



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION



Bureau of Air Quality

Air Quality A Perspective

**Small Business Compliance Advisory
Committee**

July 22, 2020

Harrisburg, PA

Tom Wolf, Governor

Patrick McDonnell, Secretary

Agenda

- Perception of our Air
- Historical Emissions Trends
- Ozone Design Values
- Fine Particulate Matter (PM_{2.5}) Design Values
 - Annual
 - Daily
- Sulfur Dioxide (SO₂) Design Values
- Challenges
- EPA's View
- The AQI
- Then and Now

Corner of 5th and Liberty circa 1940



Corner of Liberty and Fifth Avenue (Archives Services Center, U. of Pittsburgh)

Perception

Recent Headlines-

- U.S. air quality is getting worse. Here are the costs- Oct 23, 2019
- 20 Pa. counties, including several near Clairton Coke Works, on code orange air quality alert –FEB 4, 2019
- Six mid-state counties on code orange air quality alert - FEB 5,2019
- Snow-less in Boston. From deep freeze to “air quality” alert in Philly. What is with this winter?- FEB 3, 2019
- Group says air quality in Pennsylvania is getting worse –JULY 15, 2018
- Editorial: We need to know what's in our air- APRIL 14,2019

<https://stateimpact.npr.org/pennsylvania/2019/02/04/20-pa-counties-including-several-near-clairton-coke-works-on-code-orange-air-quality-alert/>

<http://www.witf.org/news/2019/02/six-midstate-counties-on-code-orange-air-quality-alert.php>

<http://www.witf.org/news/2018/07/group-says-air-quality-in-pennsylvania-is-getting-worse.php>

<https://www.philly.com/news/philadelphia-snow-boston-raleigh-winter-new-york-blizzard-equinox-20190203.html>

https://poststar.com/opinion/editorial/editorial-we-need-to-know-what-s-in-our-air/article_e7512fd9-799a-59d0-a55c-b492d5144aeb.html

<https://www.pbs.org/newshour/nation/u-s-air-quality-is-getting-worse-here-are-the-costs>



Perception

- The 2017 American Lung Association report ranks Philadelphia #24 nationally for ozone pollution
- Pittsburgh and Lancaster are tied for #8, Philadelphia at #12, Harrisburg at #15 and Johnstown at #18 for long term fine particulate pollution
- Pittsburgh is ranked at #10, Lancaster at #13 and Harrisburg at #22 for short term fine particulate pollution

<https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/most-polluted-cities.html>

Perception

American Lung Association

- 14 counties are graded as an F, eight get a D, six get a C, six get a B and only two get an A (Bradford and Franklin) for Ozone pollution
- Four counties get an F, one gets a D, three get a C, seven get a B and nine get an A short term fine particulate pollution

<https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/states/pennsylvania/>

Perception

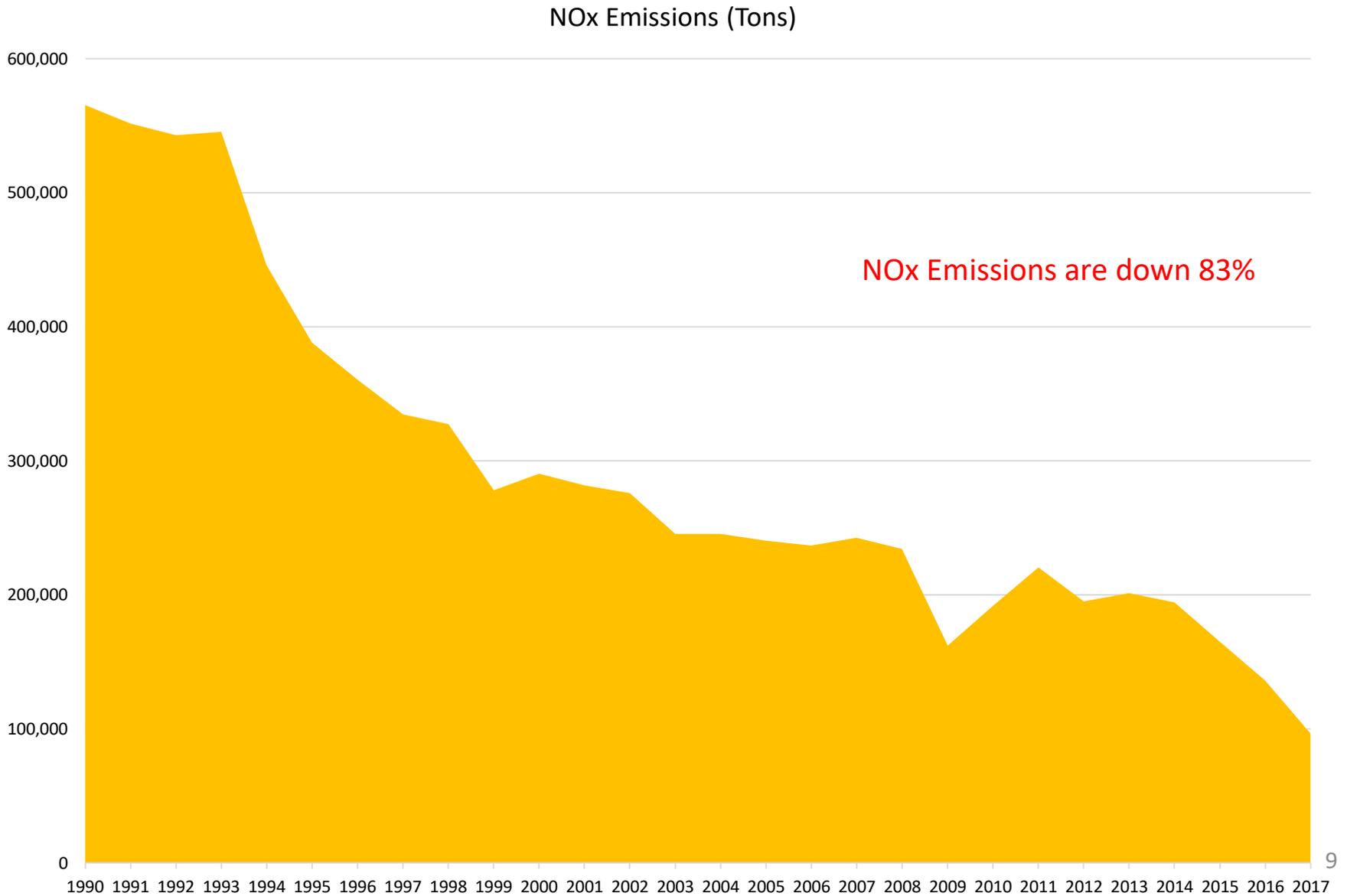
The Penn Environment Policy and Research Center issued a report in July of 2018 named Trouble in the Air -

