems are still developing, leaving them particularly susceptible to the negative health effects of increased ozone layers.

In fact, a 2010 study conducted in New York City found that ozone associated with warmer weather aggravates children's asthma leading to severe asthma attacks that could have been avoided. Asthma rates are rising in our young people. They are missing school days and emergency room visits for respiratory distress are on the rise.

I introduced legislation last month, the School Asthma Management Plan Act, to assist schools in helping young people when they have asthma attacks. I am committed to taking active measures to make the air that we breathe safer for the whole population.

There is significant evidence that lowering the ozone standard will do that. I applaud the EPA for heeding the science and proposing to strengthen the ozone standard to be more protective of public health.

The cost of inaction is immense, increased number of hospital visits, increased health care costs, even premature death. The current value of 75 ppb of ground level ozone is outdated and does not reflect the current science.

I would like to ask Mr. Greene and Dr. Diette the following. The EPA has an air quality alert system that allows caregivers to easily determine if the air quality is safe for kids to play outside. We talked about that earlier.

For children who have compromised immune systems or preexisting respiratory conditions like asthma, this alert system is very important. Air Quality Index values are reported daily and fall into the following levels: good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy and hazardous.

I assume both of you are familiar with the alert system. Under this current system, an ozone level of 75 ppb or higher is considered unhealthy for sensitive groups. Based on the current stand-

ard, do you think families are being sufficiently informed and protected against the dangers of air quality on a given day?

Dr. DIETTE. I think there is a bunch that is important in what you mentioned which is the alert system is based on acute spikes. That means today is a bad day or tomorrow is about to become a bad day and you should take care.

That is also part of the story. There is chronic exposure and acute exposure. There is increasing evidence that chronic exposure, even at lower levels than would set off the alarm bells, are harmful to people with preexisting diseases like cardiac disease and respiratory diseases.

The spikes you talked about are very important. It is a good alert system, but it does not mean you would want that system to have to be in place. The ideal is to not have those spikes coming so there would not be those dangers.

Telling people to not go outside is not fully protective. Ozone comes inside from outside. All pollutants come inside from outside.

Senator GILLIBRAND. The CDC reports 1 in 11 children and 1 in 12 adults have asthma. This costs the United States economy about $56 billion a year. More specifically, for a family with a child suffering asthma, the cost is at least an additional $1,000 in health care charges a year.

Over the last decade, the proportion of people with asthma in the U.S. grew by 15 percent. How does poor air quality further impact those who suffer from asthma?

Dr. DIETTE. Someone who has already developed asthma is a vulnerable person. Since you have been talking about children, children born prematurely also, there is a strong signal that whether or not they go on to develop asthma, they also are a vulnerable subset. Children born early or prematurely are vulnerable.

Ozone is a very provocative substance. It is an oxidizing substance that irritates and bothers the airways of someone with asthma so it can provoke an attack.

Senator GILLIBRAND. I am also concerned about extended exposure. Can you describe why children, in particular, are among the most vulnerable to elevated ozone levels and are health impacts for children exposed to this type of pollution long lasting?

Dr. DIETTE. Kids are different than adults in a lot of ways. One is that they tend to be outside playing, for example. When you are outside playing, you breathe more, so you breathe deeper and you breathe more frequently, so you inhale more of whatever it is that is around you. That is one of the reasons.

Also, their lungs are developing. One of the goals in life, if you are thinking about your lungs, is to grow you lungs to the biggest they will ever be, which happens by about your twenties.

Things that interfere with that are a problem because you do not get as good a lung function to start your adulthood. We all lose lung function after that.

Part of it is an issue about what is aggravating at the moment. Another is trying to grow your lungs to the biggest they can be.

Senator GILLIBRAND. Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Senator Gillibrand.

Senator Barrasso.

Senator BARRASSO. Thank you, Mr. Chairman.

Dr. Diette, in the Journal of Pediatrics, 2004, you conducted a study with a host of other authors entitled, Emotional Quality of Life and Outcomes in Adolescents with Asthma. The study, in its conclusion, says, "Adolescents reporting worse asthma specific emotional quality of life reported more frequent school absence, doctors' visits for asthma," also poor asthma-specific emotional quality of life was strongly related to worse asthma control. What causes specific emotional quality of life issues?

Communities and businesses across the Country are telling us counties that are designated as in noncompliance with this new ozone standard will see construction jobs and economic activity grind to a halt. It has been mentioned according to a story from the National Association of Manufacturers, EPA ozone rules could cost up to 1.4 million jobs.

Based on your research, what would be the impact to children with asthma in communities that have high unemployment, chronic high unemployment due to joblessness?

Dr. DIETTE. That is quite a string of events you are connecting.

Senator BARRASSO. I am connecting parents that are more likely to be alcoholic, more likely to have problems of substance abuse, spousal abuse, all related to chronic unemployment based on positions of this Administration going after jobs for hardworking Americans.

I think it is not a string of events. I practiced medicine for 25 years. I have taken care of lots of families under chronic, long-term unemployment and know the health of those families is documented as worse and the stresses on those children are worse and aggravated.

Did you say I am right? Is that what you said? Did you say I am right?

Dr. DIETTE. Yes.

Senator BARRASSO. Thank you.

Dr. DIETTE. Excuse me, though. You brought up a good point about the study because the report you talked about was one of several that came from that particular study.

Another one in that same series was also looking at the impact of poorly controlled asthma on subsequent school attendance and parents attending work.

If you are going to string all these things together, I think you need to be careful to look at the entire chain of events. When someone's asthma, particularly a child's asthma, is aggravated, just like any other illness that a child has, it impacts the family immensely. That means when you talk about jobs, if that is your target, mom or dad is not going to work the next day after there is an asthma attack.

Senator BARRASSO. Mom and dad are not going to work because they are one of those 1.4 million who have lost their job as a result of this policy.

Dr. DIETTE. It does not matter what industry an asthmatic is in, if they are sick, they cannot go to work. That is true for adults and it is true for the parents of the children who are sick.

I think that is the important point. You are right that we are not just talking about jobs in one sector. We are talking about jobs

across the United States, if you are talking about the impact of the millions of days of work days lost.

Senator BARRASSO. We are talking about jobs that are lost as a result of a policy by an Administration and the impact on the families impacted by the loss of the job and the chronic unemployment that comes with this.

Certainly I think it worsens quality of life across the board. Johns Hopkins has done studies to that effect. It affects peoples' income levels if they are not working.

Dr. DIETTE. To be clear, my studies do not look at the issue you are bringing up. It does not look at the issue of that chain of events.

Senator BARRASSO. Emotional quality of life, you would agree, is impacted if families are out of work? If dad or mom do not have a job, take-home pay has gone away, then there are subsequent things that happen in those families and impacts the quality of life not just the person who lost the job but the whole family.

Dr. DIETTE. That is true.

Senator BARRASSO. Mr. McKee, activist groups, like the Sierra Club, are pursuing aggressive strategies to support extreme reductions in ozone. They are encouraging the EPA to go as far as they can with their ozone rule.

Last week, Politico ran a story entitled, Inside the War on Coal: How Michael Bloomberg, Red State Businesses and Lots of Midwestern Lawyers are Changing American Energy Faster Than You Think.

The author highlighted the Sierra Club has now launched their beyond natural gas campaign to begin to eliminate natural gas from our electric grid. On the website, the Sierra Club says, "Increasing reliance on natural gas displaces the market for clean energy, harms human health," blah, blah, blah.

My question is, under the EPA's ozone rule, if they listen to these outside groups and put forward a strict standard, is there a likelihood that natural gas development, which the Sierra Club is against, will be under threat?

Mr. MCKEE. It definitely would be. We can see what has happened with coal. Natural gas is the next target. Natural gas is the clean carbon fuel that we are using today. Yes, we are very concerned about that.

Senator BARRASSO. Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Senator Barrasso.

Senator Carper.

Senator CARPER. Thank you all for being here.

When I was Governor of Delaware, we launched a mentoring initiative urging companies to adopt kids as mentors, high schools to adopt elementary schools and we recruited about 10,000 mentors. I was one of them.

I started mentoring a young man when he was in the fourth grade until he graduated from high school, ready for this, at the age of 20 and a half. He missed a lot of school growing up. So did his brothers.

One of the reasons he missed a lot of school was because he had asthma. He had a hard enough time coping even when he was going to school regularly, sitting in class and had an even harder

time when he was not there. It was hard on his mom having to support five kids, five boys, working and trying to do her job and be a nurse as well.

I just wanted to share that with my friends. This is real. We do not just make up this stuff. It really does happen.

Mr. Greene, a retired Navy Captain, thank you for your service.

My understanding is EPA already has regulations in the works to help States reduce ozone. If these rules are not delayed, hopefully they will not be, we are likely to see, I am told, somewhere between 9 to maybe as many as 59 counties in nonattainment outside of California in 2025. Those are the numbers I have been given, 9 if the standard was set at 70 ppb and could be as high as 59 if the standard was set at 65 ppb. Can you confirm that for me? Does that sound right?

Mr. GREENE. I cannot confirm that, sir.

Senator CARPER. That is fine. I will. Thank you.

Many of these counties would have to do more to find reductions, these 9 to as many as 59, depending on what the standard is but the majority of America will meet the standards that are proposed.

If this is not your understanding, how important are Federal rules to help States reduce ozone? Whether it is 9 or 59 counties outside of California in 2025, how important are Federal rules to help States reduce ozone?

Mr. GREENE. I think the point made earlier was really critical, that what we have here is clear evidence that public health is impacted by ozone at a level that is lower than the standard. That occurs across many parts of the U.S., many of which are in attainment and many have that problem.

You have citizens across the U.S. with impacts that the EPA, doctors and much research has shown that their health is impacted. Yet, they are told they are in attainment areas and their air quality is fine. From our perspective in our district, we are a public health agency and are there to protect the public. We follow the science, work very closely with our business community and have been very successful.

Our economy is doing well. We are building a new basketball stadium, so lots of good things are happening in Sacramento, but we are severe nonattainment area. We will be for quite a number of years.

We expect to continue with the success we have had for our business community. We work with our NT on a regular basis. We do very well. We are using up our Federal money but we are doing it in slightly different ways than we used to because of the conformity issues, but they are in conformity and we are doing fine.

Senator CARPER. Thank you.

I have one quick question for Mr. Srikanth. You mentioned in your written testimony that Federal efforts should include "timely enactment of implementation rules and guidance for all new standards."

Does this mean you are not supportive of any delays in EPA's proposal for a new health standard or delays in EPA's efforts to help States address ozone pollution across State boundaries such as stronger vehicle standards on emissions?

Mr. SRIKANTH. In my testimony, I am referring to a current set of emission controls that the EPA has promulgated. Within the transportation sector, there is one that addresses vehicle emissions called the Tier 3 standards. There is the fuel the vehicle uses, low sulfur fuel.

Those have been enacted. They have just been enacted. The Tier 3 standards go into effect on a rolling cycle between model years 2017 and 2025.

It is important that one, the implementation and benefits from those control programs realized so regions depending on those to demonstrate attainment can do so. There should not be any delay.

Similarly, for transport pollution, EPA is currently working on another rule. That needs to be enacted in a timely manner so that the regions can realize those benefits and then attain the standards. At the end of the day, it is very important to attain those standards for public health reasons.

Senator CARPER. Thank you all for being here.

Thank you, Mr. Chairman.

Senator INHOFE. Senator Markey.

Senator MARKEY. Thank you very much, Mr. Chairman.

The Clean Air Act mandates that we protect public health from known threats based on science and the science is clear that the current ozone level should be lowered. Whenever it becomes clear that new actions are needed to protect public health, opponents of the actions use the same old arguments.

Before the 2008 ozone standard was finalized, we heard this standard would cripple the economy, but this was just not true. In Massachusetts, both air quality and our GDP increased even as the ozone standard tightened. Our GDP increased significantly.

A new ozone standard will require changes in some industries. America is a Country of problem-solvers. Pollution is a problem that we can solve. As a State downwind of most of the rest of the Country, it is critical that we have national standards that create solutions to a national problem. Massachusetts cannot solve the problem alone.

My first question is to Dr. Diette. There were 20 studies cited in your testimony on the health hazards of ozone, all published in an 8-year timeframe, all adding to the mounting justification that the current ozone standard must be lowered to protect public health.

Given the pace of scientific research on the health impacts of pollutants, do you believe changing the assessment period of a new standard from every 5 years to every 10 years would have a negative impact on public health protections?

Dr. DIETTE. I think it sure could. It depends upon which pollutant we are talking about or which substance in general, but you are right that the science does change. I think we should reevaluate what the science tells us periodically. If we allow a whole decade to go back, that may be too long.

Senator MARKEY. Mr. Greene, you said with adequate compliance times and good partnerships among government agencies and the business community, Sacramento is on track to meet the ozone standards within your compliance timeframe. Under the pressures of our national ozone standards, your region has made significant

progress cleaning up its smog problem even with the unusual population and geographic challenges that promote ozone buildup.

Do you agree waiting until a past standard has been met to set a new standard would weaken the momentum of clean air innovation?

Mr. GREENE. I think the biggest place that is going to impact is in our area, 80 percent of the pollution comes from mobile sources. That occurs more and more as we get further into the ozone problem around the Nation.

You are not only impacting the health of people around the Nation where they should be protected by the Clean Air Act, but you are also slowing down other regulations on vehicles, planes, trains and automobiles, for example, that would help those areas that are in nonattainment.

Senator MARKEY. Dr. Diette, I will come back to you, if I can. The national ozone standard has real world impacts on the health of kids, workers across our Country, hospitalization, and even deaths caused by ozone pollution.

If the ozone standard was set at 60 ppb, do you believe a significant number of deaths and life threatening respiratory events could be avoided?

Dr. DIETTE. I do. I think there is really good evidence for it, both from the observation of the evidence that at very small increments of ozone, there are measurable increases in death rates from a variety of conditions.

I could refer you to a very good article from Berman and colleagues in Environmental Health Perspectives in 2012 which provided an estimate of what would actually happen if everyone came into compliance with the 75 ppb which would improve mortality but showed successively greater benefits from dropping to 70 ppb and to 60 ppb.

Senator MARKEY. In 1900, the average age of death in the United States was 48 years of age. We have gone from the Garden of Eden to 1900, when the average age of death in the United States was 48 years.

Then we began to implement public health policies, clean air, clean water, safe meat, and safe drinking water. The meat industry did not like it. They said it was going to kill jobs and the industry.

The truth is whether it be the automotive industry or the meat industry, you name it, these new standards wound up extending life expectancy in the United States to 79 years of age, 31 years of bonus life that has been added to the average American just in the last 100 years with these public health interventions.

What value do you put on that, seeing your grandmother, seeing your grandfather live to an older age, knowing that young children do not die from the things that used to cause death in our Country? What value do you put on that?

Yet, we do it simultaneous with having a robust economy in our Country with unemployment actually going down right now. It has been going down since we began the recovery from the economic collapse created completely unrelated to any clean air, clean water, or safe drinking laws in our Country. It was economic malfeasance on Wall Street that caused it.

In each one of these instances, we see that innovation develops new catalytic converters, new ways of generating energy, and new ways of solving the problem are developed once Americans are told there is now a requirement that we must innovate. I would say this is just going to be one more instance where that occurs.

Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Senator Markey.

That will conclude the number of individuals here. Senator Boxer would like to have an additional 2 minutes and I would also.

Senator Boxer.

Senator BOXER. Thank you, Mr. Chairman.

No one has refuted Dr. Diette's simple eloquence on the dangers of smog, no one. You all respected that.

The argument is, cleaner air means fewer jobs. As Senator Markey said, and as I have proven with my documents, that is so much baloney. It is disproven by the facts. The facts are, as we clean up the air, more jobs are created.

Everyone knows California is a leader on environmental matters. We are. I am going to ask unanimous consent to place in the record, today's San Jose Mercury News, Jobs in the Region Nearing Record. It underscores what my friend from Sacramento said.

[The referenced information follows:]

Bay Area nears record levels of employment

By George Avalos, gavalos@bayareanewsgroup.com

The Bay Area is poised to reach all-time-high levels of employment, breaking the records set at the height of the dot-com boom, as the region undergoes another technology renaissance and a reshaping of its economic landscape.

In September, the region had 3.57 million payroll jobs, which was about 43,000 jobs, or 1.2 percent, below the record of 3.61 million reached in January 2001, state data show.
But the rebound in the nine-county region's major urban centers has been uneven. The San Francisco metro area already posted record highs in recent months, and the East Bay is close to its best-ever employment numbers. For Santa Clara County, even with its remarkable job growth over the last few years, that pinnacle could be a year away.

Despite that, one thing is certain: The looming milestone is a testament to the Bay Area's ability to overcome the calamities of the tech bust, the 9/11 terrorist attacks, corporate scandals, and, most recently, the Great Recession.

And this isn't another dot-com bubble, argues Stephen Levy, director of the Palo Alto-based Center for Continuing Study of the California Economy. The foundation of the current growth is a collection of world-class market leaders in the tech sector.
"We are in a blowout, surging economy," said Levy. "A lot of it is being driven by companies with millions of customers, billions in sales and hundreds of millions or billions in profits. And the economic growth is spreading from the main tech centers to other parts of the Bay Area."

The rebound is doing more than bring employment to record levels. It also has produced a profound transformation in the Bay Area economy, this newspaper's analysis of job trends over the 14 years from the dot-com peaks in the fall of 2000 through September of this year shows.

More than 165,000 manufacturing jobs have vanished, including nearly 89,000 computer and electronics manufacturing positions in the nine-county region.

"Tech hardware jobs were decimated after the dot-com bubble, and that part of the business really hasn't come back in this cycle," said Mark Vitner, senior economist with Wells Fargo Bank. "That's the big reason behind the slower recovery for Santa Clara County."

The real estate industry is also struggling, with 30,000 construction jobs and nearly 26,000 finance and real estate positions lost since 2000.

The slumping industries were replaced by a surge in sectors such as health care and social assistance, which added 152,500 jobs; leisure and hospitality, up nearly 84,000 jobs; and a category called "professional, scientific and technical services," which was up 52,000 jobs. This category typically includes jobs such as tech engineering, computer and network design services, social media, Internet design and tech research.

The manufacturing side of high-tech has eroded so badly over the last 14 years that there are actually 52,000 fewer tech jobs in the Bay Area today compared with the dot-com period.

In September 2000, tech jobs accounted for 21 percent of the total workforce in the Bay Area, and as of September of this year, that share had dwindled to 19 percent. Computer and electronics manufacturing used to account for 7 percent of the Bay Area workforce, and now it represents 4 percent.

Yet while the tech sector has lost jobs over the 14-year stretch, it has been a robust industry in the last few years. Over the one-year period that ended in September, the Bay Area added 32,000 tech jobs, according to an analysis of figures from the state Employment Development Department and Beacon Economics.

"The Bay Area in general and Santa Clara County in particular specialize in the goods and services that help businesses be more productive," said Jordan Levine, director of economic research with Beacon Economics. "And it's happening at a time when the entire country is trying to figure out how to be more productive and efficient."