"The Gettysburg area experienced 81 days of degraded air quality. York and Hanover experienced 128 bad air days. Harrisburg suffered 132 days of bad air,.. and finally in Lebanon and Lancaster there were over 170 bad air days. That's one out of every two days," she said.

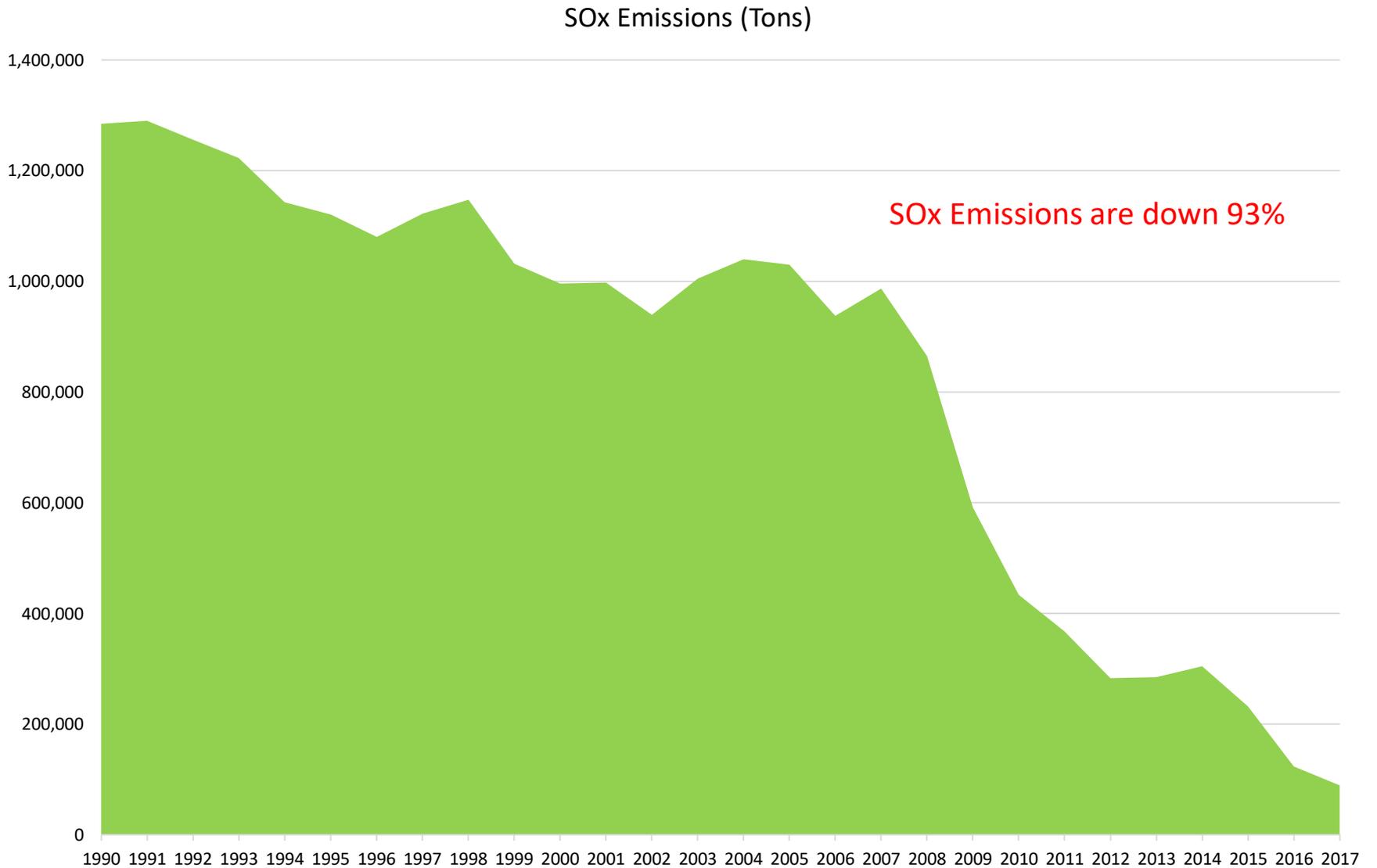
<https://pennenvironmentcenter.org/reports/pae/trouble-air>
<http://www.witf.org/news/2018/07/group-says-air-quality-in-pennsylvania-is-getting-worse.php>

Emissions Trends

NOx Emissions (Tons)