"There are a lot of openings in the tech industry, and it's easier to find jobs," said Ashim Suri, a Fremont resident who works in San Jose as a recruiter for tech companies. "It's definitely a stronger tech market than it was a year ago. Salaries for technology workers are really rising."

Yet wages aren't rising in all industries, even in the hottest metro areas.

"It's a frustrating process to find higher wages," said Clara Di Bartolo, a San Francisco resident who works in retail and marketing, says she sees plenty of available jobs, but pay raises are sluggish for nontech workers. "Wages are stagnant for middle-class people."

For two years, Santa Clara County has been the fastest-growing metro center for employment in the nation, with annual growth rates that averaged 4.2 percent, EDD statistics show.

But Santa Clara County has to overcome a steep drop in its job market following the dot-com meltdown.

After hitting its dot-com peak, the county suffered a 20 percent nose-dive in total jobs before its employment market stabilized. By comparison, the East Bay fell 11 percent before hitting bottom. The San Francisco area slumped 14 percent.

"This shows how hard Santa Clara County fell from what was an amazing peak in the dot-com years," said Jeffrey Michael, director of the Stockton-based Business Forecasting Center at the University of the Pacific. "It's plausible it could take another year or two for Santa Clara County to get to its record levels."

And changes in the tech sector have benefited the San Francisco area to a much greater degree than Santa Clara County.

For instance, Santa Clara County added 14,000 jobs in a broad category that includes software, social media, computer design, network design, mobile telecommunications and Internet-related positions, a 7.6 percent increase.

Over the same period, the San Francisco-San Mateo-Marin region added 18,500 jobs in that category, a 9.2 percent increase.

"This isn't just a flash in the pan, this is a structural shift about where the jobs are going in the Bay Area," said Scott Anderson, chief economist with San Francisco-based Bank of the West. "San Francisco has been offering tax incentives for these tech companies. They have been very aggressive in attracting these new jobs."

Plus, San Francisco has become a magnet for engineers fresh out of college or just starting out in their careers.

"The new young millennials are more apt to want to live in urban areas where there is a lot of activity and a chance for collaboration and getting together," Anderson said. "That gives some advantages to San Francisco over Silicon Valley."

Even industries such as construction are showing strength over the last year or so, despite the long-term decline in that sector.

"We have a lot of openings for welders, and have been looking to find welders for six months now," said Jason Guiol, a San Jose resident who works with a construction firm.

Perhaps the most encouraging part of the rebound in the Bay Area is the resurgence of the East Bay, at the epicenter of the cataclysm unleashed by the meltdown of the housing and banking sectors. The East Bay over the most recent 12 months has enjoyed a big surge of thousands of jobs in professional, scientific and technical services, health care, restaurants and hotels, and construction.

"The entire Bay Area is recovering strongly," Wells Fargo's Vitner said, "and all of its metro areas are firing on all cylinders. It's not just one industry that is leading things back."

http://www.mercurynews.com/business/ci_26893580/bay-area-nears-record-levels-employment

Senator BOXER. To sit here and say there are going to be no jobs and no development as you meet the standards is totally false. It is ridiculous. That is why 64 percent of people in our State, Mr. McKee, say, protect us. We are not supposed to protect the polluters. We are supposed to protect the health of the people while ensuring that we have an economically robust society. We have done it over the years.

I ask unanimous consent to place in the record a letter from ten public health groups including the American Lung Association, the Heart Association, the Stroke Association, the Allergy and Asthma Network and others, supporting the EPA rule.

[The referenced information follows:]

March 24, 2015

Dear Representative:

The undersigned public health and medical organizations urge you to strongly oppose any legislation or amendments that would block, weaken or otherwise hinder the U.S. Environmental Protection Agency's work to update and enforce strong limits on dangerous air pollution.

With the passage of the Clean Air Act more than 40 years ago, Congress made a commitment that the air in the United States would be safe for all to breathe, based on the best evidence from the health and medical science. This set our nation on a path toward safe, healthy air for all – including children, the elderly, and those with lung or heart disease. Thanks to that commitment, we have made tremendous progress to reduce pollution.

Implementing and enforcing the Clean Air Act is a strong investment in the health of our nation. Reducing air pollution saves lives and reduces health care costs by preventing thousands of adverse health outcomes, including cancer cases, asthma attacks, strokes, heart attacks, emergency department visits, and hospitalizations. A rigorous, peer reviewed analysis, *The Benefits and Costs of the Clean Air Act from 1990 to 2020*, conducted by EPA, found that the air quality improvements under the Clean Air Act will save $2 trillion by 2020 and prevent at least 230,000 deaths annually.

With benefits like these, it is no surprise that the American public supports EPA efforts to reduce pollution, and believes overwhelmingly that Congress should not interfere with EPA scientists as they work to protect public health. A recent bipartisan poll by the American Lung Association found that more than two-thirds of voters enter the debate supporting safer, stricter standards. An overwhelming 68 percent of voters across party and demographic lines support EPA setting stricter smog pollution standards to protect public health.

Despite the success of the Clean Air Act and the strong public support for continued protection, some in Congress have proposed legislation that would dismantle or delay Clean Air Act safeguards. Doing so would undermine the health of our nation, and could expose millions of Americans to unsafe levels of air pollution, increasing the number of missed work and school days due to illness, hospitalizations for respiratory and cardiovascular distress, and premature deaths due to air pollution.

Therefore, we ask you to support full implementation of the Clean Air Act and resist any efforts to weaken, delay or block progress toward the continued implementation of these vital public health protections. Further, we ask that you speak out publicly in defense of the fundamental human right to breathe healthy air.

Sincerely,

Allergy and Asthma Network
American Lung Association
American Heart Association
American Public Health Association
American Thoracic Society
Asthma and Allergy Foundation of America
Health Care Without Harm
National Association of County & City Health Officials
National Association of Hispanic Nurses
Trust for America's Health

Senator BOXER. I also ask that a letter from Colorado supporting the rule, three letters from Maine, six letters from Illinois, a letter from Michigan, four letters from Pennsylvania and four letters from Virginia be placed in the record.

[The referenced information follows:]

Lewiston, Maine

Lewiston City Council

March 10, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

RE: Please Strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As a City Councilor for Lewiston, Maine, I am charged with protecting the public health and welfare of Lewiston's citizens. That is why I write to urge you and the United States Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Our area is home to 2,274 children and 9,362 adults with asthma, plus 7,392 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As City Councilor, my job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors or send their children to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

Under the Clean Air Act, Lewiston's citizens and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics, and the American Public Health Association have repeatedly called for a standard of 60 parts per

billion. I join them in calling on you to set the standard at 60 parts per billion. I urge you to follow the science and the law and update the ozone standard to truly protect public health.

Sincerely,

Kristen S. Cloutier
Lewiston City Councilor

KSC:dapw

c: The Honorable Gina McCarthy, Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

Senator Justin L. Alfond
Senate Democratic Leader
3 State House Station
Augusta, ME 04333-0003
(207) 287-1515

May 20th, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington, DC 20500

Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As a State Senator from Portland, Maine, I am charged with protecting the public health and welfare of my district's residents. That is why I write to urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Our county, Cumberland County, is home to 5,552 children and 27,417 adults with asthma, plus 20,078 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As a State Senator, my job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside.

Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

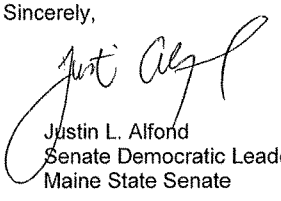
*Fax: (207) 287-1585 * TTY (207) 287-1583 * Message Service 1-800-423-6900 * Web Site: legislature.maine.gov/senate*

President Barack Obama
Page 2
May 20, 2015

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

Under the Clean Air Act, Portland's residents and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60 parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,



Justin L. Alfond
Senate Democratic Leader
Maine State Senate

CC: The Honorable Gina McCarthy, Administrator
U.S. Environmental Protection Agency

HOUSE OF REPRESENTATIVES
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Mick.Devin@legislature.maine.gov

May 21, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

I am a state representative from Newcastle, Maine and a scientist at the University of Maine's Darling Marine Center. In both of those roles it is my responsibility to protect and advance the public health and welfare of the people in my community. For that reason, I am joining the many public officials and concerned citizens across the country to urge you and the Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Demographically speaking, I represent the oldest county in the oldest state in the country. I also represent a coastal marine and tourism economy that supports tens of thousands of jobs and generates over a billion dollars each year for the people of Maine. Ozone pollution threatens all of that, as well as people living with asthma and heart disease.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. When my constituents make decisions about whether to spend time outdoors based on the air quality outside, they ought to be able to feel confident that the measurements we use are accurate and tell the whole story. Unfortunately, the Air Quality Index (AQI) that is currently used for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

District 90 Bremen, Bristol, Damariscotta, Newcastle, Nobleboro (part), South Bristol (part) and Monhegan Plantation, plus the unorganized territory of Louds Island

Printed on recycled paper

Until the EPA revises the ozone standard, the Air Quality Index information could easily mislead members of our community into believing that our air is safe to breathe during times when it is not.

Under the Clean Air Act, Maine's citizens and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Mick Devin
State Representative

STATE CAPITOL
HOUSE POST OFFICE
SPRINGFIELD, ILLINOIS 62706

STATE OF ILLINOIS
99TH GENERAL ASSEMBLY
HOUSE OF REPRESENTATIVES

CAROL AMMONS
STATE REPRESENTATIVE
103RD DISTRICT

March 16, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please Strengthen The National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As the State Representative of Illinois' 103th District, I am charged with protecting the public health and welfare of the citizens of Illinois District 103. That is why I write to urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Our area, Champaign County, is home to approximately 4,300 children and 16,000 adults with asthma, plus 12,700 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As a State Representative, my job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

Under the Clean Air Act, Illinois District 103's citizens and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60 parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Respectfully submitted,

Carol Ammons

Rep. Carol Ammons

RECYCLED PAPER - SOYBEAN INKS

ILLINOIS HOUSE OF REPRESENTATIVES

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ANN M. WILLIAMS
STATE REPRESENTATIVE • 11TH DISTRICT

March 17, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President,

As the State Representative of Illinois' 11th District, I am charged with protecting the public health and welfare of the citizens of Illinois District 11. That is why I write to urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Our area, Cook County, is home to approximately 113,300 children and 340,000 adults with asthma, plus 300,000 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As a State Representative, my job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not.

Under the Clean Air Act, Illinois District 11's citizens and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60 parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Ann M. Williams

Ann M. Williams
Illinois- 11th District

ILLINOIS HOUSE OF REPRESENTATIVES

• DISTRICT OFFICE:
830 S. BUFFALO GROVE ROAD
SUITE 120
BUFFALO GROVE, ILLINOIS 60089
847-229-5499
847-229-5487 FAX

• SPRINGFIELD OFFICE:
245-E STRATTON BUILDING
SPRINGFIELD, ILLINOIS 62706
217-558-1004
217-558-4554 FAX

ELAINE NEKRITZ
STATE REPRESENTATIVE
57TH DISTRICT

ASSISTANT MAJORITY LEADER
COMMITTEES:
CHAIRPERSON
• JUDICIARY - CIVIL
• PERSONNEL & PENSIONS
MEMBER
• APPROPRIATIONS - PUBLIC SAFETY
• PUBLIC UTILITIES
• SPECIAL NEEDS SERVICES

March 17th, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As the State Representative of Illinois' 57th District, I am charged with protecting the public health and welfare of the citizens of Illinois District 57. That is why I write to urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Our area, Cook County, is home to approximately 113,300 children and 340,000 adults with asthma, plus 300,000 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As a State Representative, my job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

RECYCLED PAPER • SOYBEAN INKS

Under the Clean Air Act, Illinois District 57's citizens and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Elaine Nekritz, State Representative D-57th District

ILLINOIS HOUSE OF REPRESENTATIVES

SPRINGFIELD OFFICE:
260-W STRATTON BUILDING
SPRINGFIELD, ILLINOIS 62706
217/782-2023
FAX: 217/524-0641

DISTRICT OFFICE:
449 EAST 35TH STREET
CHICAGO, ILLINOIS 60616
773/924-1755
FAX: 773/924-1775

CHRISTIAN L. MITCHELL
STATE REPRESENTATIVE
26TH HOUSE DISTRICT

COMMITTEES
ELEMENTARY & SECONDARY EDUCATION: SCHOOL CURRICULUM & POLICIES
JUDICIARY: CRIMINAL
JUVENILE JUSTICE & SYSTEM INVOLVED YOUTH
RENEWABLE ENERGY & SUSTAINABILITY
REVENUE & FINANCE
STATE GOVERNMENT ADMINISTRATION

March 17, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As the State Representative of Illinois' 26th District, I am charged with protecting the public health and welfare of the citizens of Illinois District 26. That is why I write to urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Our area, Cook County, is home to approximately 113,300 children and 340,000 adults with asthma, plus 300,000 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As a State Representative, my job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

Under the Clean Air Act, Illinois District 26's citizens and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Christian Mitchell
State Representative
26th District

Illinois House of Representatives

Esther Golar

State Representative • 6th District

Committee Chairwoman:

- Housing

Member:

- Appropriations Human Services
- Elementary & Secondary Education
- Personnel & Pensions
- Public Utilities

4926 South Ashland
Chicago, IL 60609
P: 773.925.6580
F: 773.925.6584

esthergolar@sbcglobal.net

268-S Stratton Building
Springfield, IL 62706
P: 217.782.5971
F: 217.558.6370

March 17, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

Illinois House of Representatives

Esther Golar

State Representative • 6th District

Committee Chairwoman:

- Housing

Member:

- Appropriations Human Services
- Elementary & Secondary Education
- Personnel & Pensions
- Public Utilities

4926 South Ashland
Chicago, IL 60609
P: 773.925.6580
F: 773.925.6584

esthergolar@sbcglobal.net

268-S Stratton Building
Springfield, IL 62706
P: 217.782.5971
F: 217.558.6370

As the State Representative of Illinois' 6th District, I am charged with protecting the public health and welfare of the citizens of Illinois District 6. That is why I write to urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Our area, Cook County, is home to approximately 113,300 children and 340,000 adults with asthma, plus 300,000 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As a State Representative, my job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Illinois House of Representatives

Esther Golar

State Representative • 6th District

Committee Chairwoman:

- Housing

Member:

- Appropriations Human Services
- Elementary & Secondary Education
- Personnel & Pensions
- Public Utilities

4926 South Ashland
Chicago, IL 60609
P: 773.925.6580
F: 773.925.6584

esthergolar@sbcglobal.net

268-S Stratton Building
Springfield, IL 62706
P: 217.782.5971
F: 217.558.6370

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

Under the Clean Air Act, Illinois District 6's citizens and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60 parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Esther Golar

☐ Springfield Office
Room 122
State Capitol Building
Springfield, Illinois 62706
Phone: 217/782-8492
Fax: 217/558-6006
www.heathersteans.com
☐ District Office
5533 North Broadway
Chicago, Illinois 60640
Phone: 773/769-1717

Illinois State Senate

Heather A. Steans
Senator • 7th District

Committee Membership:
Appropriations I - Chair
Environment - Vice Chair
Appropriations II
Executive
Public Health

March 12, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As the State Senator of Illinois' 7th Legislative District, I am charged with protecting the public health and welfare of the citizens of Illinois Legislative District 7. That is why I write to urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Our area, Cook County, is home to approximately 113,300 children and 340,000 adults with asthma, plus 300,000 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As a State Representative, my job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

RECYCLED PAPER • SOYBEAN INKS

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

Under the Clean Air Act, Illinois Legislative District 7's citizens and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60 parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Senator Heather Steans

March 9, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue, NW
Washington, D.C. 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460
Docket# ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As an elected official, I am charged with protecting the public health and welfare of our citizens. That's why I urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

In Meridian Township, Michigan, we have many children and adults with asthma and heart disease. We are also a very active community that enjoys outdoor sports, activities and exercise year round. Meridian Township government, through our Parks and Recreation Department and elected Parks Commission, commits a lot of staff time and tax payer money to support activities that promote health and fitness, as well as offering educational and fun programs that connect our citizens with the natural environment within our community. Ozone pollution threatens all of them. I am writing this letter as an elected official and concerned citizen of the United States, to speak up for my constituents and my family to protect them, especially those who are most vulnerable.

As parents, we know how hard it is to tell our children they cannot go outside to play with their friends or that they will miss a sporting event because they are being grounded, but they usually understand that this decision is a consequence to something they did. It is harder still to tell them they have to come inside or quit playing in the game because it is getting too hard for them to breathe. Young kids don't understand this complicated issue or the danger it poses to their health. It is hard for many families to spend quality family time together because Grandma cannot be outside for any length of time because of the air quality. For many of my constituents this is their realty. Our kids just want to be kids, to go outside and play or go to the zoo with their grandparents until the sun goes down. Parents just want to spend quality time with their families. However, we do understand these issues. As elected officials, it is our job to do everything possible to make our environment safe for our children and the people we were elected to represent and in this case protect. We need to do all we can so that our kids can be kids, without fear of the environment that we are teaching them to love.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is

based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it's not. This must change.

Under the Clean Air Act, all citizens have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. This is the purpose of my letter to you, to ask you to update the ozone standards to 60 parts per billion to help my family and the families I was elected to protect better understand their environment and to be able to make safe choices for their families. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Angela Wilson
Trustee, Meridian Township
5151 Marsh Rd.
Okemos, MI 48864

DAN GILMAN

Member of Council - District 8

March 11, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As a member of the Pittsburgh City Council I am charged with protecting the public health and welfare of our City's residents. That is why I urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Pennsylvania is home to 284,691 children with asthma and 1,012,132 adults with asthma, plus 915,718 people with heart disease, some of whom live here in Pittsburgh. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As Councilman, my job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades, with drastic improvements seen in the Pittsburgh metro region. Even with those improvements, families with growing children and our neighbors with asthma are still at risk. In the American Lung Association's 2014 State of the Air Report, Metropolitan Pittsburgh ranked 21st worst in the country for smog pollution.

Leaders in Pittsburgh have worked for years to pass policies to mitigate regional air pollution. Yet recent studies demonstrating the region's poor air quality have the effect of undermining much of our hard work to bring new businesses and residents to our city and to grow our economy. A strong, clear and well-enforced federal standard is needed to help our region improve its air quality and continue to grow.

My constituents often make decisions about how to spend their time – such as whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately,

Pittsburgh City Council-District 8 • 510 City-County Building • Pittsburgh, Pennsylvania 15219
412-255-2133 412-255-0738 (Fax)
www.city.pittsburghpa.gov

the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat. Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

Under the Clean Air Act, Pittsburgh residents and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Dan Gilman

CITY OF PHILADELPHIA
CITY COUNCIL

March 16, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As a Councilmember, representing Philadelphia's 8th District, I am charged with protecting the public health and welfare of Philadelphia's citizens. That is why I urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Our area is home to children and adults who suffer with asthma as well as people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As a member of Philadelphia City Council, my job is to speak up for my constituents and protect them, especially those who are most vulnerable. Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk.