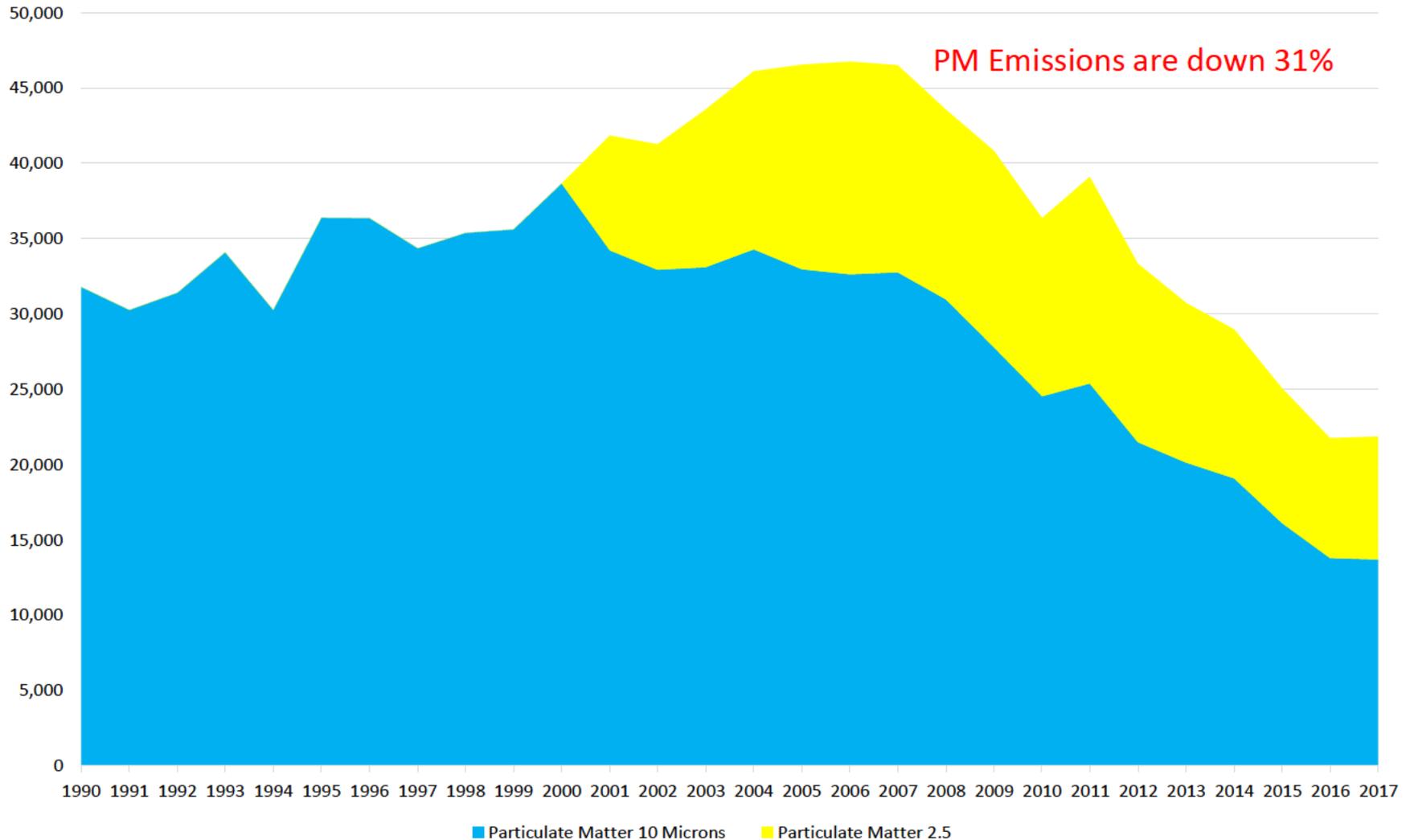


SOx Emissions (Tons)

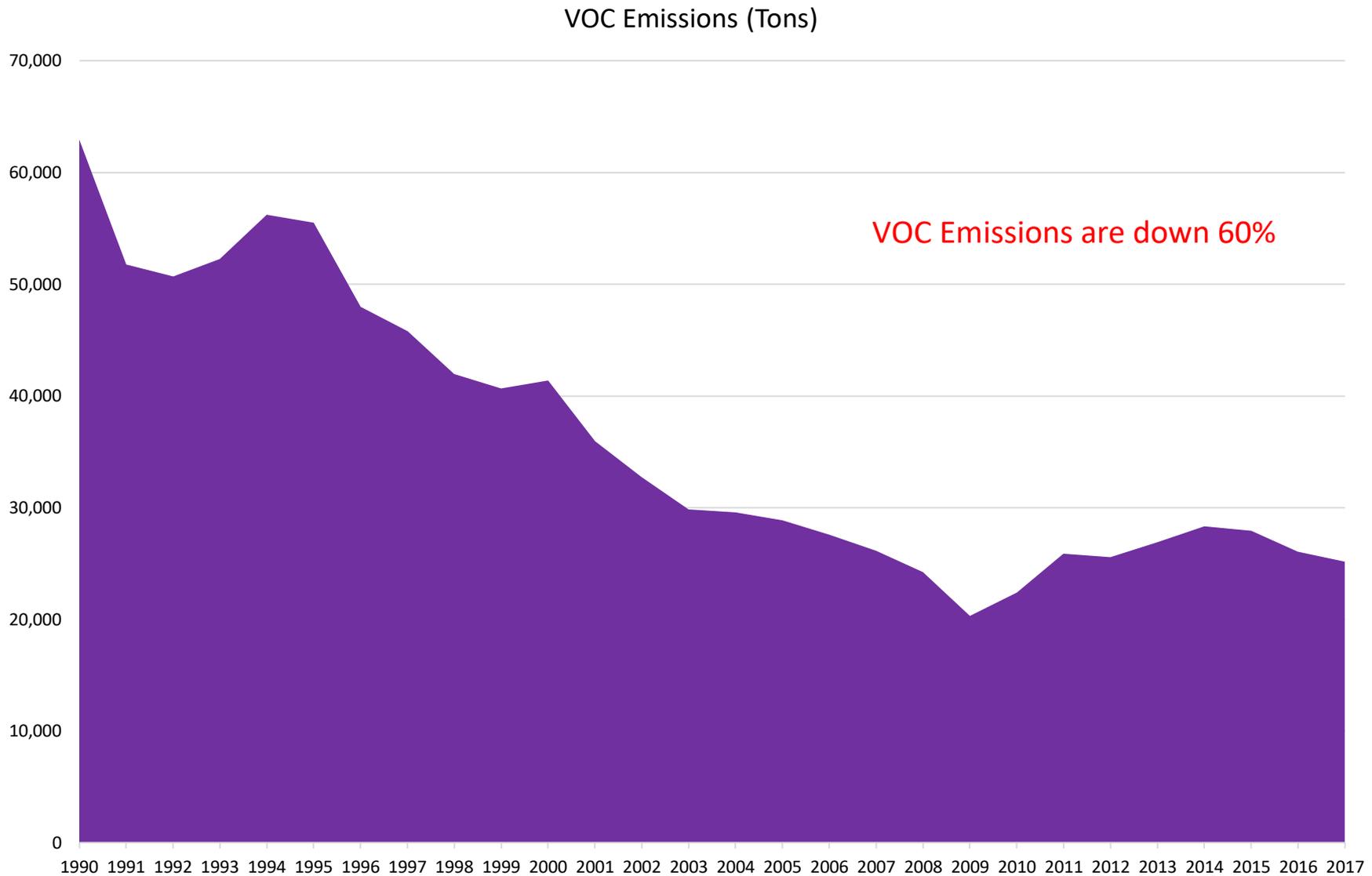


PM Emissions (Tons)

Particulate Matter Emissions (Tons)

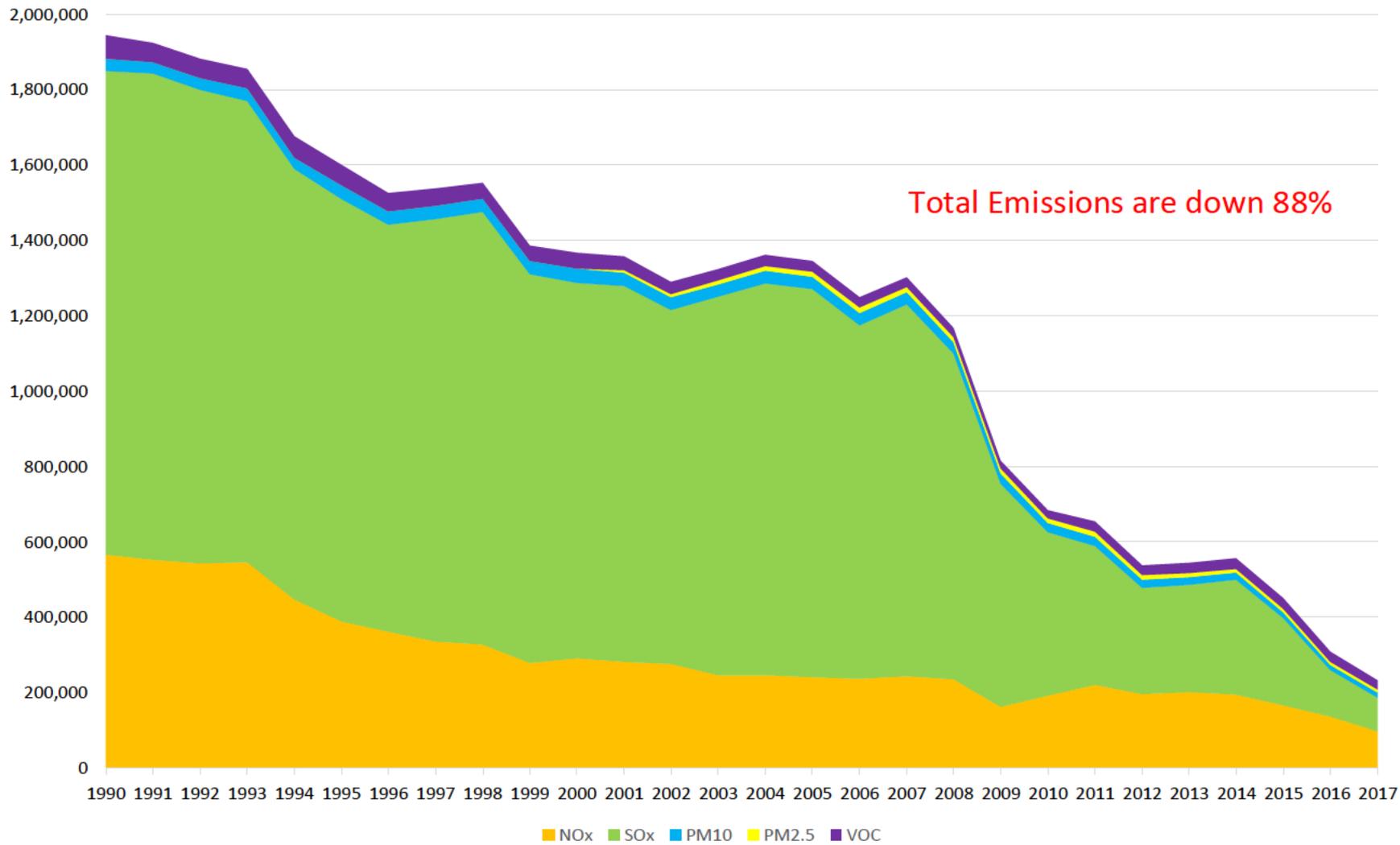


VOC Emissions (Tons)