Under the Clean Air Act, Philadelphia's citizens and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Cindy Bass

Cindy Bass
Councilmember-8th District

CITY OF PHILADELPHIA
CITY COUNCIL

BLONDELL REYNOLDS BROWN
CITY HALL, ROOM 581
PHILADELPHIA, PA 19107
(215) 686-3438 or 3439
Fax No. (215) 686-1926

COUNCILWOMAN AT-LARGE
MAJORITY WHIP

COMMITTEES
Chairwoman
Environment

Vice Chairwoman
Education

Member
Commerce & Economic Development
Ethics
Finance
Global Opportunities & Creative Economy
Parks, Recreation & Cultural Affairs
Rules
Transportation & Public Utilities
Whole

March, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As Philadelphia City Councilwoman At-Large and Chair of the Committee on the Environment, I am charged with protecting the public health and welfare of our citizens. That is why I write urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Pennsylvania is home to 284,691 children with asthma and 1,012,132 adults with asthma, plus 915,718 people with heart disease, some of whom live here in Philadelphia. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. As Councilwoman At-Large, my job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time -- like whether to exercise outdoors, or send their kids to soccer practice -- based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

Under the Clean Air Act, Philadelphia's citizens and all Americans have a right to know when poor air quality puts their health at risk -- and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

In Service,

Blondell Reynolds Brown
Councilwoman At-Large

Jeanne Sorg
Mayor of Ambler Borough
122 East Butler Ave, Ambler, PA 19002

April 2, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As Mayor of Ambler, my chief responsibility is public safety and the well-being of the people I represent. That is why I urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion. Ozone pollution threatens children and adults with asthma and heart disease, as well as, the elderly in my community.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. However, the Air Quality Index (AQI) that my neighbors in Ambler Borough rely on is based on old information, not the latest scientific evidence. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not.

Under the Clean Air Act, Ambler's citizens and all Americans have a right to know when poor air quality puts their health at risk. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have called for a standard of 60 parts per billion. I join them in calling on setting the standard at 60 parts per billion. I urge you to update the ozone standard to truly protect public health.

Sincerely,

Jeanne Sorg
Mayor of Ambler Borough

jsorg@borough.ambler.pa.us

SENATE OF VIRGINIA

A. DONALD McEACHIN
9TH SENATORIAL DISTRICT
ALL OF CHARLES CITY COUNTY;
PART OF HANOVER AND HENRICO COUNTIES;
AND PART OF THE CITY OF RICHMOND
4719 NINE MILE ROAD
RICHMOND, VIRGINIA 23223

COMMITTEE ASSIGNMENTS:
AGRICULTURE, CONSERVATION AND NATURAL RESOURCES
COURTS OF JUSTICE
PRIVILEGES AND ELECTIONS

February 25, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As Senator for Virginia's 9th district, I am charged with protecting the public health and welfare of my constituents. That is why I write urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Together, the city of Richmond and the counties of Henrico, Hanover, and Charles City are home to more than 12,000 children and 43,000 adults with asthma, plus more than 40,000 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. My job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

Under the Clean Air Act, citizens of the Richmond area -- and all Americans -- have a right to know when poor air quality puts their health at risk. They also have a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Donald

Senator A. Donald McEachin

CITY OF CHARLOTTESVILLE

City Council
City Hall • Post Office Box 911
Charlottesville, Virginia 22902
Telephone (434) 970-3113

March 3, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As a member of the Charlottesville City Council, I am charged with protecting the public health and welfare of the people of Charlottesville. That is why I write urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

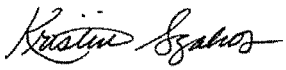
Charlottesville is home to more than 600 children and 3,100 adults with asthma, plus more than 2,200 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. My job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

Under the Clean Air Act, citizens of Charlottesville -- and all Americans -- have a right to know when poor air quality puts their health at risk. They also have a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60 parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,



Council Member Kristin Szakos

COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

SCOTT A. SUROVELL
MINORITY CAUCUS CHAIRMAN

POST OFFICE BOX 289
MOUNT VERNON, VIRGINIA 22121

FORTY-FOURTH DISTRICT

COMMITTEE ASSIGNMENTS:
COUNTIES, CITIES AND TOWNS
MILITIA, POLICE AND PUBLIC SAFETY
SCIENCE AND TECHNOLOGY

March 6, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue Northwest
Washington DC 20500

CC: The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW.
Washington, DC 20460
Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Mr. President:

As Delegate for Virginia's 44th district, I am charged with protecting the public health and welfare of my constituents. That is why I write urge you and the U.S. Environmental Protection Agency to adopt a strong National Ambient Ozone Standard of 60 parts per billion (ppb).

Fairfax County is home to more than 23,000 children and 74,000 adults with asthma, plus 68,000 people with heart disease. Ozone pollution threatens all of them, along with children, seniors, and our neighbors living in poverty. My job is to speak up for my constituents and protect them, especially those who are most vulnerable.

Thanks to the Clean Air Act, our nation's air quality has improved significantly over the past four decades. Even with those improvements, our families with growing children and our neighbors with asthma are still at risk. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI labels air quality as "safe" even on days when ozone pollution poses a recognized threat.

Until EPA revises the ozone standard, the Air Quality Index information that my constituents rely upon for critical air quality information misleads members of our community that our air is safe to breathe when it is not. This must change.

DISTRICT: (571) 249-4484 • RICHMOND: (804) 698-1044 • FAX: (804) 698-5744
E-MAIL: DELSSUROVELL@HOUSE.VIRGINIA.GOV

Under the Clean Air Act, my constituents and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected. Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for a standard of 60 parts per billion. I join them in calling on you to set the standard at 60parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Delegate Scott A. Surovell
44th District

Senator BOXER. Mr. Chairman, I thank you so much for this. I know we are at odds on this, but to me, it is so clear what our job is. As a committee, we are the environment committee. We are not the pollution committee. We are supposed to protect people from harmful pollution and do it in a way that is smart.

EPA has developed the numbers. The cost benefit ratio is there. When I listened to Senator Rounds talk about his family member with asthma, I think to myself how lucky he is to be in a position to protect that child and all of America's children.

I thank you so much for this opportunity.

Senator INHOFE. Thank you very much.

Since you were mentioned by name, Judge Moore, is there any final comment you would like to make?

Judge MOORE. I would just say that we do care about the health of our community. From early childhood development programs I have started in my community to elderly programming, it is important.

I have three grandchildren that live in my county. I have two grandchildren who live in Senator Boxer's State. We do want them protected.

We are making improvements with the 2008 standard. We are doing it while the economy is growing and the Nation is prospering. We want the opportunity to continue to do that under the 2008 standard because we are doing it right.

Thank you.

Senator INHOFE. Thank you very much.

As I said earlier, in Oklahoma, we are doing it right too, because all 77 of our counties, as I mentioned, are all in compliance now. However, with the standard lowered, all 77 of our counties would be out of attainment.

We appreciate all five of you. It has been an excellent meeting. We appreciate the time and inconvenience you went through to be here. Thank you so much.

[Whereupon, at 11:35 a.m., the committee was adjourned.]

[An additional statement submitted for the record follows:]

STATEMENT OF HON. BENJAMIN L. CARDIN,
U.S. SENATOR FROM THE STATE OF MARYLAND

Mr. Chairman, thank you for holding today's hearing on the EPA's Proposed National Ambient Air Quality Standard for Ground-Level Ozone.

I would like to thank Dr. Diette for joining us here today to discuss the EPA's proposed ozone standards. Dr. Diette is Professor of Medicine at Johns Hopkins University and Professor of Epidemiology & Environmental Health Science at the Bloomberg School of Public Health. His research focuses on identifying factors that cause or provoke asthma. He has been especially interested in air pollutants and allergens that are problematic in inner city homes and has done a significant amount of research on the health effects of air pollution in Baltimore in particular.

In 2009, 13.9 percent of Maryland adults and 17.1 percent of Maryland children had a history of asthma. From 2005–2009, an average of 66.6 people died per year due to asthma.

Further, low income households (those with household incomes less than $15,000) had an asthma rate of nearly twice that of households with incomes more than $75,000. Finally, between 2007 and 2009, asthma prevalence for Black, non-Hispanic children (14.9 percent) was nearly double that of White, non-Hispanic children (7.5 percent).

Dr. Diette is also a practicing physician specializing in pulmonology, caring for people with lung disease, asthma and other respiratory diseases. He was appointed

by the Maryland Governor as a Commissioner for the Children's Environmental Health and Protection Advisory Council. Dr. Diette, welcome.

[Additional material submitted for the record follows:]

PNAS PLUS

Reforestation as a novel abatement and compliance measure for ground-level ozone

Timm Kroeger[a,1], Francisco J. Escobedo[b], José L. Hernandez[c,2], Sebastián Varela[b,3], Sonia Delphin[b], Jonathan R. B. Fisher[a], and Janice Waldron[d]

[a]Central Science Department, Nature Conservancy, Arlington, VA 22203; [b]School of Forest Resources and Conservation, University of Florida, Gainesville, FL 32611; [c]ENVDAT Consulting, Knoxville, TN 37923; and [d]Texas Operations, Dow Chemical Company, Freeport, TX 77541

Edited* by Peter M. Kareiva, Nature Conservancy, Seattle, WA, and approved August 14, 2014 (received for review May 27, 2014)

High ambient ozone (O_3) concentrations are a widespread and persistent problem globally. Although studies have documented the role of forests in removing O_3 and one of its precursors, nitrogen dioxide (NO_2), the cost effectiveness of using peri-urban reforestation for O_3 abatement purposes has not been examined. We develop a methodology that uses available air quality and meteorological data and simplified forest structure growth-mortality and dry deposition models to assess the performance of reforestation for O_3 precursor abatement. We apply this methodology to identify the cost-effective design for a hypothetical 405-ha, peri-urban reforestation project in the Houston–Galveston–Brazoria O_3 nonattainment area in Texas. The project would remove an estimated 310 tons of (t) O_3 and 58 t NO_2 total over 30 y. Given its location in a nitrogen oxide (NO_x)-limited area, and using the range of Houston area O_3 production efficiencies to convert forest O_3 removal to its NO_x equivalent, this is equivalent to 127–209 t of the regulated NO_x. The cost of reforestation per ton of NO_x abated compares favorably to that of additional conventional controls if no land costs are incurred, especially if carbon offsets are generated. Purchasing agricultural lands for reforestation removes this cost advantage, but this problem could be overcome through cost-share opportunities that exist due to the public and conservation benefits of reforestation. Our findings suggest that peri-urban reforestation should be considered in O_3 control efforts in Houston, other US nonattainment areas, and areas with O_3 pollution problems in other countries, wherever O_3 formation is predominantly NO_x limited.

air pollution | ecosystem services | natural infrastructure | state implementation plan

Ground-level (tropospheric) ozone (O_3) is a secondary air pollutant formed through the chemical interaction of nitrogen oxides (collectively referred to as NO_x and comprising NO and NO_2) and volatile organic compounds (VOC) in the presence of conducive solar radiation and temperature conditions (1). Ground-level O_3 is considered one of the most pervasive and damaging air pollutants globally, with background concentrations that have more than doubled in the northern hemisphere since the late nineteenth century (2). Despite widespread and often decadeslong control efforts, ambient O_3 concentrations in urban areas in many parts of the world regularly exceed the World Health Organization guideline value of 50 parts per billion (ppb; daily 8-h average concentration) (3).

Despite the highly complex nature of estimating O_3 health effects (4), O_3 has been linked to increased mortality in humans (4–7), with an estimated annual death toll of 28,000 in Europe (8) and 152,000 [95% confidence interval (CI): 52,000–276,000] globally (9), and to reduced worker productivity (10) and increased respiratory and cardiovascular disease (7, 9). In Europe, an estimated 39,000 respiratory hospital admissions per year are attributed to O_3 concentrations above 35 ppb (8). In the United States, an estimated 10.7 (90% CI: 5.5–15.8) million acute respiratory symptoms; 5,300 (90% CI: 0–11,900) respiratory emergency room visits; 4,100 (90% CI: 1,100–7,900) respiratory hospital admissions; and 3.7 (90% CI: 1.6–5.9) million school loss days could have been avoided per year on average during 2005–2007 if O_3 concentrations in those years had been reduced such that their 8-h averages would not have exceeded 60 ppb anywhere (11). Ozone also has been shown to reduce food crop and forest productivity (12, 13) and is an important greenhouse gas (2).

Efforts to reduce ambient concentrations of O_3 and other pollutants have relied predominantly on engineering-based approaches to reduce emissions from fossil fuel combustion processes, implemented via command-and-control or market-based mechanisms (14).These have included physical dilution of emissions via tall stacks (15); intermittent or permanent, partial, or complete plant shutdowns (16); conversion to lower-emitting combustion processes and fuels (17); and end-of-pipe controls (18).

Despite these control efforts, high ambient O_3 concentrations remain a widespread problem in many areas of the world. In the United States, O_3 is regulated by the Environmental Protection Agency (EPA) as a hazardous air pollutant. In 2013, there were 46 areas with a total population of 123 million that were designated as O_3 nonattainment areas because at least one monitor exceeded the 75 ppb (daily 8-h average) 2008 National Ambient Air Quality Standard (NAAQS) for O_3 3 times a year (19). States

ENVIRONMENTAL SCIENCES

Significance

Despite often decadeslong control efforts, in many regions of the world ambient concentrations of ground-level ozone threaten human and ecosystem health. Furthermore, in many places the effects of continuing land use and climate change are expected to counteract ongoing efforts to reduce ozone concentrations. Combined with the rising cost of more stringent conventional technological ozone controls, this creates a need to explore novel approaches to reducing tropospheric ozone pollution. Reforestation of peri-urban areas, which removes ozone and one of its precursors, may be a cost-effective approach to ozone control and can produce important ancillary benefits. We identify key criteria for maximizing the ozone abatement and cost effectiveness of such reforestation and the substantial potential for its application in the United States.

Author contributions: T.K., F.J.E., J.R.B.F., and J.W. designed research; T.K., F.J.E., J.L.H., S.V., S.D., and J.R.B.F. performed research; T.K., F.J.E., J.L.H., and J.R.B.F. analyzed data; J.W. contributed data; and T.K. and F.J.E. wrote the paper.

The authors declare no conflict of interest.

*This Direct Submission article had a prearranged editor.

Freely available online through the PNAS open access option.

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are required to develop and implement EPA-approved State Implementation Plans (SIP) for each nonattainment area that outline measures deployed to achieve attainment. Because EPA has jurisdiction over mobile sources, states pursue attainment principally by imposing emission limits on large industrial processes and utilities (point sources) and smaller stationary processes (area sources). Due to the often dominant (>50%; NO_x) or large (25–50%; VOC) contribution of point sources to total stationary O_3 precursor emissions, the imposition of limits on permitted point source precursor emissions is a key SIP component in these nonattainment areas. Point sources comply with their NO_x emission limits by installing combustion controls (fuel switching, low-NO_x burners, fuel reburning, flue gas recirculation), end-of-pipe controls (selective catalytic or noncatalytic reduction), or by purchasing emission credits on the precursor-specific cap-and-trade markets established for many nonattainment areas. The 1990 Clean Air Act Amendments (20) create a further incentive for attaining NAAQS by imposing fines for VOC and NO_x emissions from major sources in areas that fail to meet attainment deadlines.

In the United States, the O_3 problem may worsen due to continuing land use and climate change, especially rising temperatures (21–24). A possible tightening of the O_3 NAAQS due to health concerns (25) may cause further reductions in precursor emission limits in many areas. The picture is similar in many other regions of the world (2). Because marginal control costs are increasing (26), achieving additional abatement will become increasingly costly. Thus, there is a pressing need to find new, cost-effective approaches to addressing the O_3 problem.

One as yet largely unexplored possibility for O_3 abatement is reforestation. Forests have been shown to reduce ambient concentrations of many anthropogenic air pollutants, in both urban and immediately adjacent peri-urban areas located between rural areas and the outer boundary of urban settlements (27–30). Trees absorb and diffuse ambient NO_2 and O_3 via dry deposition and foliar gas exchange, lowering the concentrations of these gases in the air mass moving through the forest canopy (27). Trees also release VOCs in response to many biophysical factors, increasing ambient VOC concentrations (28). The net effect of a reforestation project on O_3 concentrations depends on the magnitude of these two processes and on whether the project is located in an area where O_3 formation is limited by available NO_x or VOC, respectively. Using atmospheric chemistry and transport and meteorological models, Alonso et al. (31) found that peri-urban forests near Madrid, Spain, were O_3 sinks. Using forest structure data and a coupled dry deposition and mesoscale weather prediction model, Baumgardner et al. (32) found that a peri-urban forest near Mexico City improved regional air quality by removing O_3 and respirable particulate matter.

These studies raise the question of whether reforestation–and forest management and conservation more broadly–might constitute a novel and cost-effective approach to O_3 abatement by removing its precursor gases from the atmosphere at lower cost per unit precursor removed than engineering alternatives. If so, regulated emitters with a portfolio of abatement choices—such as many point sources, which currently can choose to achieve compliance with their emission limits via installation of various control technologies, purchase of precursor emission credits on nonattainment-area–specific cap-and-trade markets, or both—in principle might deploy reforestation projects to generate part of the required precursor abatement. Previous analyses have found that urban trees can be a cost-effective public strategy for improving air quality (33, 34). However, the private cost effectiveness and financial feasibility for regulated point sources of using peri-urban reforestation projects for O_3 precursor control remains unexamined.

We develop an integrated methodology that provides guidance for evaluating the long-term performance of reforestation in peri-urban areas for O_3 control and analyzing its cost-effectiveness as a compliance approach. We select the Houston–Galveston–Brazoria (HGB) O_3 nonattainment area in Texas as a case study because it exceeds O_3 standards and exhibits large-scale reforestation potential.

We first identify key siting and design parameters that affect the cost of reforestation projects per ton (t) of O_3 precursors removed. Second, we develop a simplified tree growth-mortality model that predicts key forest canopy parameters that affect air pollutant removal. We use these canopy parameters along with meteorological and ambient pollutant concentration data and the Urban Forest Effects (UFORE) dry-deposition air-pollutant removal and biogenic emissions model (30) to generate estimates of pollutant deposition and biogenic VOC emissions for a hypothetical 405 hectare (ha) reforestation project in the HGB area. Next, we combine removal estimates and reforestation and land costs to estimate the cost of the project per ton of O_3 precursor abated, with and without the carbon (C) credits such a project could generate under the California Air Resources Board (CARB; ref. 35) forest project offset protocol, the highest-price carbon market US reforestation projects can currently access. We compare these costs with those of conventional point-source NO_x controls in the HGB area. We also quantify the social economic value of the C sequestered by the project. Finally, we identify where guidance is needed from regulatory authorities in the selection of key estimation parameters to reduce uncertainties and narrow ranges in pollutant removal and cost-effectiveness estimates.