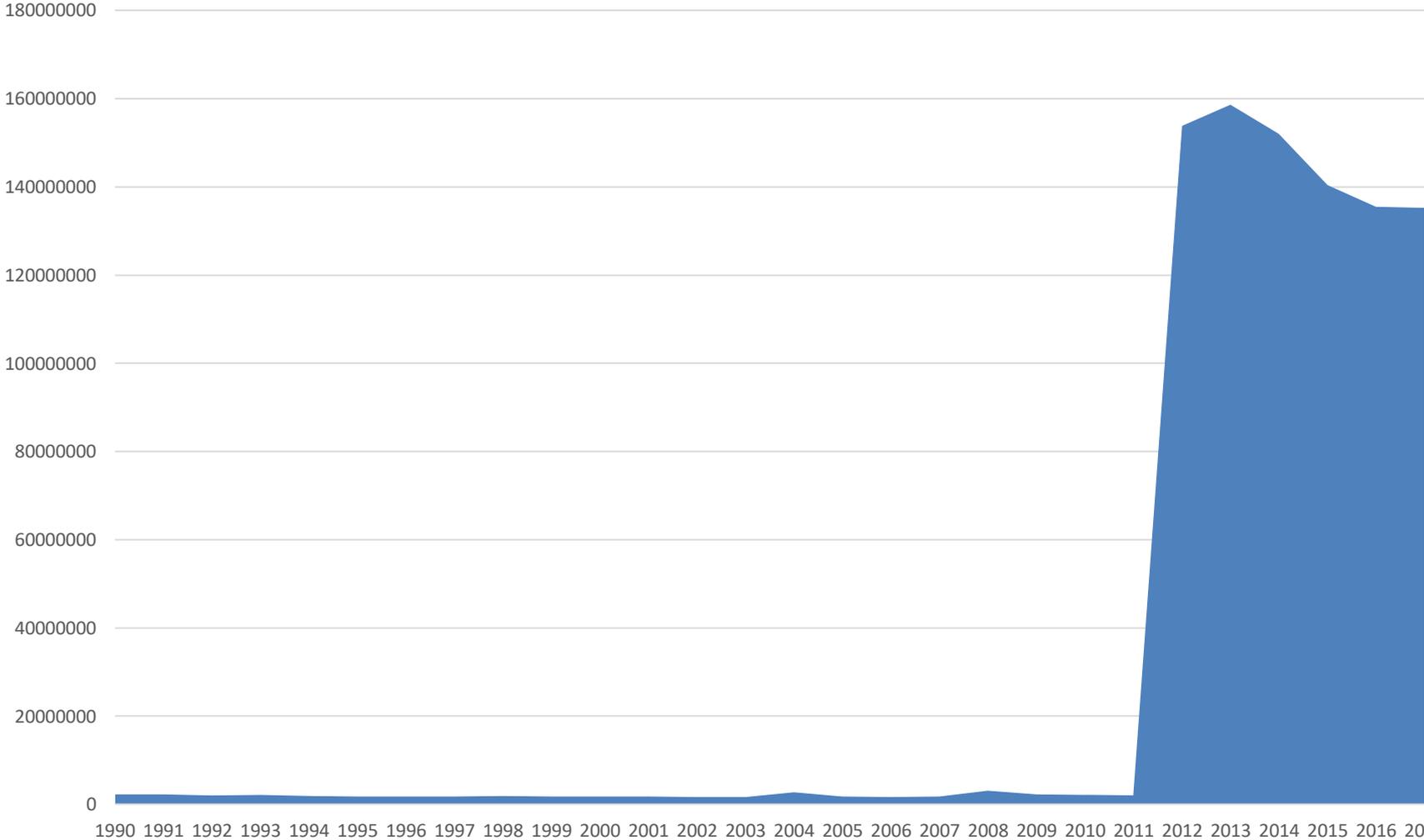
Total Emissions (Tons)

Total Criteria Pollutants (Tons)



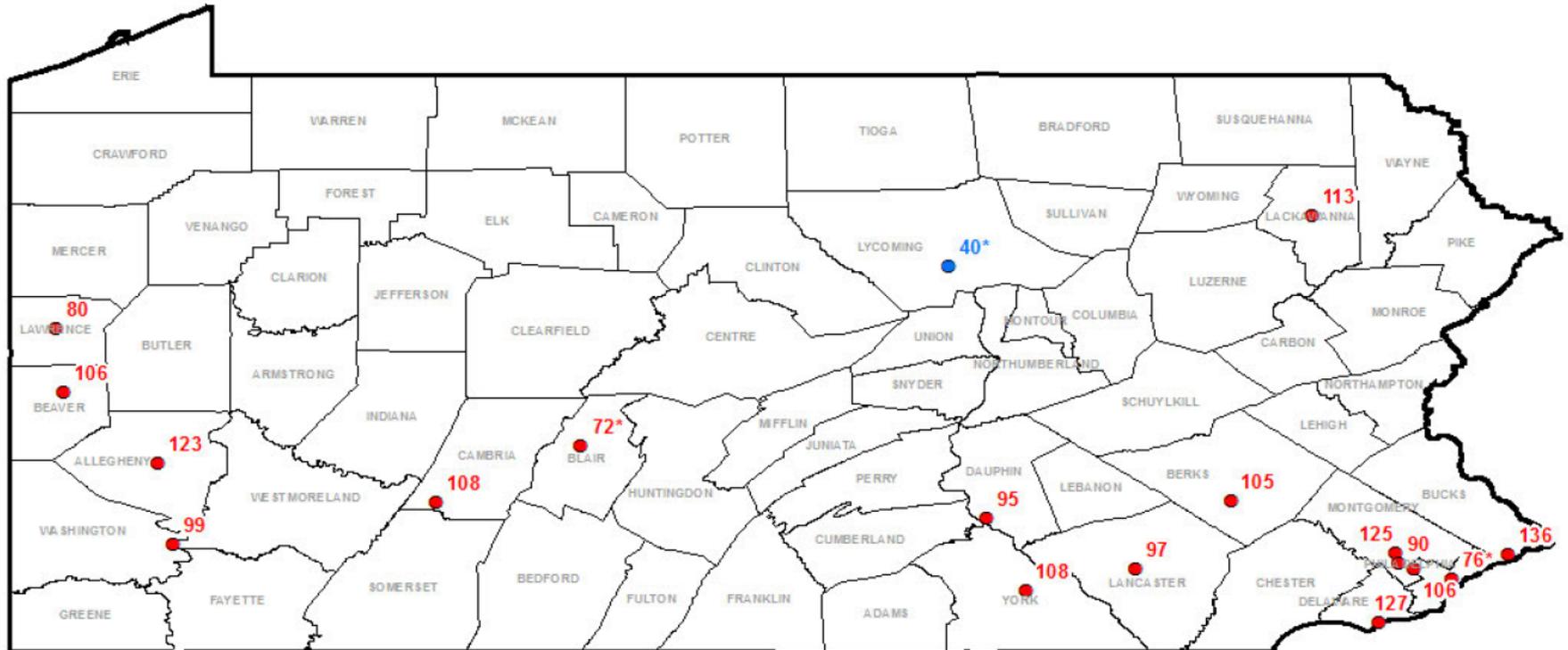
Total Emissions (Tons)

Total Criteria Pollutants (Tons)



Historical 8-hour Ozone Concentrations in PA

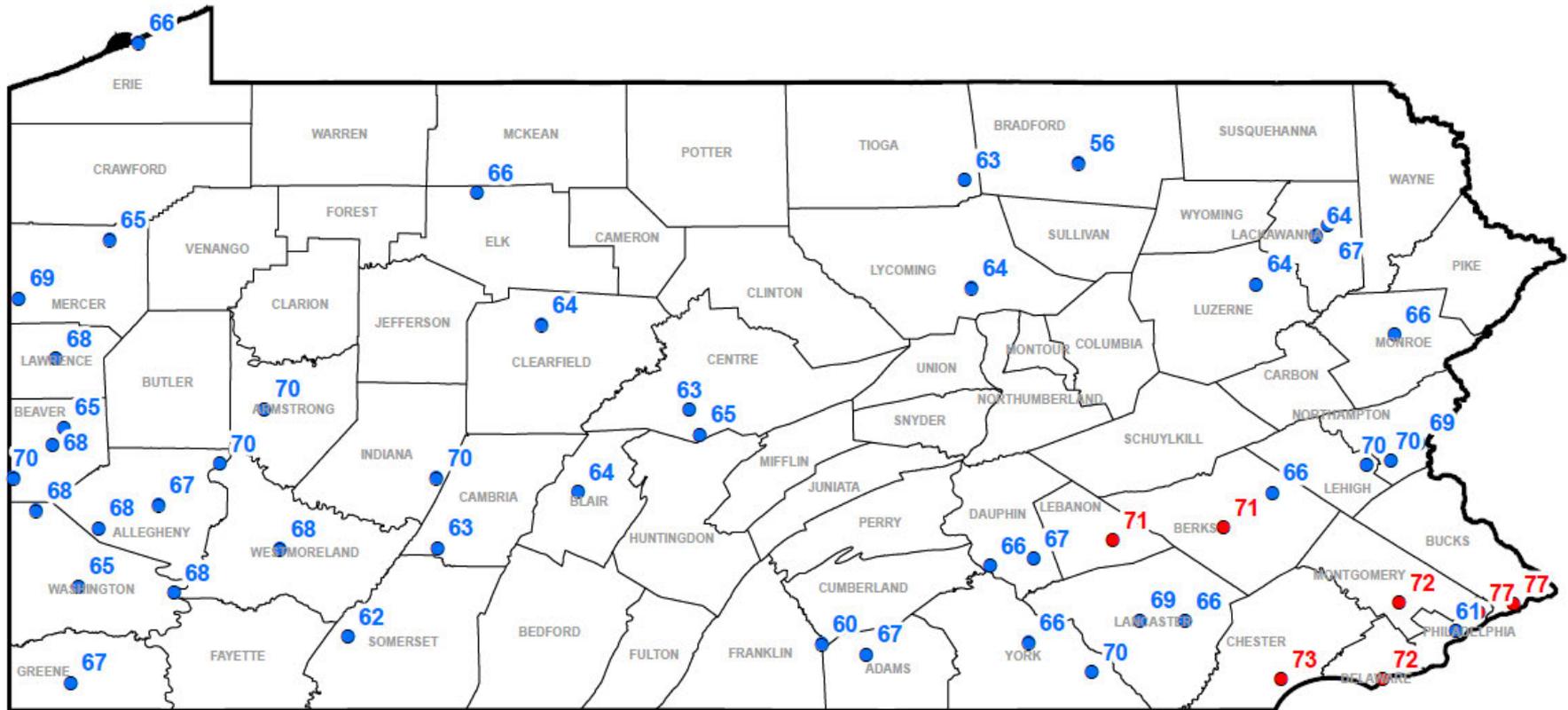
1980 8-Hour Ozone Design Values



Appearing in Red - 1980 8-Hour Ozone Design Value above 70 ppb (2015 Ozone Standard)