It is important to note that peri-urban and urban forests provide a wide range of ecosystem services in addition to air-quality improvement (36, 37). Reforestation thus may yield a series of cobenefits not provided by conventional engineering-based controls.

Results and Discussion

Forests remove both O_3 and NO_2. However, because O_3 is not emitted directly, a SIP regulates point-source emissions not of O_3 but of its precursors, NO_x and VOC. Thus, the objective of an O_3 SIP reforestation project is the abatement of O_3 precursor equivalents. In the case of NO_x, these equivalents (NO_xe; *Case Study and Methods*) are the sum of the NO_2 directly removed by the forest, and the NO_x indirectly removed in the form of O_3 formed from NO_x and VOC. Because trees do not remove, but rather emit, VOCs (28), a reforestation project can only achieve removal of VOC equivalents (VOCe) if it removes more O_3 than forms from its VOC emissions. Whether the O_3 removed by the forest is equivalent to NO_x or VOC abatement depends on whether O_3 formation in the area is predominantly NO_x or VOC limited, respectively. Thus, depending on its location, a reforestation project may generate either only NO_xe or both NO_xe and VOCe abatement.

Model scenarios with different planting densities and stock sizes (*SI Appendix*, Table S1) identified seedlings planted at 1,500/ha as the planting design with the lowest cost per ton of NO_xe removed. Unless indicated otherwise, all results presented below refer to this design, which achieves maximum forest crown area in year 23 after planting (*SI Appendix*, Fig. S2).

Precursor and Ozone Removal, Carbon Storage, and VOC Emissions. Based on our modeled forest structure and UFORE-estimated specific pollutant removal rates (Table 1), the reforestation project is estimated to remove a total of 309.7 t O_3 and 58.1 t NO_2 over our 30-y analysis period and store 24,574 t aboveground C at year 30. Annual air pollution removal was greatest in year 23 of the project at maximum canopy cover (O_3: 14,156 kg; NO_2: 2,659 kg), and C sequestration was highest in year 16 (1,153 t). For O_3 and NO_2, the predicted decline in annual removal rates

Table 1. Modeled forest structure parameters and specific pollutant removal for the 405-ha reforestation project

	Phase 1 (DBH < 12.7 cm)	Phase 2 (DBH ≥ 12.8 cm)
Forest structure parameter		
Number of trees	502,698	94,440
Average DBH (cm)	7.6	25.4
Average tree height (m)	7.8	15.9
Average crown height (m)	3.1	6.4
Average crown width (m)	3.0	7.1
UFORE modeled forest structure		
Average LAI	3.17	3.42
Total leaf area (m^2)	1,861,620	2,298,500
UFORE modeled air quality effects—Pollution removal		
NO_2 (g/m^2 crown area/y)	0.579	0.600
O_3 (g/m^2 crown area/y)	3.116	3.194

Modeling phases: 1—tree establishment (years 1–10) and 2—maturity (years 11–30).

after year 23 is due to the omission of natural forest regeneration from our model, making our removal estimates conservative.

At our estimated removal rates per hectare, reforesting half or all of the estimated potentially reforestable 189,400 ha of bottomland habitat in the HGB area (*SI Appendix*, Fig. S3) would abate an estimated average 2,426–4,852 t O_3 and 455–911 t NO_2 per year over 30 y. Using the reported HGB area, O_3 production efficiency envelope of NO_x of 3–8 (38, 39), this results in an estimated 995–1,641 to 1,990–3,282 t NO_xe removal per year, or ~1.7–5.5% of the average of the estimated 2006 and 2018 annual HGB-area NO_x point-source emissions of 59,700 t (40). While these abatement levels by themselves likely would not be sufficient to achieve attainment, they do amount to several percent of the additional abatement that may be needed (*SI Appendix*, section S3).

Estimated 30-y total VOC emissions of the cost-effective (1,500 seedlings/ha) planting scenario are 115 t of isoprene, 41 t of monoterpenes, and 197 t of other VOC.

Cost Effectiveness of Reforestation for Ozone Precursor Abatement. We compared reforestation and conventional controls in terms of 30-y present value (PV) cost per ton NO_xe removed. All cost-effectiveness estimates assume full provisional up-front credit of pollutant removal as per EPA guidance (41) and that our projections represent actual forest growth during the 30-y analysis period.

NO_x—land cost scenario 1: No land costs. The reforestation project would remove an estimated total of 209 or 127 t NO_xe over the 30-y analysis period in the "high" and "low" removal scenarios, respectively (incremental O_3 production efficiencies of NO_x = 3 and 8, respectively). On lands where reforestation does not incur land costs (*Private Land Opportunity Costs*), this translates into approximately \$1,680–\$3,210/t NO_xe (high removal) and \$2,770–\$5,300/t NO_xe (low removal), with the low and high values in each range resulting from low and high planting cost estimates, respectively (*SI Appendix*, Table S4). If CARB carbon offset revenues are included at \$12.25/t carbon dioxide equivalent (CO_2e), the cost-effectiveness of NO_xe removal improves substantially, to \$300–\$1,840 and \$500–\$3,030/t in the high and low removal scenarios, respectively. These latter ranges reflect expected revenue (\$372,400) and transaction costs (\$103,400) of carbon offsets (both PV at 7% discount rate) over the 30-y time horizon. Ozone accounts for 39% and 63% of the total removed NO_xe in the low and high removal scenarios, respectively.

In all but the low removal scenario—where a project receives less NO_x credit for the O_3 removed due to high O_3 production efficiency of NO_x—reforestation in the HGB area has a lower mean cost per ton of NO_xe removed than conventional NO_x controls (\$2,500–\$5,000/t) and NO_x allowances (\$3,300/t; *SI Appendix*, section S5); that is, permits granting a perpetual right to emit 1 t NO_x per year (Fig. 1). Because reforestation projects would be expected to be sited in areas where they generate the most precursor abatement per dollar, we expect our high-removal scenario estimates–\$1,680–\$3,210/t without, \$300–\$1,840/t with C offsets–to be more representative of actual projects. Importantly, contract bids would provide ex ante certainty for actual projects about planting, and thus project cost and cost per ton of NO_x removed.

NO_x—land cost scenario 2: \$4,940/ha. At a representative price of suitable lands in the study area of \$4,940/ha (*Case Study and Methods*), total planting-related project cost is more than 5 times the average cost (\$493,000; range \$333,000–\$654,000) in land cost scenario 1. As a result, reforestation is no longer cost competitive with engineering-based precursor abatement, even with C offsets (*SI Appendix*, Fig. S4).

VOC. A reforestation project could achieve net VOCe removal if it removed more O_3 than is formed from its VOC emissions. Because our case study project is not located in an area where O_3 formation is VOC limited, its O_3 removal is equivalent to abatement of NO_xe, not VOCe. Nevertheless, to assess whether the project might abate VOCe if it were located in VOC-limited portions of the Houston area (Galveston Bay or southern Harris County; ref. 42) we estimate its net O_3 balance in a VOC-limited area.

Using the maximum incremental reactivity (MIR; ref. 43) scales (gram O_3/gram VOC) to estimate the quantity of O_3 formed by its VOC emissions, the project would produce an estimated 1,650 t O_3 over the 30-y analysis period, or over 5 times the estimated 310 t O_3 removed via dry deposition (*SI Appendix*, sections S6 and S7). The MIR scale represents relatively high NO_x conditions (areas with high NO_x:VOC ratios like Galveston Bay or southern Harris County in the HGB area; ref. 42), where O_3 is most sensitive to changes in VOC emissions, and is most often used or proposed for use in regulatory applications (43). Other reactivity scales (43) yield lower O_3 production estimates that however still exceed estimated removal via dry deposition. Although these findings are based on simplified models and assumptions and should be considered preliminary given the complex nature of O_3 formation (44), they suggest that reforestation projects may not yield net VOC abatement.

Private and Social Value of Carbon Sequestration. The project generates C offsets with an expected net PV of \$269,000 and avoids social costs of carbon (SCC)—the sum of future damages from increased atmospheric CO_2 concentrations—with an estimated PV of \$1.96 million (3% pure rate of time preference [PRTP]) to \$3.25 million (2.5% PRTP). On public or private lands with a qualifying conservation easement, lower mandatory contributions to the CARB forest offset project buffer account (12% of calculated sequestration vs. 19% in our estimates) would increase net present offset value by 12%. We consider both private and social C value estimates conservative because of the exclusion of natural regeneration in our forest model, which reduces estimated C sequestration after year 20.

Sensitivity Analysis. Engineering-based NO_x control options have an average economic lifetime of only 20 y (45). Full replacement of NO_x control equipment in year 21, for example, would increase the abatement cost per ton of engineering-based controls by 18% (assuming annual maintenance and repair costs for chemical processes of 3% [ref. 46] of initial capital cost and a 7% discount rate; *Case Study and Methods*). Extending the time

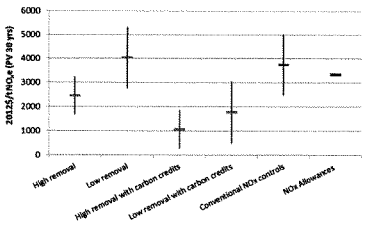

Fig. 1. Average cost per ton of NO_x control through reforestation at zero land cost, for high and low removal scenarios, and cost of standard point source controls and NO_x stream allowances in the HGB area. Vertical lines indicate ranges caused by different cost assumptions. Costs expressed as PV over 30-y period. NO_xe—NO_x equivalent.

horizon of the analysis also would increase the competitiveness of reforestation with conventional controls, as the established forest stand will keep removing O_3 and NO_2 at no additional cost beyond year 30. Thus, reforestation may be even more competitive with conventional NO_x controls than our analysis suggests.

Our finding that purchasing bottomland hardwood forest habitat for reforestation would not generate cost-competitive NO_x abatement is based on the assumption that emitters would fully absorb these costs. That may not necessarily be the case. Reforestation of former bottomland hardwoods can generate cobenefits, making cost-share arrangements likely for reforestation projects on some lands. Local and national stakeholders, such as the US Fish and Wildlife Service, the Texas chapter of the Nature Conservancy, and other conservation organizations in our study area have expressed strong interest in such cost-share arrangements for reforestation of ecologically valuable bottomlands. Whether cost sharing for purchased lands yields cost-competitive NO_x removal through reforestation of pasture lands depends on the cost shares. For example, at \$4,940/ha land cost, cost sharing at 3:1 (project partner:point source) would achieve \$2,690/t NO_xe in the best case (high removal, low planting cost plus C offsets) scenario, which would be competitive.

The competitiveness of reforestation projects may also be enhanced by interplanting of fast-growing species such as *Populus deltoides* in our study area to support a one-time selective timber harvest (47). The impact of such harvests on the cost per ton of NO_xe reduced depends on timber prices, volume harvested, accessibility, distance to the nearest mill, and requirements of the relevant C offset protocols.

The approach we present simplifies several complex biophysical processes. First, we were unable to find growth-mortality rates and allometric equations for seedlings and saplings of our bottomland hardwood species. Therefore, we assumed that our rates and equations can be applied to trees with a diameter at breast height (DBH) < 7.6 cm. Second, by not accounting for natural regeneration (47, 48) we underestimate total leaf area and air pollution removal during the later years of our analysis period. Likewise, our assumption that 2009 pollutant levels will remain constant may bias our estimates downward (*SI Appendix*, section S7). Third, we do not model effects of stochastic disturbance events like drought, wildfire, pests and diseases, or hurricanes in our analysis. However, our mortality rates are from a Houston study (49) covering an 8-y period that included a hurricane landfall (Hurricane Ike). Thus, they reflect recent historic pest and disease induced mortality, and implicitly assume an annual hurricane landfall probability of 1/8, although historic probability for our site (Brazoria and Fort Bend Counties) is <1/25 (50). Moreover, bottomland hardwoods are less prone to hurricane damage than mature, pine-dominated forest stands with large open-grown trees (49, 51). Southern bottomland forests also are less susceptible to drought than upland forests and have a low fire frequency (52), with fire risk for bottomland hardwoods in our area classified as very low (53). Overall, aggregate tree mortality risk from all pests and diseases in 2013–2027 is an estimated 1–5% at our study site and 1–15% for other bottomland forests in the area (54). The assumed 5.1–12% annual mortality rates for our project (*SI Appendix*, Table S2.5) thus exceed the combined risk from all these stochastic disturbance events. If disturbance risks were unknown or an additional margin of safety sought, a SIP could specify that a portion of estimated pollutant removal be deposited in a programwide risk buffer account, as is done in forest C offset protocols (35).

Another limitation is the use of pollution and weather data from fixed stations not located on our project site. Other studies on the effects of peri-urban forests on O_3 have used regional weather and chemistry models [e.g., Weather Research and Forecasting (WRF)-Chem; ref. 32]. The high sensitivity of the O_3 concentrations predicted by WRF-Chem and other advanced air quality models to meteorological conditions and the difficulty of accurately specifying those conditions for complex coastal zones make application of those models in the HGB area challenging (22, 55, 56).

Finally, the treatment of any net VOC emissions from a reforestation project will affect the overall cost effectiveness of such projects for O_3 precursor control, and hence their implementation. To promote reforestation for O_3 abatement without sacrificing air quality goals, it would seem appropriate to not debit a project with its VOC emissions as long as those emissions are unlikely to lead to O_3 formation. Such a treatment would be justified on the basis that it does not conflict with the defined policy (SIP) goal of reducing O_3 concentrations, but rather promotes adoption of novel O_3 control measures that would achieve additional O_3 abatement beyond that achieved by legally mandated control technologies. Application of such a differentiated treatment of VOC emissions and accurate conversion of the O_3 removed by a reforestation project to NO_xe both require reasonably reliable spatial information on the type (NO_x, VOC) and degree (i.e., production efficiency) of sensitivity of O_3 formation to ambient precursor concentrations, and can significantly affect the siting of reforestation projects and their cost per ton of precursor removal (*SI Appendix*, section S8).

Conclusion

Our analysis indicates that reforestation could be a viable, novel approach for abating ground-level O_3 pollution that complements conventional technology-based controls. Including reforestation in a comprehensive control strategy is desirable for regulators because it furthers attainment beyond what is achievable with current approaches considered technically or economically feasible. It is also desirable for regulated emitters because it may lower their compliance costs, in part due to the uniquely scalable nature of reforestation that contrasts with the lumpy costs and abatement provided by technological controls. We expect that reforestation in the Houston O_3 nonattainment area would be cost competitive with additional conventional point source NO_x controls on lands where it has negative or negligible opportunity cost for landowners and thus does not incur land costs. It may even be cost competitive on many additional lands where it does incur opportunity costs. These lands may need to be purchased, but acquisition costs may be defrayed through suitable timber harvests, or private or public cost-share agreements motivated by not only the high conservation value of those lands (57), but additional water quality (58), and recreation and scenic benefits restored forests may provide once established and mature (59, 60).

Our findings have implications for other areas with O_3 pollution problems in the United States and elsewhere. Given the large extent of suitable bottomland reforestation areas—historic bottomland forest currently in shrubland, grassland, or agriculture located in NO_x-limited portions of US O_3 nonattainment areas (Fig. 2) with similar O_3 and NO_2 concentrations (*SI Appendix*, section S7) and conventional NO_x control costs (*SI Appendix*, section S5)—we expect reforestation of peri-urban lands could be a cost-competitive NO_x control approach in many other existing US O_3 nonattainment areas. With high pollutant removal rates reported for peri-urban forests in high-O_3, NO_x-limited (61, 62) cities with deforested and degraded peri-urban areas in need of restoration such as Shanghai, China (63), and Mexico City, Mexico (32), reforestation may assist in O_3 control also in other countries.

Nevertheless, total pollutant removal by forests is space constrained: our study forest removes ~0.5 t NO_2 and 2.6 t O_3 km^{-2} y^{-1} and those in Shanghai and Mexico City remove around 2.1 t NO_2 km^{-2} y^{-1} (no O_3 removal estimate due to lack of ambient concentration data; ref. 61) and 0.04 t NO_2 and 1.7 t O_3 km^{-2} y^{-1} (32), respectively. Thus, reforestation clearly could not replace all additional, let alone existing, conventional controls.

In the United States, opportunities already exist to integrate reforestation into regulatory O_3 abatement efforts. Specifically, EPA's (41) policy "Incorporating Emerging and Voluntary Measures in a State Implementation Plan" encourages states to explore novel approaches to achieve NAAQS compliance. The policy defines as "emerging" a measure that does not have the same high level of certainty for quantification purposes as traditional measures but still fulfills the usual SIP requirements of being surplus, enforceable, quantifiable, permanent, and antibacksliding. It explicitly mentions tree planting as an example of an ambient concentration-reducing measure that could be used for purposes of SIP attainment, reasonable further progress, rate of progress, or maintenance requirements. Under this policy, being an emerging SIP measure, reforestation could not replace emission controls already mandated in a SIP (antibacksliding). Rather, it would form part of a suite of additional policies, incentives, and controls implemented for attainment or maintenance purposes.

Importantly, forests may lower ambient O_3 levels in NO_x-limited areas by more than a conventional control device with the same total annual amount of NO_xe abatement. This is due to the fact that photosynthetic activity and thus O_3 and NO_2 removal by trees are clustered around the O_3 season (May–September), and abatement by conventional controls is distributed more or less evenly throughout the year. Whether or not higher O_3 reductions would result in additional health benefits depends on differences in the spatial patterns of O_3 reductions produced by the two control options and resulting differences in total human exposure.

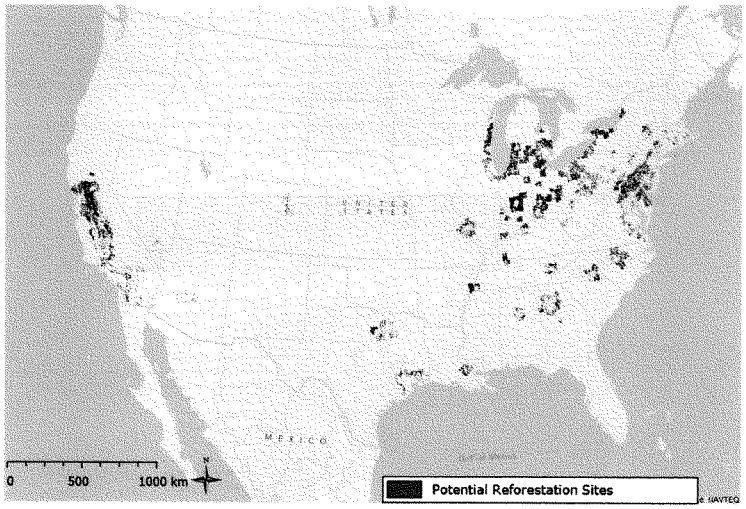

Fig. 2. Potential sites in the conterminous United States where reforestation could abate ozone. Sites were identified by intersecting O_3 nonattainment and maintenance areas (80 ppb 1997 8-h standard; ref. 19), NO_x-limited areas (formaldehyde/NO_2 ratio ≥1, from figure 6 in ref. 66), pre-European settlement forested areas [LANDFIRE Biophysical Settings Layer Refresh 2008 (lf_1.1.0), US Department of the Interior, Geological Survey, www.landfire.gov/vegetation.php] and lands presently under grass, shrub or agricultural cover (NLCD2006 Landcover, US Department of the Interior, Geological Survey, www.mrlc.gov/nlcd06_data.php).