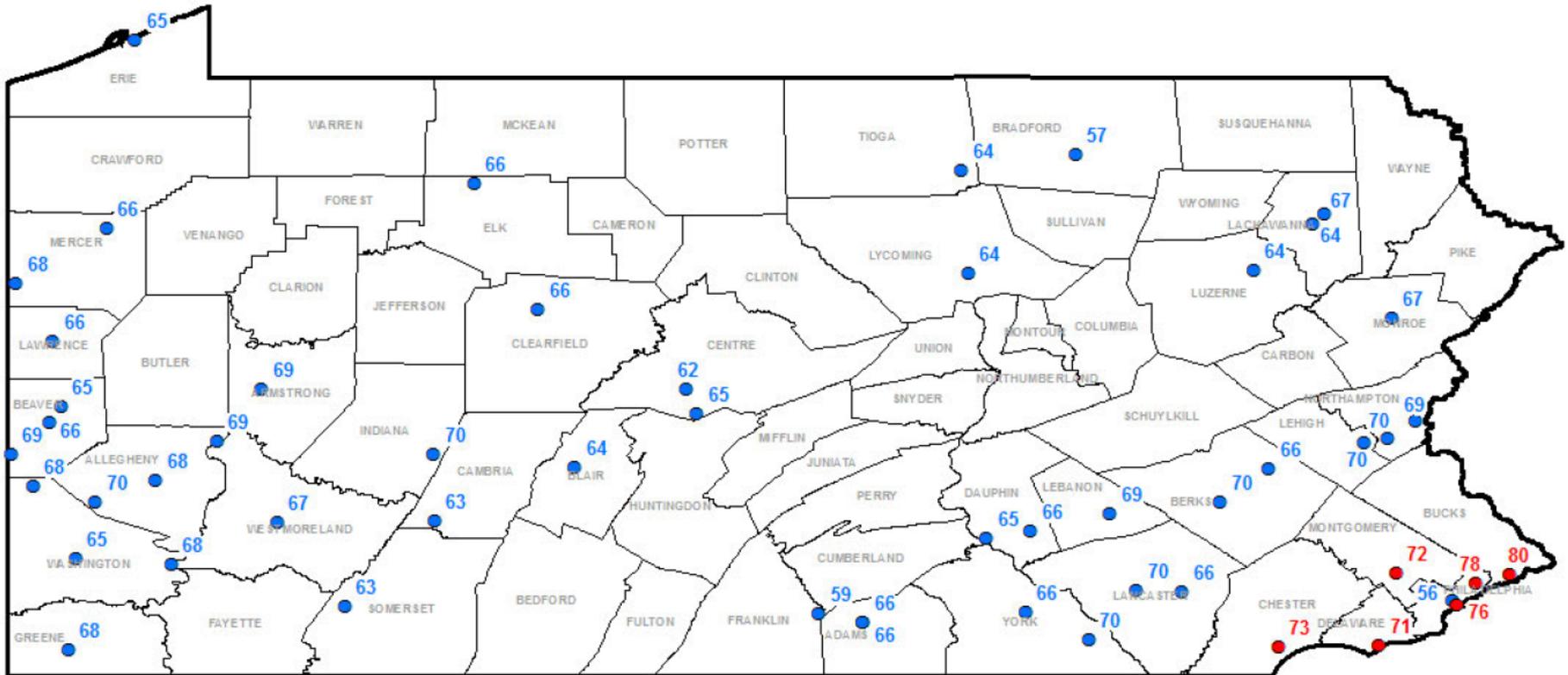
Appearing in Blue - 1980 8-Hour Ozone Design Value at or below 70 ppb (2015 Ozone Standard)

2016 8-Hour Ozone Design Values



Appearing in Red - 2016 8-Hour Ozone Design Value above 70 ppb (2015 Ozone Standard)
Appearing in Blue - 2016 8-Hour Ozone Design Value at or below 70 ppb (2015 Ozone Standard)