In this paper we present, to our knowledge, a first attempt at constructing a methodology for integrating reforestation into O_3 control efforts. Making such integration a reality requires additional work, above all of the development of specific regulatory guidance that addresses several of the uncertainties outlined in our analysis, in particular the ozone production efficiency of NO_x; NO_x vs. VOC limitation of ozone production; and the portion of NO_xe abatement to be deposited in a SIP "buffer" account to hedge against catastrophic disturbance events, if any. In some cases, removing or reducing these uncertainties may require additional research.

Large-scale reforestation for O_3 abatement generally should be limited to NO_x-sensitive environments, as additional forest cover may increase O_3 levels in situations where O_3 formation is VOC limited (30, 44, 64, 65). It is important to note that with the exception of the urban cores of large metropolitan areas, many portions of O_3 nonattainment and maintenance areas in the United States (19, 66) and elsewhere (61, 62) are characterized as NO_x sensitive. Use of reforestation for O_3 abatement therefore may have widespread applicability. Our findings suggest that reforestation for air pollution abatement constitutes a potentially globally applicable example of "natural infrastructure" solutions to environmental challenges (e.g., 67, 68).

Case Study and Methods

Case Study Site. The eight-county HGB area has an average annual temperature between 15 and 20 °C (60 and 70 °F) and annual precipitation averages 1,020–1,530 mm (40–60″) (69). It lies primarily in the Gulf Coast prairies and marshes ecoregion, and partially in the upper west gulf coastal plain ecoregion (70), and contains the eastern two-thirds of the 515,000-ha Columbia Bottomlands Conservation area extending from the Gulf Coast inland along the Brazos, Colorado, and St. Bernard Rivers (57). Out of a total of ~189,400 ha potentially available for reforestation to bottomland hardwoods (*SI Appendix*, Fig. S3), we selected a 404.69-ha reforestation site located just north of Brazos Bend State Park (29°24′54″N, 95°33′51″W) expected to achieve high O_3 and NO_2 removal (*SI Appendix*, section S7). Historically forested, the site is now primarily grassland with sparse tree and shrub cover. Fig. 3 shows the HGB area, the study site, and the Texas Commission on Environmental Quality (TCEQ) monitoring stations from which pollution and meteorological data were obtained.

Forests in the HGB area have been declining primarily due to anthropogenic disturbances including timber harvest, agriculture, and urbanization (49, 51, 71). Bottomland forests in the region have experienced particularly high losses (72). Although this trend is predicted to continue in a business-as-usual scenario, improved forest protection could reduce future net forest loss (73), and coupled with large-scale reforestation might even reverse the long-term trend of declining forest cover. Bottomland forests in the HGB area have a high potential for restoration (57), are less susceptible to drought and wildfire than upland forests (49, 51, 52), and have high biodiversity and recreation value (57, 72). Thus, we chose a bottomland site for our analysis.

Selection of Suitable Reforestation Sites and Silvicultural Criteria. Planting site selection for O_3 and precursor control purposes should maximize pollutant removal per unit cost. Analysis of emissions, ambient concentrations, and wind data suggests that reforestation would remove the most O_3 in southern and southwestern Harris and in Brazoria County, and NO_2 removal would be highest in, and downwind of, the downtown Houston area and northwest of major NO_x point sources along the Gulf Coast (*SI Appendix*, section S7). Siting depends on whether NO_x or VOC abatement is prioritized (*SI Appendix*, section S8). We maximize NO_x abatement by locating the study site south of Houston in an area already high in biogenic VOC emissions (74) where O_3 formation is expected to be mostly NO_x limited–as it is in most of the HGB area (figure 2b in ref. 42) especially during late morning to late afternoon (42, 62) when biogenic VOC emissions are highest. Thus, VOC emissions from the additional forest are unlikely to lead to additional O_3 formation that would reduce the O_3 net balance of the project. Our case study site is located in Brazoria County (Fig. 3), just downwind of major industrial NO_x sources along the Gulf Coast and in the path of high NO_x concentrations and O_3 plumes drifting southwest over the Houston metro area (*SI Appendix*, section S7).

Our hypothetical project is a contiguous forest in a peri-urban area characterized by suitable soil and site properties. Such a design is expected to require less maintenance, be self-regenerating, and achieve lower mortality, allowing planting of smaller trees that in urban areas would be more prone to accidental or vandalism-related damage. This minimizes costs and emissions from maintenance, replacement, and monitoring activities (75, 76). We minimize VOC emissions by avoiding the planting of high-VOC-emitting species (*SI Appendix*, section S6).

Maximizing Precursor Abatement: NO_xe vs. VOCe. Ozone and NO_2 removal rates by trees generally increase with pollutant concentrations (29). Although very high pollutant concentrations can reduce photosynthetic rates

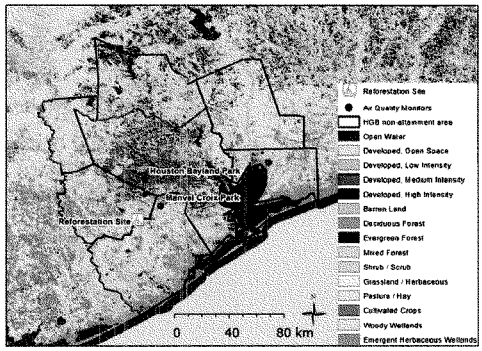

Fig. 3. Map showing the HGB nonattainment area, the reforestation site, Texas Commission on Environmental Quality air quality monitoring stations from which data were obtained, and land cover.

or makes trees more susceptible to other stressors such as insect or pathogen attack (77, 78), exposure levels to O_3 in the HGB area are not within the range that is expected to result in injury to shrubs and trees (79). We therefore assume that reforestation will achieve the highest O_3 and NO_2 removal rates in areas with the highest O_3 and NO_2 concentrations, respectively.

Nitrogen dioxide removal by forests–appropriately adjusted for uncertainties–can be translated directly into NO_x removal a reforestation project could claim. The calculation of the precursor removal a project could claim for the O_3 it removes is less straightforward. Ozone removal by forests is equivalent to avoiding emission of the precursor quantities used up in the formation of the removed quantity of O_3. Converting O_3 removed into its equivalent quantities of avoided precursors requires information on the O_3 production efficiency in the area, that is, the number of O_3 molecules formed from a precursor molecule (80).

Results from simulations (38) and measurement flights (39) indicate an O_3 production efficiency envelope of 3–8 in the HGB area for NO_x; that is, 3–8 O_3 molecules are formed per NO_x molecule oxidized during midday hours, making removal of an O_3 molecule equivalent to removal of 1/3–1/8 of a NO_x molecule under NO_x-limited conditions. We use this 3–8 range to develop high and low removal cases, respectively, for our reforestation project.

With O_3 formation in our study and much of the HGB area characterized as NO_x limited, we convert O_3 removed by the project to NO_2 equivalents (NO_2e) using the molecular weights of the two compounds and the 3–8 range of O_3 production efficiencies of NO_x (i.e., 1 O_3 = 0.32–0.12 NO_2). Because point sources are regulated on emissions of NO_x (most of which are immediately converted to NO_2 in the atmosphere) and not NO_2, we follow existing policy guidance and convert NO_2e to NO_xe using the national NO_2:NO_x default ratio of 0.75 (81), which closely matches observed ratios of 0.73–0.74 in the HGB area (82).

Time Horizon of Analysis and Discount Rates. Both time horizon and discount rate affect cost-effectiveness estimates. We use a 30-y time horizon that somewhat exceeds the average 20-y lifetime of conventional NO_x control equipment (45) and the 25-y crediting period used for CARB forest carbon offset projects (35). Although the planted forest is expected to survive past 30 y and its cost-effectiveness increases with the time horizon, uncertainty as to future O_3 levels (and thus biogenic removal rates) and changes in the regulatory framework argue against much longer timeframes.

We use a 7% discount rate to calculate the PV of future project costs (SIP and C offset reporting and monitoring) and of C offset revenues, which "approximates the marginal pretax rate of return on an average investment in the private sector" (ref. 83, p. 9; *SI Appendix*, Table S9). We discount future SCC estimates using 2.5% and 3% discount rates, respectively (*Avoided Social Cost of Carbon*).

Reforestation and Silvicultural Characteristics. Rosen et al. (72) report that eight native tree species (*Carya aquatica, Celtis laevigata, Fraxinus pennsylvanica, Quercus nigra, Q. texana, Q. virginiana, Ulmus americana, U. crassifolia*) accounted for 87% of overstory basal area in a mature, protected bottomland hardwood forest in southwestern Brazoria County (*SI Appendix*, Table S2.1). Online reviews and phone inquiries with regional tree nurseries showed that six of these species (all but *C. laevigata* and *C. aquatica*) were commercially available in a variety of planting stocks and sizes. We selected these six species for planting and assume a constant forest composition (*SI Appendix*, Table S2.2) during our analysis period and no natural regeneration or introduction of any additional species.

We assessed possible climate change effects on our selected species using the *Climate Change Atlas for 134 Forest Tree Species* that predicts tree distribution ranges based on the random forests model (84, 85). Specific climate, topographic, soil, and land use parameters used in the random forest model and modeling methods are detailed in ref. 84. Our analysis suggests that habitat suitability in the bottomland forest areas in the HGB area will remain generally unchanged for the planted species during our time horizon (*SI Appendix*, Table S2.3).

Initial tree planting density and size affect overall pollutant removal and project costs and thus are key project design and modeling parameters. Recommended initial planting density for bottomland hardwood forests ranges from 400 to 3,000 plants per hectare (*SI Appendix*, Table S2.4). For this study we used 730 seedlings per hectare as a base case (47), based on recommendations for ecological restoration of bottomland hardwood forests in this region (86).

The size of tree planting stock, in terms of DBH or caliper (diameter at 61 cm above ground), is the dominant driver of reforestation costs. High-quality planting stock, and in general larger planting material, have overall higher survival rates (75) and thus will achieve a given age-specific target density with a lower initial planting density. Tree size also is positively related to crown area (87)–a key air pollution removal variable–and thus pollutant removal per tree is greater for larger trees in any given year. However, tree stock and planting costs also increase with tree size. The most cost-effective size at planting depends on all of these factors. Much of the scientific literature examining bottomland reforestation focuses on seedlings (*SI Appendix*, Table S2.4), which may be the most cost-effective size for adding trees in open, unpopulated areas (75). We modeled different tree size classes and planting densities to identify the cost-effective planting design for O_3 and precursor abatement.

Project Costs. Our SIP reforestation project costs comprise of (*i*) planting-related costs for project design, planting stock, site preparation and maintenance; (*ii*) land opportunity costs from forgone value of displaced land uses; and (*iii*) transaction costs for legal or coordination activities with regulatory bodies or third parties for initial project approval and for monitoring and reporting for SIP and carbon offset compliance (verification and registration) purposes, if any.

Planting-Related Costs. We obtained cost estimates for planting stock, site preparation, and labor (*SI Appendix*, Table S1) from the literature and regional providers (75, 88). Recommended site preparation techniques for hand and machine planting styles comprise reduction or elimination of weeds through prescribed fire, mowing, or double disking (89). Given expected constraints on the use of prescribed fire in our study area due to potential effects of smoke on air quality, we assumed site preparation by mowing and double disking.

For tree seedlings and planting costs, our low estimate combines a stock cost estimate of $0.24 per seedling and Texas Forest Service per-acre cost estimates for hand planting ($75) and mowing ($33) as recommended for this planting option (89). Our high estimate uses Texas Forest Service estimates for hardwood seedling costs ($0.60 each) and per-acre costs for planting by wildland machine ($85) and double disking ($115) as recommended for this planting option (89). We assume hand and machine planting costs per acre are for commonly used planting densities like those reported in Stanturf et al. (47, 86), and scale these costs proportionally for higher planting density scenarios.

Private Land Opportunity Costs. Land opportunity costs are highly dependent on the value of displaced, incompatible uses by owners. Not all uses are incompatible with reforestation–including timber production (48, 86), recreation opportunities or visual amenities for people living in the viewshed of reforested lands (59, 60), although the latter two are generally lower for peri-urban reforestation sites due to their initially dense, low-height structure and their location away from populated areas. Reforestation opportunities exist on public, deforested bottomlands currently under shrub or grass cover, and on large tracts of converted former bottomland hardwoods owned by companies with several large point sources in the area on which reforestation would not displace current or anticipated future high-value uses, thus incurring negligible land opportunity costs. Private third-party land owners might also be willing to have their bottomlands reforested for free or for a charge. With most converted former bottomlands currently in agriculture, we bracket potential opportunity costs by using two estimates: (*i*) zero cost; and (*ii*) $4,940/ha–the approximate average fee-simple cost for nonwaterfront agricultural land in bottomland habitat in the area (*SI Appendix*, section S1).

Third-Party Land Opportunity Costs. Reforestation may impose costs on third parties by restricting the supply of developable land. Because of its small size and location away from urban expansion, this is not a concern for our case study project. It also generally is less of a concern for peri-urban reforestation. Furthermore, any development-related opportunity costs would be at least partially offset by property value premiums and nonmarket benefits owners of properties near reforested lands would receive (59, 60).

Transaction Costs. To satisfy SIP-related monitoring requirements (41), we assume that a site analysis ($2,000 each) will be carried out every 3 y to assess whether tree survival and growth (key drivers of pollutant removal) match model predictions. We also assume an initial site inventory ($10,000). If the project registers for CARB C offsets (35), the more demanding CARB inventory would be substituted for the SIP inventory. In the case of C offset generation, we assume an initial complete forest inventory ($20,000) followed by full verifications ($20,000 each) in years 14, 20, and 26, and annual interim verification and data reports (35) ($5,000 each). All offset

cost estimates are based on The Nature Conservancy data for California Climate Action Reserve integrated forest management offset projects.

Forest Canopy Modeling. We modeled tree canopy cover at annual time steps during the analysis period based on a simplified growth-survivability model and a tree stem-crown area allometric equation (49, 87, 90). We determined the cost-effective planting density and tree size by modeling O_3 and NO_2 removal and project costs for planting densities between 730 and 1,500 stems per hectare, for seedling and larger planting stock. We estimated the number of surviving trees (ST) during the 30-y analysis period from initial tree populations and DBH size-class-based growth and mortality rates (*SI Appendix*, Table S2.5) for Gulf Coast peri-urban forests (49, 90). These rates account for hurricane-related mortality. The annual tree crown width (CW) increments were then estimated using the following DBH-based allometric equation for Alabama *Quercus spp* (87):

$$CW = -0.8941 + 0.515\ DBH + 0.0059(DBH)^2. \quad [1]$$

Crown area (CA) for each year was calculated as $CA = \pi \times (CW/2)^2$ for each individual tree and summed over ST. Natural regeneration or stand clearing disturbance events were not separately accounted for in our 30-y analysis period.

Air Pollution Removal, VOC Emission, and Carbon Sequestration Modeling. We used the UFORE model (UFORE-ACE version 6.5 with U4D020701.SAS and U4B020700 modules; ref. 76) and hourly pollution concentration and meteorological data from January 1 to December 31, 2009 (*SI Appendix*, Table S7.1) to estimate the annual removal of NO_2 and O_3 and VOC emissions per unit area of surviving tree cover using UFORE-estimated forest structure parameters (Table 1). Hourly pollutant concentrations and solar radiation data are from TCEQ's Manvel Croix Park C84 (29°31′–41′N, 95°23′–29′W) and Bayland Park (29°41′45″N, 95°29′57″W) monitors, respectively, and meteorological data (wind direction and speed, temperature, dew point, atmospheric pressure, precipitation, and sky cover) from the National Oceanic and Atmospheric Administration National Climatic Data Centers' Pearland station (29°31′1″N, 95°15′0″W). We assume that 2009 O_3 concentrations and meteorological parameters will remain constant over the 30-y analysis period (*SI Appendix*, section S7). Also, rather than model required UFORE structural parameters and annual air pollution removal and VOC emissions for every year in our 30-y analysis period, we use a simplified approach and model two representative urban forest structural phases (Table 1) and respective air quality effects to obtain necessary modeling parameters.

Our first modeling period represents the stand establishment phase at around year 3 of the project [Phase 1; leaf area index (LAI) = 3.17 and DBHs < 12.7 cm]. Our second modeling period characterizes a maturing stand at about year 20 to represent years 11–30 (Phase 2; LAI = 3.42 and DBHs ≥ 12.7 cm). To simplify our biophysical modeling, we assume that seedlings without a DBH will have similar growth and mortality rates as those trees with a DBH < 7.6 cm. Further, we assume that because of appropriate site preparation, planting criteria and monitoring, planting stock will become established within the first year of planting. Additional required modeling parameters were set at these values: Leaf dieback and missing crown, 80% and 10%, respectively, for both phases; tree condition = good, and percent crown present = 75, for both phases; and crown light exposure of 3 and 5, for phases 1 and 2, respectively.

To simplify our biogenic emission modeling, we estimate phase 1 and phase 2 VOC emissions for a growth-mortality modeled tree population of 244,456 (year 3) and 56,214 (year 20), respectively, for a reforestation project with an initial planting density of 730/ha (*SI Appendix*, Table S6.2). Although leaf biomass is usually the key forest structural parameter used for biogenic emission modeling (44, 64), due to the lack of leaf biomass allometric equations for our species we assume a linear relationship between leaf biomass and leaf area and develop leaf area-scaled VOC emission estimates (kilograms of VOC per square meter of tree cover) for other planting densities using modeled tree cover, DBH-based growth-mortality model estimates and the crown area equation (87), and VOC emission results from phases 1 and 2 (*SI Appendix*, section S6). Detailed UFORE modeling methods and assumptions can be found in refs. 32 and 76.

Finally, due to a lack of species- and region-specific allometric equations, we estimate individual tree aboveground carbon (AGC) storage using a composite equation for mixed hardwoods (91):

$$AGC = \exp(-2.48 + 2.4835 \times \ln\ DBH). \quad [2]$$

We derived annual net carbon sequestration as the year (t)-on-year difference in carbon storage during our analysis period, $AGC_t - AGC_{t-1}$.

Carbon Offsets. Reforestation projects in the United State are eligible for generating carbon offsets under California's US Forest Projects Offset Protocol if they are additional–that is, not otherwise required by law, regulation, or any legally binding mandate applicable in the offset project jurisdiction, and would not otherwise occur in a conservative business-as-usual scenario (35). Unlike the regulatory-prescribed conventional air pollution control technologies included in SIPs, emerging SIP measures like reforestation are not mandatory. Thus, we expect a reforestation project to meet the additionality requirement, except in cases where its cost effectiveness exceeds that of conventional control approaches sufficiently to make its implementation clearly profitable even without offsets.

We use the March 2012 price of \$12.25/t CO_2e (\$45/t C) for December 2013 forward contracts for guaranteed California Compliance Offset Credits (92) to calculate expected offset revenue. Offset prices have increased slightly during January 2012–January 2013 (93, 94), but we assume real offset prices will remain unchanged during our analysis period–likely a conservative assumption given the large current and expected future supply shortfall (95). We estimate offset quantity as aboveground tree carbon sequestered by the project minus the maximum 19% mandatory contribution to the CARB forest offset project buffer account (using US default fire risk of 4%; ref. 35).

Avoided SCC. Estimates of the SCC–the total value of the sum of future damages from a 1-t increase in atmospheric CO_2 concentrations–vary widely (96). We use the two "middle" SCC estimates developed by the federal Interagency Working Group on Social Cost of Carbon (97), which represent the averages of the damage estimates produced by the Dynamic Integrated Climate-Economy; Policy Analysis of the Greenhouse Effect; and Framework for Uncertainty, Negotiation and Distribution models (97) for discount rates (PRTP) of 3% and 2.5%. The SCC present value (2012) used to value aboveground carbon sequestered by our reforestation project declines from \$24.7 (3% PRTP) and \$40.1 (2.5%) respectively per ton of C in 2012 to \$18.4 and \$31.4/t in 2042 (*SI Appendix*, Table S10).

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GREENBERG QUINLAN ROSNER RESEARCH

PERCEPTION INSIGHT

opinion research for strategic communications

November 24, 2014

Voters Overwhelmingly Support Stricter Smog Standards

To: The American Lung Association

From: Andrew Baumann and Chloe Mullins, Greenberg Quinlan Rosner
Marc DelSignore, Perception Insight

A new bipartisan national survey of 1,000 registered voters[1] finds that a vast, bipartisan majority of American voters support tighter standards on smog-causing pollution. Over two-thirds of voters enter the debate favoring updating standards with stricter limits, and a solid 62-percent majority continues to favor the standards after messaging from both sides of the issue. Support for the proposal is robust across every region of the country and across almost every demographic group and it earns support from an overwhelming percentage of Democrats and independents and even a solid majority of Republicans.

Key Findings

An overwhelming majority of voters across party and demographic lines support stricter smog pollution standards. Initially, voters strongly support stricter smog pollution standards on the amount that power plants, oil refineries and other industrial facilities can release with 68 percent of voters nationwide supporting the standards and only 25 percent opposed. This includes decisive support from independents and even 54 percent support from Republicans. The proposal gets at least 65 percent support in every region of the country, and 59 percent support or above from almost every demographic group tested, including 68 percent support from white voters.[2]

After a balanced debate, including strong opposition messaging, the proposal maintains two-to-one support. After messages[3] in support and opposition – that include a strong financial and economic attack on the measure from opponents – the proposal to update standards maintains a solid majority with a thirty-point margin in favor of the standards (62 percent favor, 31 percent oppose). Importantly, after messaging, support remains robust among independents and while there is some erosion with Republicans, they end the exercise in a statistical tie. Meanwhile, the proposal maintains at least 61 percent support in each of the 4 major regions of country (the Northeast, Midwest, South and West).

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[1] Memo based on a national survey of 1000 registered voters reached via live telephone interviews on both landlines and cell phones. Conducted for the American Lung Association by Greenberg Quinlan Rosner and Perception Insight, November 13-18, 2014. Margin of error for the full national sample is 3.1%.
[2] Please see the appendix for full text of question.
[3] Please see the appendix for full text of messages.

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Table 1: Support for Stricter Smog Standards

	Total	Dems	Inds	Reps	NE	MW	South	West	Men	Wom	White	Non-White
Initial Favor	68	82	70	54	69	72	65	70	64	72	68	70
Initial Oppose	25	11	27	43	25	21	28	26	32	20	28	19
Net	+43	+71	+43	+11	+45	+51	+36	+44	+32	+52	+41	+50
Final Favor	62	79	63	46	64	62	61	62	57	67	61	66
Final Oppose	31	15	33	48	31	28	32	31	35	27	33	24
Net	+31	+64	+29	-2	+33	+34	+29	+31	+22	+40	+28	+42

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Appendix A — Text of Description of Standards

As you may know, the EPA is considering an update to air pollution standards that would place stricter limits on the amount of smog that power plants, oil refineries and other industrial facilities can release. Do you favor or oppose the EPA setting stricter limits on smog?

Appendix B — Text of Messaging

Now let me read you two statements some people on both sides of the issue make.

Some people say: Scientists say that updating these standards would prevent hundreds of premature deaths and thousands of additional asthma attacks every year. If the EPA failed to update these standards they would be keeping parents in the dark about the true impact of pollution on their children. By taking this step, the EPA is just doing its job of holding polluters accountable for their actions.

Other people say: Now is the worst time for the EPA to enact costly regulations that will raise energy prices and kill jobs. These unrealistic new regulations would raise electricity bills on American families and business while closing much of the country to new or expanded manufacturing businesses and causing millions of American jobs to be shipped to countries like India and China.

Now that you've heard more about this issue let me ask you again, do you favor or oppose the EPA setting stricter limits on smog?

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March 9, 2015

Ms. Gina McCarthy, Administrator
Air and Radiation Docket Information Center
U.S. Environmental Protection Agency
Mail Code 28221T
1200 Pennsylvania Avenue, NW.
Washington, DC 20460

Attention Docket # ID No. EPA-HQ-OAR-2008-0699

RE: Please strengthen the National Ambient Air Quality Standard for Ozone

Dear Ms. McCarthy:

As the Mayor of Fort Collins, Colorado, I am concerned with protecting the public health and welfare of Fort Collins' citizens. That is why I write to urge you to adopt a stronger National Ambient Air Quality Standard for Ozone below the current 75 parts per billion (ppb).

Our area is home to over 5,000 children and 22,000 adults with asthma, plus approximately 11,000 people with heart disease. Fort Collins currently lies within an ozone non-attainment area and ozone pollution threatens all citizens especially children, seniors, and our neighbors living in poverty. My constituents often make decisions about how to spend their time – like whether to exercise outdoors, or send their kids to soccer practice – based on the air quality outside. Unfortunately, the Air Quality Index (AQI) that they rely on for such guidance is based on old information, not the latest scientific evidence regarding the dangers of ozone pollution. Thus, the AQI may indicate that air quality is "safe" even on days when ozone pollution poses a recognized health threat. Fort Collins' citizens and all Americans have a right to know when poor air quality puts their health at risk – and a right to be protected.

Medical and health societies like the American Lung Association, the American Academy of Pediatrics and the American Public Health Association have repeatedly called for an ozone standard of ***60 parts per billion***. I join them in calling on you to set the standard well below the current 75 parts per billion. I urge you to follow the science and the law, and update the ozone standard to truly protect public health.

Sincerely,

Karen Weitkunat

Karen Weitkunat
Mayor, City of Fort Collins

Children's Health Protection Advisory Committee

Chair:

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Seattle Children's Research Institute
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May 19, 2014

H. Christopher Frey PhD
Chair
US EPA Clean Air Scientific Advisory Committee

RE: CASAC Review of the Health Risk and Exposure Assessment for Ozone and Policy Assessment for the Review of the Ozone NAAQS: Second External Review Drafts

---

Dear Dr. Frey:

I appreciate the opportunity to comment on the review of US EPA's second drafts: Health Risk and Exposure Assessment and Policy Assessment for the Review of the National Ambient Air Quality Standard (NAAQS) for 8 hour exposure to ozone. In 2007, the US EPA Children's Health Protection Advisory Committee (CHPAC) submitted two letters to Administrator Johnson that highlighted scientific findings regarding ozone-related children's health effects and urged him to support an ozone standard of 60ppb in order to adequately protect children's health with a sufficient margin of safety. I am writing now to strongly re-affirm the recommendation of 60ppb based on the expanding scientific evidence base documenting adverse childhood health impacts in relation to ambient ozone exposure. The higher end of the range, 60ppb – 70ppb, put forth by the Clean Air Scientific Advisory Committee (CASAC) in 2007 will not be sufficient to protect children's health.

Children suffer a disproportionate burden of ozone-related health impacts due to critical developmental periods of lung growth in childhood and adolescence that can result in permanent disability. In addition, children have increased susceptibility due to increased ventilatory rates and increased outdoor physical activity compared with adults. The 6.8 million children suffering from asthma in the US are some of the most vulnerable to ozone-related respiratory impacts (CDC, 2014). The US EPA 2013 Ozone Integrated Science Assessment summarized numerous recent epidemiologic studies that cite relationships between ambient ozone exposure concentrations within and even below the CASAC previously proposed range, 60-70 ppb, and adverse childhood health impacts including: increased asthma exacerbations, impaired lung development, changes in birth outcomes, and increased upper respiratory illness (US EPA, 2013). Therefore, the current scientific evidence base documenting ozone-related childhood health impacts is now expanded and stronger compared to the last review and warrants a lower recommended range of standards to adequately protect children's health and well-being.

One concrete example of how children's health will be positively impacted by a lower standard is outlined in the 2014 EPA Second Draft Policy Assessment for the Review of Ozone NAAQS (US EPA, 2014). It estimates that 14-19% of children (approximately 952,000 – 1,292,000 asthmatic children based on CDC statistics) living in urban centers will have a greater than 10% decrement in lung function based on a standard of 75ppb, and this percentage decreases to 5-11% (approximately 340,000 – 748,000 asthmatic children based on CDC statistics) with a 60ppb standard. The reduction from 75ppb to 60ppb would translate to approximately 500,000 fewer children affected by ozone exposure. Therefore, the reduced standard would result in significant quantifiable children's health protections, and this is only one example of the numerous childhood health protections afforded.

Based on the strengthened scientific evidence reporting adverse childhood-related health impacts at concentrations above 60ppb, I strongly re-affirm the original 2007 CHPAC recommendations to set the NAAQS ozone standard for 8 hour exposure to 60ppb in order to adequately protect children's health. I thank you for considering this recommendation and have included the previous CHPAC letters for your reference. I would be happy to provide any further information as needed.

Sincerely,

Sheela Sathyanarayana MD MPH
Chair, Children's Health Protection Advisory Committee (CHPAC)

Enclosures: March 23, 2007 CHPAC Letter re: Ozone NAAQS
September 4, 2007 CHPAC Letter re: Ozone NAAQS

cc: Janet McCabe, Office of Air and Radiation
Steve Page, Office of Air Quality Planning and Standards
Khesha Reed, Office of Children's Health Protection

References:

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June 3, 2015

The Honorable James Inhofe
Chairman
Committee on the Environment and Public Works
The U.S. Senate
Washington, D.C. 20510

Dear Chairman Inhofe:

The Portland Cement Association (PCA) appreciates the leadership you and your colleagues on the Senate Committee on the Environment and Public Works are demonstrating in highlighting the challenges posed by revisions to the Environmental Protection Agency's (EPA) National Ambient Air Quality Standards (NAAQS) for ground-level ozone.

PCA members represent approximately 80% of U.S. cement-making capacity, operating cement manufacturing plants and distribution centers in nearly every Congressional district. Plant operations will be significantly impacted by the EPA proposal.

The standard currently in force (2008) has not yet been fully implemented. It is still working, continuing to drive improved air quality. According to EPA's own data, ozone concentrations nationwide have steadily improved, with a significant decline since 2002.

A more stringent NAAQS for ozone at this point will not improve air quality any more quickly. It will only result in more "non-attainment" designations, with additional hurdles and costs imposed on manufacturers. The National Association of Manufacturers estimates that the EPA proposal would cost the U.S. economy $140 billion annually. PCA estimates that additional compliance costs at cement plants could lead to closure of up to 35% of U.S. cement manufacturing capacity and result in an additional $700 million hit to the broader construction industry. This is simply the wrong type of regulation at the wrong time.

The cement and concrete industries applaud your Committee's leadership in promoting policies that improve the environment while protecting American jobs. If you have any questions or would like additional information, please contact me.

Very truly yours,

James G. Toscas
President and Chief Executive Officer

Copy: Members of the Committee on the Environment and Public Works

Statement of the American Chemistry Council on EPA's Proposed Ozone NAAQS
Senate Committee on Environment and Public Works Hearing
"Challenges and Implications of EPA's Proposed National Ambient Air Quality Standard for Ground-Level Ozone and Legislative Hearing on"
June 3, 2015

Thank you, Chairman Inhofe, for holding such a critical hearing today, focusing on the impact and achievability of EPA's proposed ozone standards. The American Chemistry Council (ACC) is pleased to offer this statement for the record of the hearing. ACC[1] represents the leading companies engaged in the business of chemistry. We apply the science of chemistry to create innovative products and services that make people's lives better, healthier, and safer. The U.S. chemical industry is a key element of the economy, providing 793,000 skilled, good-paying jobs across the country. We are among the nation's largest exporters and investors in research and development. Our advanced materials and technologies include many that help save energy and reduce greenhouse gas emissions.

ACC is opposed to EPA's proposal to lower the ozone National Ambient Air Quality Standard (NAAQS).

EPA Administrator Has Discretion to Set the Standard

In setting the 2008 ozone standard, EPA Administrator Stephen Johnson said CASAC's recommendation appeared to be based on "a mixture of scientific and policy considerations," noting that he was "in general agreement with CASAC's views concerning the interpretation of the scientific evidence. The Administrator also note[d] that *there is no bright line clearly directing the choice of level and the choice of what is appropriate is clearly a public health policy judgment entrusted to the Administrator*."[2] Given the discretion afforded him under the Clean Air Act, Administrator Johnson set the standard at 0.075 ppm.

[1] ACC members apply the science of chemistry to make innovative products and services that make people's lives better, healthier and safer. ACC is committed to improved environmental, health and safety performance through Responsible Care®, common sense advocacy designed to address major public policy issues, and health and environmental research and product testing. The business of chemistry is an $812 billion enterprise and a key element of the nation's economy. It is the nation's largest exporter, accounting for twelve percent of all U.S. exports. Chemistry companies are among the largest investors in research and development. Safety and security have always been primary concerns of ACC members, and they have intensified their efforts, working closely with government agencies to improve security and to defend against any threat to the nation's critical infrastructure.

[2] pp. 16482-83, *Federal Register Volume 73, Number 60, March 27, 2008, National Ambient Air Quality Standards for Ozone, Final Rule*, emphasis added

The Health Science Evidence Does Not Support Lowering the Standard

ACC believes in appropriately peer-reviewed sound science. We do not believe the scientific evidence supports a lowering of the standard. EPA's existing ozone standard of 0.075 ppm, through a series of significant emission control programs, will continue to provide ample protection of public health. Moreover, there are numerous questions about the science being used to justify a lower standard: Some recent health studies contain inconsistent or conflicting findings, while others are re-analyses of previous studies that rely on outdated information.

U.S. Air Quality Continues to Improve

The nation's air quality has significantly improved and continues to improve with new voluntary and regulatory programs already in place or being implemented. According to EPA, total emissions of the six principal criteria air pollutants fell by 62 percent between 1980 and 2013, with ozone concentrations falling by 33 percent over the same time frame.

Voluntary and regulatory emission reduction programs will continue to yield benefits for decades to come. Over the next twenty years, cleaner fuel rules and utility regulations are expected to produce large air quality improvements. Current emission reduction programs will continue to reduce ozone concentrations through 2030.

ACC Member Company Contributions to Cleaner Air

ACC members understand and value the importance of clean air, and we support protecting public health and the environment. Our commitment is reflected in our significant and continued progress in reducing emissions. Since 1990, ACC member companies and the broader business of chemistry have reduced nitrogen oxides by 70%, sulfur dioxide by 58%, volatile organic compounds by 87% and fine particulate emissions by 65%. These results are due to a combination of voluntary member company initiatives, such as Responsible Care®, and regulatory programs.

ACC member companies make a wide range of solutions, such as plastics and insulation products, which help save energy in vehicles, homes, and businesses. The energy savings result in lower emissions of greenhouse gases and ozone precursors such as NO_x.

A Lower Standard Could Stall Manufacturing Growth

The shale gas revolution is driving a historic expansion in American chemistry. More than $142 billion in new chemical industry investment is planned or underway, thanks to plentiful and affordable supplies of natural gas and natural gas liquids. Fully 60 percent is foreign direct

investment. The 231 projects – new plants, expansions, and factory restarts – could create and support over 650,000 jobs by 2023. They will also generate increased GDP, tax revenue, and access to innovative new products.

A lower ozone standard could impede manufacturing growth in many areas of the country. On November 26, 2014, EPA proposed a more stringent standard of between 0.065 and 0.070 ppm. Much of the U.S. will be unable to meet a lower NAAQS. Manufacturing growth could slow or stop in states that find themselves in non-compliance, since facilities located in "nonattainment" areas face burdensome and extensive regulatory requirements. These rules make investment projects far more costly and complex.

To safeguard the significant planned investment in chemical manufacturing in the United States, and to ensure that the industry can create the jobs and products that foster economic growth, we need regulatory policies that do not impose unnecessary barriers to growth in our sector. EPA's anticipated proposal to lower the ozone NAAQS will impose significant burdens and hurdles on new investment.

Communities and Industry in "Nonattainment" Areas Face Significant Challenges

Currently, 222 counties covering a population of over 120 million people are classified in nonattainment with the 0.075 ppm standard. If EPA revises the standard to the lower end of the proposed range, we estimate that more than 2000 counties – urban and rural – would be in nonattainment, based on the 2011-2013 design values and modeling.

Communities designated "nonattainment" have a hard time attracting and retaining industry and sustaining economic activity and growth. Industry located in a nonattainment area face increased operating costs, permitting delays, and restrictions on building or expanding facilities. These challenges increase the "time to market" for innovative new products.

New facilities and expansions in nonattainment areas cannot proceed until emissions are offset. Offsets are not always readily available, and increase in price as they become scarce. For example, offset prices in the Houston-Galveston-Brazoria nonattainment area are more than $200,000/ton for NOx and $300,000/ton for VOC. Offset prices in southern California nonattainment areas are approaching $125,000/ton of NOx.

Even facilities that are not expanding can experience the burdens of operating in a nonattainment area. For example, in the Houston area, which is in nonattainment with the current standard, existing facilities are subject to additional controls under the Highly Reactive VOC (HRVOC) rule. Combustion units, such as boilers and ethylene crackers, must install costly SCRs and low-NOx burners. They may also lose federal highway and transit funding, as federal projects must

conform with State Implementation Plans (SIPs) in order to proceed. Furthermore, facilities located in counties designated as in "severe" or "extreme" nonattainment will face significant Section 185 fees for emissions in their area, even though many of these facilities have already spent many millions of dollars to reduce emissions.

A Better Path Forward

The current ozone standard of 0.075 ppm is the most stringent ever and has not been fully implemented across the United States. EPA and states should focus on fully implementing and attaining the existing standard before contemplating a lower standard – an approach that will continue to provide necessary health protection. As the science develops further, EPA will have the opportunity to determine whether any additional actions might be warranted in the future.

Congress also can play a role in forcing EPA to address implementation concerns with a lower ozone NAAQS. Bills S. 638, Commonsense Legislative Exceptional Events Reforms Act of 2015; S. 751, Clean Air, Strong Economies Act; and S. 640, the ORDEAL Act of 2015, all focus on addressing concerns with the current process of setting a NAAQS in the United States, and should be looked at as potential solutions to the upcoming ozone NAAQS.

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Danger in the Air

From rural Utah to Dallas and L.A.: Smog besets communities across U.S.

As EPA looks to tighten ozone standard, battle lines form over cost, health benefits

By Jamie Smith Hopkins email 5:00 am, March 12, 2015 Updated: 8:59 am, March 18, 2015

Syd Sattler, 19, holds up an anti-smog sign at a Salt Lake City rally for clean air in January. Ozone, the lung-damaging gas in smog, hits levels deemed too high in communities across the country — including a rural part of Utah. Jamie Smith Hopkins/Center for Public Integrity

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RANDLETT, Utah — Mountains sweep up from a landscape of red dirt and brown scrub. Pump jacks nod, pulling oil and gas from the ground. Deer dart toward a river. Trucks swish by, a few at a time, past the Ute Indian reservation.

It's an unlikely place to find ozone levels that sometimes rival those of smoggy Los Angeles.

Too-high ozone, it turns out, bedevils communities across the United States. It's not limited to the urban

Key findings:

It's not just L.A.: From big cities to suburbs to rural Utah, many places fail EPA's smog standards.

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The EPA places the cost of reducing lung-damaging ozone at $15 billion a year. The National Association of Manufacturers says $140 billion.

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centers that have struggled for decades to reduce the lung-damaging air pollutant, created when nitrogen oxides and volatile organic compounds bake in the sun.

There's ozone above the federal standard in smaller cities such as Cincinnati, Ohio, and Middletown, Connecticut. Because the stuff doesn't stay put, it's often worse in suburbs than car-clogged downtowns. And it's over the threshold in parts of the Mountain West, exactly where you'd expect the air would be cleanest.

But even that fails to capture the full picture. For almost a decade, the U.S. Environmental Protection Agency's independent scientific advisory committee of researchers and doctors has said the nation's ozone standard is too lenient, a point of view backed by the American Academy of Pediatrics and other health groups.

Americans get no air-quality warnings about a host of bad-ozone days.

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EPA's science advisers have said since '06 that U.S. ozone standards don't protect health.

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Current U.S. smog standard, set in 2008, is the first one that's stricter than the original limit set in 1971.

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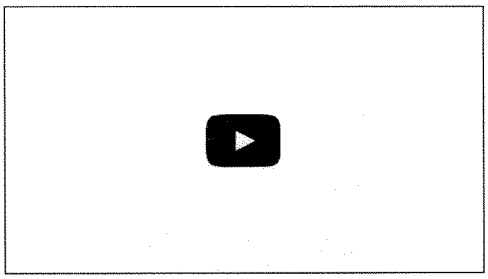
That means people in a wide swath of the country breathe air that doesn't violate any rules — and thus doesn't trigger any warnings — and yet, according to research, is unhealthy. That's particularly true for the young, the elderly, people with lung diseases and outdoor workers. As ozone rises, even to levels below the EPA's 75-parts-per-billion threshold, studies have found increased asthma attacks and respiratory-driven hospital visits. There's also growing evidence that ozone can affect the heart, increasing the risk of cardiac arrest.

Winter Ozone in Utah's Uinta Basin



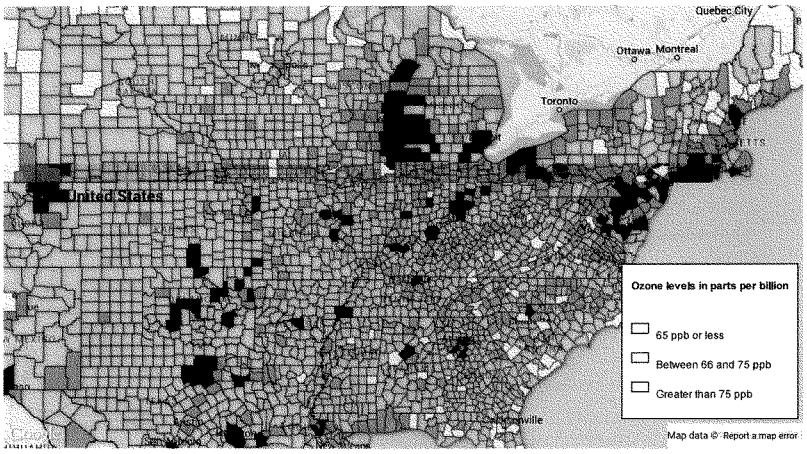
"The science is showing how much more harmful ozone is than we previously thought," said Janice Nolen, assistant vice president of national policy for the American Lung Association, which sued the EPA to press the agency to act.

The EPA's advisory committee has said since 2006 that the standard should be between 60 and 70 ppb. In November, the EPA proposed a range of 65 to 70 ppb, saying it would save both medical costs and lives.

The geography of smog

The U.S. Environmental Protection Agency wants to tighten its standard for ozone, the lung-damaging gas in smog. It's considering a range of 65 to 70 parts per billion, any part of which would put a significantly broader swath of the country out of compliance, requiring government agencies and industry in those places to step up pollution-control efforts. This map shows which counties measured ozone levels below and above the proposed limit, including which areas topped the current

75 ppb standard, during 2011-2013. Click on counties for more information.



Source: U.S. Environmental Protection Agency

"There are millions of Americans who suffer from asthma, or their kids do," Janet McCabe, acting assistant administrator for the EPA's Office of Air and Radiation, said in an interview. "The American people are entitled to know whether their health is at risk based on the amount of ozone in the air."

A final rule is due by October 1.

The EPA's proposal turned a years-long cold war into a hot one. Tightening the rule by just 5 ppb could cost certain industries billions of dollars a year to better rein in ozone-causing emissions.

Those pollutants come from a variety of activities that make modern society tick. Car tailpipes. Power plants. Factories. Refineries. Natural gas wells. Paints and other consumer products. Whenever the EPA proposes new ozone standards, the pushback is rapid.

The National Association of Manufacturers said the rule would be "the most expensive regulation ever imposed on the American public." A U.S. Chamber of Commerce official testified in January that the proposal could cause "potentially devastating economic and employment impacts." The American Petroleum Institute insisted that the current standards already protect public health.

Businesses haven't made the same arguments in Canada, which has a voluntary 63-ppb standard. Much of that country has reduced ozone levels below the range under consideration here. But the statements from American industry — especially predictions of economic devastation — echo every U.S. ozone battle for the past four decades.

Not every old argument has been resurrected. No one seems to be seriously suggesting this time, as the American Petroleum Institute did in the 1970s, that the major polluters are trees.

But now, with ozone well below where it was in those years, trade groups and some states say future reductions will be far more difficult.

"What we're bumping up to in the West especially is ... we get things in from California, we get a lot of tropospheric ozone coming in from Asia, and so if EPA puts that ozone level down towards 60 ppb, we could wipe out all human activity and we still would have pretty high ozone," said Kathleen Sgamma, vice president of government and public affairs with the Western Energy Alliance, an oil-and-gas industry group.

McCabe said the EPA doesn't ask high-ozone communities to stop growing and will work with areas that have unique challenges. The National Association of Clean Air Agencies, which represents the officials in 41 states and 116 localities who handle ozone efforts, endorsed a tighter standard this year.

But the last time the EPA considered taking this action, it was staved off by intense lobbying. There's plenty of that going around again.

Fourteen of the companies and groups that consistently lobbied Congress, the EPA or both on ozone in the past two years have publicly stated their positions on a tighter standard. Only two — the lung association and the League of Conservation Voters — are for it. The rest — business interests, largely trade groups representing manufacturers and energy firms — are against it, according to a Center for Public Integrity analysis of federal disclosure data.

"We absolutely at this point are urging the EPA and anybody else who will listen to us to keep the current standard," said Ross Eisenberg, vice president of energy and resources policy at the National Association of Manufacturers, which hears about regulatory delays and high expenses from members in ozone "nonattainment" areas. "At a time when ... we're having a manufacturing comeback largely because of energy, this just seems like the wrong way to go."

A stricter standard could affect almost every state. The EPA says 358 counties had ozone levels in recent years that would violate a 70-ppb rule, about two-thirds of which are out of attainment with the current standard. At 65 ppb, the number rises to 558 counties.

Under the Clean Air Act, the EPA can freeze federal highway funds and impose other sanctions on areas that exceed health standards. But regions need only to submit plans and take steps toward achieving goals. McCabe said she expects many communities will be able to push their ozone below the threshold just by reaping the benefits of already enacted federal rules. A major one is a 2017 change in fuel standards.

"As my lungs got worse, the high ozone would affect them more and more. It

would be like going outside on a subzero day — my lungs would just freeze up."

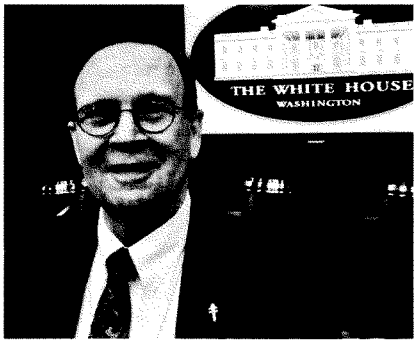
- Daniel M. Dolan-Laughlin, a retired railroad executive

Ozone isn't something most people worry about. It's confusing, for one. Up in the stratosphere, ozone is good, creating a layer that protects against ultraviolet radiation. It's the stuff down at breathing level that's bad, irritating the lungs and — research suggests — inflaming the blood vessels.

On top of that, it's invisible. Only when it mixes with particle pollution does it pop into view as smog and offer a visual cue that something's wrong with the air.

But Daniel M. Dolan-Laughlin pays close attention to ozone levels near him. He's had to ever since chronic obstructive pulmonary disease began making everyday activities difficult in the 1990s.

"As my lungs got worse, the high ozone would affect them more and more," said Dolan-Laughlin, a retired railroad executive who lives in a suburb of Chicago.



Daniel M. Dolan-Laughlin, a Chicago-area resident who has testified in favor of clean-air regulations, said high ozone made it increasingly hard for him to breathe as his lung disease worsened. He received a double lung transplant in 2011. Even now, he wears a mask if he must go out when ozone levels climb. Courtesy of the American Lung Association

His disease made it increasingly hard to breathe, forcing him into early retirement in 1994 and later onto oxygen from a tank. Even with the oxygen, he couldn't go outside when ozone levels rose.

"It would be like going outside on a subzero day," he said. "My lungs would just freeze up."

Dolan-Laughlin received a life-saving double lung transplant in 2011. Now he can walk up stairs without pausing every few steps to gasp. He's climbed several mountains, in fact. But he won't go out on bad ozone days without a mask.

Dolan-Laughlin, who has testified at EPA hearings in favor of a variety of clean-air rules, hopes the agency will tighten its ozone standard.

"I'm a strident capitalist," he said, "but I'm also an environmentalist just out of common sense."

Dianne LaFaver, a teacher who lives in the Dallas-Fort Worth metroplex, an ozone-challenged region, also wants a tighter standard.

LaFaver's daughter, 22-year-old Laura Day, has asthma. Before Day left the area for college, her mother twice had to rush her to the emergency room on

high-ozone days.

"She hadn't been exercising, which was the normal trigger," LaFaver said. "She hadn't been stressing herself. We were just in the car. ... At the emergency room, they were saying they were having lots of visits."

Dr. Alfred Munzer, a lung-disease specialist who retired last year from Washington Adventist Hospital in Takoma Park, Maryland, saw 40 years' worth of patients affected by ozone. There were the asthma attacks triggered by it — ozone causes spasms in the respiratory tract — and the infections that cropped up a day or two later because the pollutant interferes with the lungs' ability to cleanse themselves, he said.

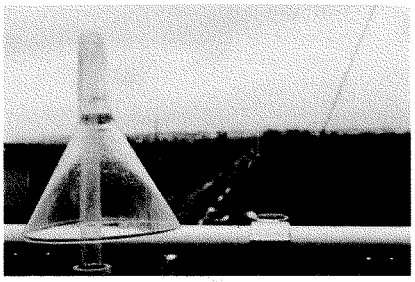
"There really is, as far as I know, no really safe level of ozone," said Munzer, a former president of the American Lung Association.

The American Academy of Pediatrics has warned that children are more susceptible to ozone's effects because their bodies are still developing. The EPA's proposal, the group said in November, is "long overdue."

The politics of ozone

That's also the message coming from the EPA's Clean Air Scientific Advisory Committee Ozone Review Panel, whose 20 scientists and doctors are largely drawn from universities.

Last year panel members unanimously recommended tightening the ozone standard. While they said a range of 60 to 70 ppb would be better than the current threshold, they warned that the upper end might not "protect public health with an adequate margin of safety."



Pumps suck in air through this funnel atop an air-monitoring station in Roosevelt, Utah, to test for ozone levels. Jamie Smith Hopkins/Center for Public Integrity

The panel unanimously recommended the same range in 2006, under President George W. Bush. And in 2008 and 2011, for good measure.

The panel considered the science. Out in the wider world, politics took over.

Though the EPA can consider only public health when it sets the standard, not factors such as cost, the agency disregarded its advisory committee's recommendation in 2008 and lowered the threshold from 80 ppb only down to 75. The EPA reconsidered the matter after Barack Obama was elected president. But following industry lobbying, he blocked the agency from setting a lower level in 2011.

Obama said he didn't support a change at that time, given that the standard was due for reconsideration in 2013. And he emphasized "the importance of reducing regulatory burdens and regulatory uncertainty, particularly as our economy continues to recover."

Then and now, business groups and key Republicans in Congress have contended that a lower standard would be too costly and difficult.

"EPA's proposal ... will lower our nation's economic competitiveness and stifle job creation for decades," U.S. Sen. James M. Inhofe said in a statement in November. Now chairman of the Senate Environment and Public Works Committee, he plans to hold hearings about the standard.

Air-quality officials in some states see a tighter standard differently — as a welcome relief.

Maryland is one example. Despite its ozone controls, the state had some of the highest concentrations in the East from 2011 to 2013, according to the most recent data from the EPA.

That's because on almost all bad ozone days, the air already violates current standards as it crosses into Maryland, said Tad Aburn, director of the state's Air and Radiation Management Administration. He wants to see upwind states reduce their smog, so he favors a stricter standard. "It's really a regional problem," he said.

An unexpected location

Air-quality field tech Mike Natchees traveled a wide-open stretch of road one drizzly January morning, past sagebrush, pump jacks and a gas flare burning like an oversized birthday candle. His goal: a shed-like structure atop an unpaved hill. Inside, devices measure how much ozone is in the air.

A tanker winds around a road on land overseen by the federal Bureau of Land Management. Oil and petroleum-waste trucks are a common sight in the Uinta Basin, but the agency says it's taking many steps to reduce traffic and other oil-related emissions. Jamie Smith Hopkins/Center for Public Integrity

That air is in Ouray, Utah, part of the Ute tribe's 4.5-million-acre reservation. Cattle and wild horses probably outnumber the cars going by.

"Occasionally we see antelope out here," said Preston McDonald, the tribe's head of air-quality data analysis.

The reservation, along with wide swaths of federal land and small towns, makes up the Uinta Basin in northeast Utah. The mountain-encircled region sits far from urban areas. Population in the largest city, Vernal, barely tops 10,000.

Yet the region has an ozone problem. Not in the summer, but in the dead of winter.

Ozone has to be cooked into life by sunlight, which is usually too weak in the winter to produce much photochemistry. But reflection off snow gives the basin's sunlight an extra kick. Snow cover also causes temperature inversions that keep polluted air from rising out of the basin.

In such conditions, volatile organic compounds from thousands of oil and gas sites across this region drive ozone way up. In 2013, an inversion-heavy year, the eight-hour average ozone level in Uintah County — spelled with an "h," unlike the basin — exceeded the standard on 54 days. Concentrations spiked as high as 142 ppb, according to EPA figures. That's "code purple," the worst category for air pollution warnings.

Los Angeles County in California, by contrast, had 59 days that exceeded the standard that year, none of which were code purple.

The problem came to light in 2009 after a settlement between the EPA and an energy company operating on Ute land brought air monitors to the area, including the one in Ouray. The state kicked in money to study the problem. So did the Western Energy Alliance, federal agencies and other groups.

The studies determined that the oil and gas industry's volatile organic compounds, or VOCs, are the big contributor. Annual emissions in the basin are on par with the VOCs spewed from 100 million vehicles driven thousands of miles each, according to a University of Colorado Boulder study.

"What might need to be done ... and whether it would put the stranglehold on our oil and gas industry and shut it down, or whether just a little bit can make a big difference, are questions that are open still," said Seth Lyman, a basin ozone researcher who heads Utah State University's Bingham Entrepreneurship and Energy Research Center.

The state of Utah requires stricter emission controls at new oil and gas sites than it did several years ago and passed regulations last fall to phase in retrofits of older, leaky equipment.

"VOC emissions should be reduced pretty dramatically ... as things tighten up," said Brock LeBaron, the state's deputy director of air quality.

The environmental group WildEarth Guardians argues that those efforts aren't sufficient, given the problem's scale, and contends that all levels of government are falling down on the job in the basin. Many wells are on

federal land.

The EPA has also declined to designate the area in violation of current ozone rules. (Its decision hinges on the fact that much of the past ozone data comes from monitors run by companies, not the government.) WildEarth Guardians sued over the matter in 2012 and awaits a ruling.

Seth Lyman, executive director of Utah State University's Bingham Entrepreneurship and Energy Research Center, is a key ozone researcher in the Uinta Basin. He's based in Vernal. Jamie Smith Hopkins/ Center for Public Integrity

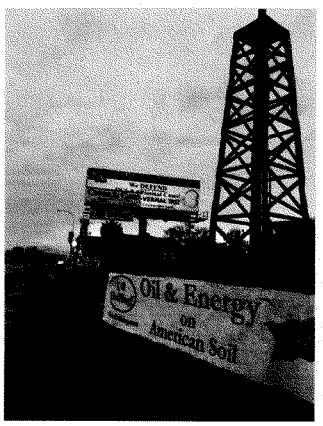
Several weeks ago, WildEarth's Jeremy Nichols drove from Vernal to a wildlife refuge in Randlett, pointing out pump jacks and the tanker trucks that continually travel to and from the basin.

"It's dangerous, the scale and pace of development," said Nichols, the group's climate and energy program director. "You're seeing that with the air-quality issues. I mean, *Vernal* has a big-city ozone problem?"

It's a place that in some ways looks as small-town as it is. A bubblegum-pink fiberglass brontosaurus grins at motorists above Vernal's welcome sign, one of many local nods to the fossil-studded Dinosaur National Monument nearby.

But it's also a town with 19 hotels and motels. Its glassy library and other high-end public buildings are different sorts of monuments than the pink dinosaur, ones that speak to years of oil-related taxes and royalties.

The owner of a juice and smoothie bar put up a miniature oil rig outside his business with a sign that seems to sum up the local sentiment: "I (heart) Drilling!"



Oil and gas is the biggest employer in this county, according to state data. The industry directly accounts for about a fifth of the jobs here, and Uintah County Commission Chairman Michael McKee says it rises to half if you add in the ripple effect.

"You take any community, state or region with those dynamics, it's important that we protect our jobs," he said. "It's also important that we have clean air and clean water and a good environment."

Still, McKee sees a tighter ozone standard from the perspective of a job threat, one that looms as the region heads into an oil bust. Plunging prices prompted layoffs here and the fear of more.

McKee said officials are working on the ozone problem, but he doesn't see how the basin could meet a tighter

standard. While the area doesn't get inversions every winter — McKee described the air as often "pristine" — compliance is judged based on a three-year average of each year's fourth-highest daily reading. Inversion years go awfully high.

A miniature rig beside the main drag in Vernal, in Utah's Uinta Basin, stands as one business owner's thumbs-up to drilling. Jamie Smith Hopkins/Center for Public Integrity

Utah State University studied asthma-related hospital visits and didn't see an impact from the area's high-ozone days, McKee added.

Lyman, whose center wrote that study, is quick to insert a cautionary note: Unlike Atlanta, central New Jersey and other urban areas where studies have found links, the basin has a tiny population. That makes it difficult, if not impossible, to jump the bar of statistical significance.

"We think there certainly is an impact, but exactly how it compares to summertime urban ozone is probably never going to be found out because there's just not enough people here," Lyman said.

Ozone, at least, is quiescent this winter. Warm temperatures have kept snow from piling up, warding off an inversion.

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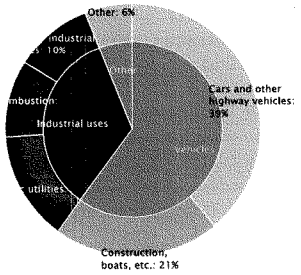
But the VOCs are still here, millions of cars' worth, ready to react when conditions are right. Stephanie Howard and Megan Crandall, both with the federal Bureau of Land Management in Utah, drove through the Pariette Wetlands area in the basin on a recent afternoon, explaining what the agency is doing to reduce emissions from ubiquitous oil and gas equipment. Steps include eliminating VOC-heavy evaporation ponds and pressing operators to replace leaky valves.

At the same time, the bureau is reviewing whether to allow more than 8,500 additional oil and gas wells in the region, double the number now under its jurisdiction. Leonard Herr, an air resources specialist for the Bureau of Land Management in Utah, knows that poses a tough question: Can total emissions be reined even as sources multiply?

He's optimistic about that. And he doesn't view a tighter ozone standard as a looming disaster for the basin.

"Nonattainment and failure to meet the

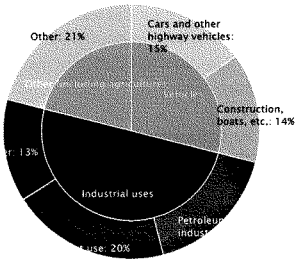
U.S. manmade nitrogen oxides emissions



Source: Center for Public Integrity analysis of U.S. Environmental Protection Agency estimates.

U.S. manmade volatile organic compound emissions

standards after that isn't the end of the world," he said. "Just look at L.A. It's been nonattainment almost my whole adult life, and it's not a barren wasteland of economic development."



Source: Center for Public Integrity analysis of U.S. Environmental Protection Agency estimates.

The cost debate

When the EPA sets its ozone standard, the Supreme Court ruled in 2001, the Clean Air Act mandates that only one factor be weighed: what the best available science shows people can safely breathe.

Some members of Congress want to change that. Among the flurry of ozone bills submitted last year was the industry-supported "Clean Air, Strong Economies Act," which would have required the agency to consider cost. It also would have barred a new standard from taking effect until 85 percent of counties failing the old standard fixed their air.

The companion bills, sponsored by U.S. Sen. John Thune, R-S.D., in the Senate and U.S. Rep. Pete Olson, R-Texas, in the House, didn't get put to a vote last year. The bills were referred to committees that are now both headed by Republicans opposed to tighter ozone standards, which could give the measures new life if reintroduced as planned this year.

The National Association of Manufacturers' Eisenberg characterized the effort as a way to give the EPA more flexibility, though he acknowledged that the group hasn't spent much time considering how that might affect public health.

"We're certainly hoping to have that discussion," he said.

What's more evident to manufacturers is the business impact when a community tips into ozone nonattainment. They must more than offset any pollution added if they want to expand or build something new, Eisenberg said. That could mean buying pricey credits on the emissions-offset market or shutting down another pollution source, he said, so more often manufacturers simply go elsewhere.

The EPA argues that the value of its proposal outweighs the expense because medical care and missed work days from ozone-triggered health problems add up fast. The agency estimated the benefit of a 65-ppb standard at $19 billion to $38 billion a year beginning in 2025, when it expects most of the country would meet that tighter threshold, compared with an estimated $15 billion in annual costs.

Trade groups say the negative impact would be far higher. A study for the National Association of Manufacturers suggests a 65-ppb standard would cost the U.S. economy $140 billion a year. The effects would include fewer jobs,

higher electricity costs and restricted fossil-fuel production, the study says.

The Congressional Research Service weighed in last fall to declare the impact too far off to estimate. Ozone rules usually have deadlines that are years, even decades, into the future, and they often spur new, less expensive pollution technology.

"Aside from some statutorily mandated compliance measures, states — not EPA — decide what sources will be regulated and how stringent the controls will be," the nonpartisan think tank added in its issue brief. "Often, industry can choose how to comply."

Given that, the actual cost of past ozone reduction would be useful to know. But those numbers don't seem to exist, despite all the effort spent trying to estimate them in advance the past 40 years.

The EPA, working with economists, did put a price tag on the expense of reducing all the pollutants covered by the Clean Air Act. Their $22-billion-a-year tally for 1973 to 1990 was less than half the annual amount the American Petroleum Institute projected in 1979 for the cost of reducing ozone alone.

The ozone seesaw

In the history of environmental action, 1970 was a watershed year. President Richard Nixon created the EPA and — over the strenuous objections of automakers — signed the Clean Air Act into law.

"Through our years of past carelessness we incurred a debt to nature, and now that debt is being called," Nixon, a Republican, said in his 1970 State of the Union address.

The Clean Air Act prompted the first national ozone standard, set at 80 ppb the next year. Catalytic converters followed, eventually reducing vehicle pollution in a big way.

But amid the high oil prices and inflation of the later '70s, the Carter administration targeted regulations that advisors and industry argued were more cost than benefit. Carter's inflation-fighting economists questioned whether the ozone studies of the time, then less definitive, really demonstrated that the pollutant needed to be reduced as much as the standard suggested. Up it went in 1979, to 120 ppb.

Industry groups had called for the standard to be set at 160 ppb or higher. Even 120 ppb, the American Petroleum Institute argued, would prompt "extensive social and economic disruption," *The Washington Post* reported at the time.

The institute was then in the midst of an ozone lawsuit. The EPA, the trade group alleged, suppressed research showing the main source of smog was natural vegetation.

Ozone timeline

1971 **First ozone standard**
First ozone standard enacted in the U.
President Richard Nixon launches the

1975 **Auto makers take action**
Major auto manufacturers release car
substantially reduce pollution leading t

1970s **New standards face pressure**
Pressure mounts on the EPA over its E
Carter administration's inflation-fighte

1979 **EPA yields, loosens standard**
The EPA raises its ozone threshold to 1

1997 **Back to 80 ppb**
The EPA tightens the ozone threshold
barbecues and lawnmowers could foll

2001 **Supreme Court steps in**
The U.S. Supreme Court rules that, cou

Patrick R. Zimmerman wrote those EPA-funded studies, and he says the agency did drag its feet in allowing him to publish his results. Later, he realized that officials were worried someone would purposely misinterpret his findings — which is what he says the institute did.

Trees and vegetation, Zimmerman found, emit certain VOCs at such high levels that they far out-produce man-made sources in forest-heavy regions. But that doesn't mean urban smog is a tree problem, Zimmerman said — it's not. (Rarely is ozone formed without an assist from man-made pollution, the EPA says.)

Zimmerman was appalled at what happened next.

"The American Petroleum Institute ... wrote articles that they planted in all kinds of magazines and newspapers," said Zimmerman, a scientist who now runs an environmental-technology firm in South Dakota. "It must have been 100 of them. Each article was pretty much the same, and it said something like, 'Trees emit so much pollution, we can't possibly control ozone, and the standards should be higher.' "

That apparently made an impression on Ronald Reagan. While running for president, he said trees and plants were bigger polluters than cars — his so-called "killer trees" moment.

The petroleum institute didn't respond to the Center's requests for comment.

Zimmerman couldn't believe how little the actual science seemed to matter. He was glad to get out of ozone research.

"I really underestimated the importance of politics," he said.

'Dirty secret'

Outside Utah's state Capitol building in January, several thousand people pressed together, some carrying signs, some wearing gas masks. They cheered speakers railing against air pollution. They clapped as a band turned the heavy-metal anthem "We're Not Gonna Take It" into "We're Not Gonna Breathe It."

"People have just had enough," said Daniel Roper, a Salt Lake City resident who attended the rally with his 21-month-old son. "It's Salt Lake City's dirty secret. We didn't know about it when we moved here."

Salt Lake City, like the Uinta Basin, is a region with air-quality challenges — ozone in the summer and harmful particulate matter in the winter. But unlike the Uinta, there's a large contingent of residents here who loudly press officials to do more about it.

Nearly nine in 10 Utah residents view air pollution as a "serious problem,"

consider only what is safe to breathe v

2006 **EPA considers tougher standards**
With research showing harms from lo scientific advisory panel on ozone una level between 60 and 70 ppb.

2008 **New standard prompts criticism**
EPA sets the ozone standard at 75 ppb level "fails to satisfy the explicit stipulat margin of safety for all individuals."

2010 **Obama's EPA**
EPA, now under President Barack Oba

2011 **Obama intervention**
As the EPA prepares to set a tighter st changed yet because it is due to be re

2013 **Health groups sue EPA**
With no ozone reconsideration underv sue the EPA.

2014 **New standards by Oct. 2015**
After a federal judge sets deadlines fo October 2015.

driven by concerns in the Salt Lake area, according to a Colorado College poll released in February.

Rally speakers, elected officials among them, urged Utah's legislature to accelerate efforts to clean the state's air and criticized businesses that put themselves on the other side of the debate.

"Without public health, there is no prosperity," said the Rev. David Nichols of Mount Tabor Lutheran Church in Salt Lake City, one of the speakers.

Cherise Udell, a rally organizer who founded the 3,000-member Utah Moms for Clean Air, hates the jobs-vs.-air argument with a passion. She has a different way of looking at clean-air standards: Who should pay for pollution?

Once, she says, everybody threw their waste into the streets. Then it became clear how unsanitary that was, and people had to shell out to get their trash hauled away.

She contends that some businesses are still dumping their garbage into the community by polluting the air — making other people pay for it in medical bills and worse health.

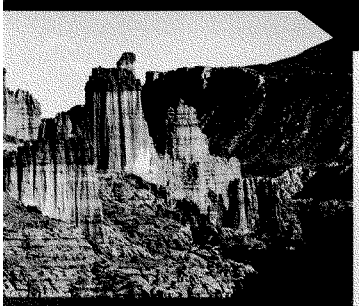
"That's completely and utterly unfair," Udell said. "If your neighbor was doing that, you'd be outraged."

Maryam Jameel and Alexander Cohen of the Center for Public Integrity contributed to this article. A version of this story also appeared on National Geographic's site.

More stories about

Environment, United States Environmental Protection Agency, Air pollution, Clean Air Act, Pollution, Pollutants, Smog, Volatile organic compound, Tropospheric ozone, Ozone, Ozone depletion, Building biology, Environmental Protection Agency

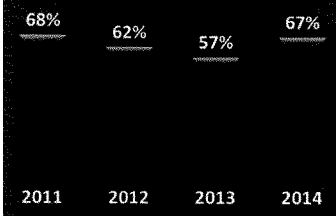
UTAH



Beehive State voters continue to worry about air quality, oppose river diversions as a solution to water woes, and demonstrate a strong connection to public lands and candidates that support them.

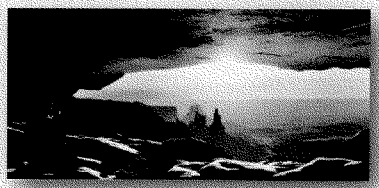
Utah voters stand out from the rest of the Western region due to their significant and sustained concern about air quality. Voters in Utah have consistently stated that "air pollution and smog" are extremely or very serious problems facing their state, with two-thirds (67%) today qualifying it as such, and virtually everyone classifying it as at least a somewhat serious problem (95%). This stands in stark contrast to the perceptions of the rest of the region (32% extremely or very serious problem region-wide).

Smog and Air Pollution Trend



Consistently throughout the data, Utah voters demonstrate their strong connection to public lands…

- They are the most likely to say that the closure of public lands during the federal shutdown hurt small businesses and the economy of communities near public lands (89% agree, only 8% disagree).
- One-in-three (33%) say the closures of public lands left them "annoyed" and another quarter (24%) were outright "angry."
- 96% of voters report having visited public lands in the last year.
- Two-thirds (66%) say they are more likely to vote for a Congressional candidate who supports protection of public lands.
- Conversely, 63% say they are less likely to vote for a candidate who proposes the sale of federal lands.



Voters in Utah have the most positive reaction to the use of Master Leasing Plans by the Bureau of Land Management of any state.

- Two-thirds (67%) register their support after hearing a brief explanation of the concept, and only 20% oppose it. These views remain solid after voters hear a pro and con discussion of the issue as well.

Master Leasing Plan Views By State

Those who support master leasing plans say that some places are appropriate for drilling, but on some public lands drilling could negatively affect our rivers, wildlife, or opportunities for hunting, fishing, and outdoor recreation. These plans will resolve conflicts in advance so that wildlife habitats, air quality and water quality are protected, and leasing can move forward in appropriate areas with fewer delays.	60%
Those who oppose master leasing plans say that the government already takes years planning for whether or not oil and gas drilling can occur in specific sites. Master leasing plans are yet another layer of red tape that will slow down responsible energy production on public lands, making it take even longer for oil and gas companies to develop our country's energy resources.	28%

The vast majority reject river diversions as a way to deal with water shortage issues in Utah.

- 81% say that low levels of water in rivers is a serious problem facing the state – the only state in the region to register more concern today than last year.
- When provided with two paths that state resource officials could take in dealing with water shortage problems, Utah voters strongly prefer a conservation-based approach over diversions of river water, much as those in neighboring states facing the same issue.

	Colorado	Utah	Wyoming
Using our current water supply more wisely, by encouraging more water conservation, reducing use, and increasing recycling of water	78%	76%	75%
Diverting more water from rivers in less populated areas of the state to communities where more people live	14%	12%	13%

PUBLIC OPINION STRATEGIES

THE COLORADO COLLEGE STATE OF THE ROCKIES PROJECT
Conservation in the West Poll

Fairbank, Maslin, Maullin, Metz & Associates
FM3

UtahStateUniversity
BINGHAM ENTREPRENEURSHIP & ENERGY RESEARCH CENTER

Background Ozone

Ozone exists in the atmosphere even in the absence of significant, local, human-caused emissions of NOx and VOC. The term "background ozone" has been used in many contexts, but it is defined here as ozone due to (1) human-caused emissions transported from outside the United States and (2) natural emissions. In other words, background ozone is ozone that is beyond the ability of regulators to control.

Background ozone is higher in higher elevation areas like Utah's Uintah Basin. EPA estimates that average background ozone in the intermountain West is between 40 and 50 ppb during spring and summer (Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards, EPA-452/R-14-006, 2014). The amount of background ozone varies from day to day, however, and can reach 65 ppb at remote locations in the West (Emery et al., Atmos. Environ. 2012, 47, 206-217).

Background ozone in the Western U.S. is increasing every year due to increasing emissions in Asia that are transported to the North American continent (Cooper et al., Nature 2010, 463, 344-348). Thus, over time the ozone standard will become increasingly difficult for western states to meet. In rural areas of high-elevation states, the vast majority of ozone on a typical day is due to background ozone (Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards, EPA-452/R-14-006, 2014).

Many remote, high-elevation locations in the West experience occasional exceedances of EPA's current ozone standard of 75 ppb. EPA proposes to lower the ozone standard to somewhere between 65 and 70 ppb. Many western locations, even remote sites without significant local emissions of NOx and VOC, regularly have ozone exceeding 65 and 70 ppb and likely will not be in attainment of a 65-70 ppb standard (see Jaffe, Environ. Sci. Technol. 2011, 45, 432–438). Most of the ozone in these exceedance events at remote western sites is due to background ozone, but some is likely also due to emissions from within the United States but outside of the region.

The Uintah Basin has had ozone exceedances during some winters when extensive snow cover and high barometric pressure lead to multi-day temperature inversions that trap pollutants close to the ground. Outside of multi-day winter inversion episodes, ozone in the Uintah Basin has been similar to that at remote Western national parks. The table below compares Uintah Basin ozone during 2012, a year with no multi-day winter inversion episodes, with ozone monitoring stations at national parks and monuments in the intermountain West.

Annual average ozone and number of exceedances of the current and proposed ozone standards at several Uintah Basin locations and at several National Parks and Monuments in the western U.S. Uintah Basin data are for 2012, a year without high wintertime ozone. National Park and Monument data were obtained from Jaffe, Environ. Sci. Technol. 2011, 45, 432–438.

Site	Elevation	Annual Avg. 4th-high 8-hr Ozone (ppb)	Annual Exceedances of 75 ppb standard	Annual Exceedances of 70 ppb standard	Annual Exceedances of 65 ppb standard
UINTAH BASIN SITES (2012)					
Ouray	1464	49.3	1	2	17

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Red Wash	1689	47.5	0	0	6
Vernal	1606	45.7	0	0	3
Roosevelt	1587	50.3	0	1	11
Rangely	1648	46.6	0	2	11
U.B. Site Average	**1599**	**47.9**	**0.2**	**1.0**	**9.6**
REMOTE WESTERN SITES (1995-2009 AVERAGE)					
Canyonlands N.P.	1809	50.5	0.7	4.8	19.9
Chiricahua N.M	1570	49.5	0.4	3.2	12.6
Big Bend N.P.	1052	43.7	0.1	1.1	4.0
Great Basin N.P.	2060	48.8	1.7	6.8	17.1
Remote Site Average	**1623**	**48.1**	**0.7**	**4.0**	**13.4**

Since background ozone levels in the high elevation West are very close to the current EPA ozone standard, it is more difficult for Western communities, including the Uintah Basin, to meet EPA standards. As the ozone standard decreases and the background level increases, it may become impossible for these communities, including the Uintah Basin, to be in attainment of the standard. EPA's decision to lower the ozone standard to near-background levels will lead to regulatory and economic disadvantages for Western communities, including Utah's Uintah Basin.