2017 8-Hour Ozone Design Values

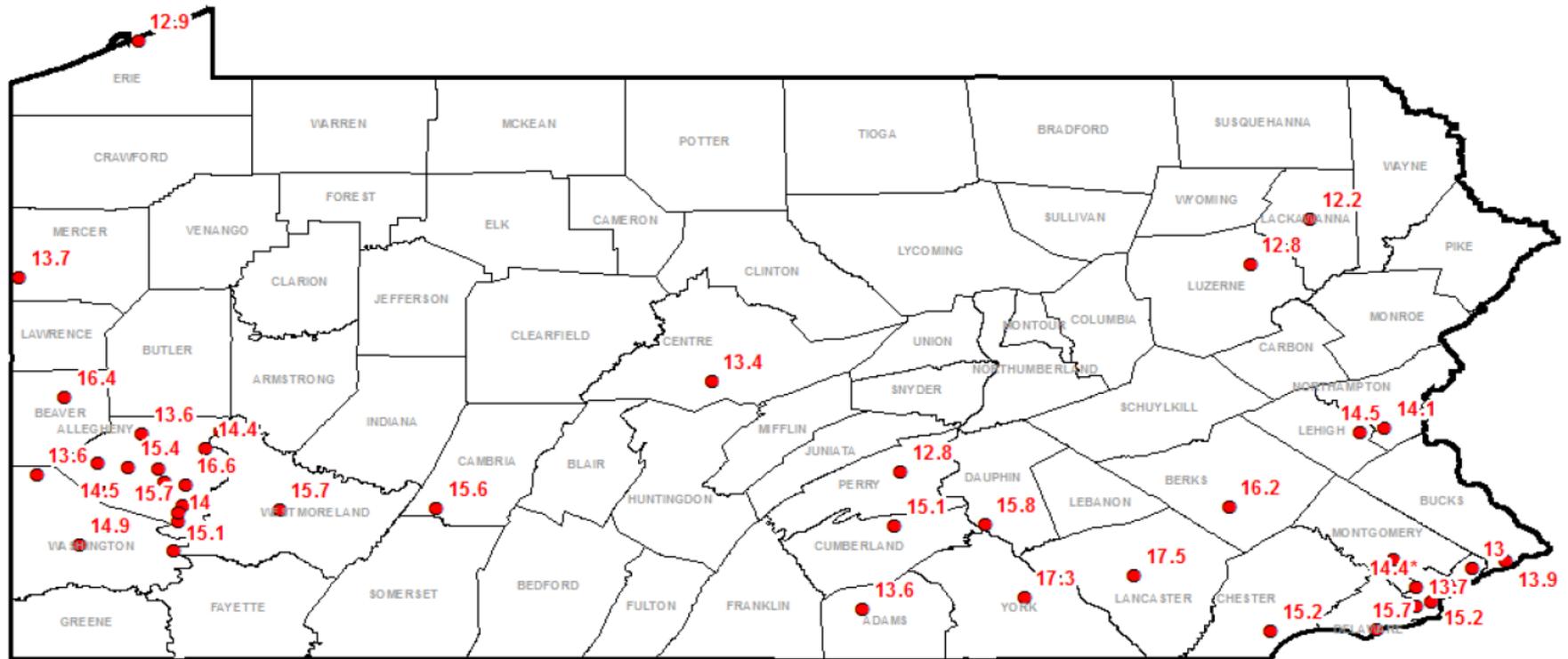


Appearing in Red - 2017 8-Hour Ozone Design Value above 70 ppb (2015 Ozone Standard)

Appearing in Blue - 2017 8-Hour Ozone Design Value at or below 70 ppb (2015 Ozone Standard)

Historical Annual PM_{2.5} Concentrations in PA

2005 Annual PM_{2.5} Design Values



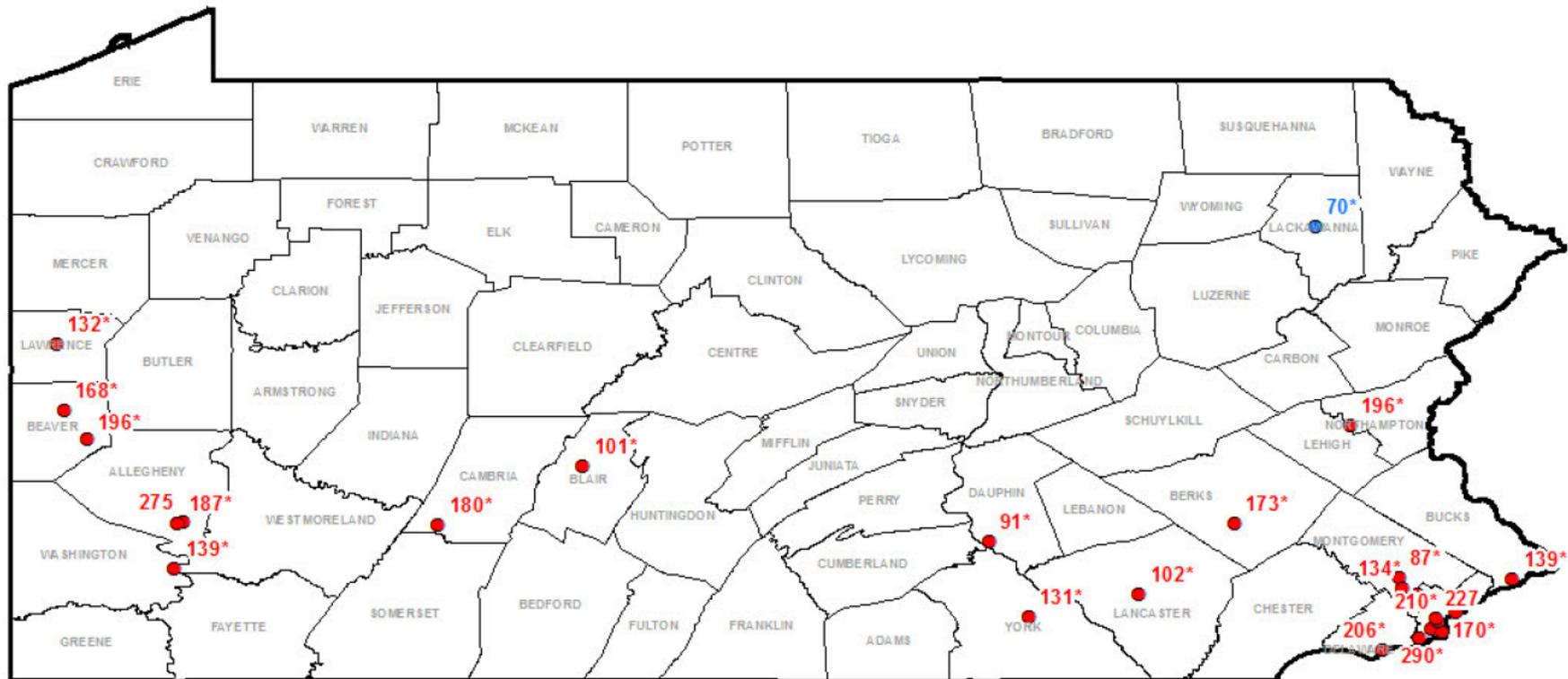
Appearing in Red - 2005 Annual PM_{2.5} Design Value above 12.0 ug/m³ (2012 PM_{2.5} Standard)

Appearing in Blue - 2005 24-Hour PM_{2.5} Design Value at or below 12.0 ug/m³ (2012 PM_{2.5} Standard)

Historical 24-hour PM_{2.5} Concentrations in PA

Historical 1-hour SO₂ Concentrations in PA

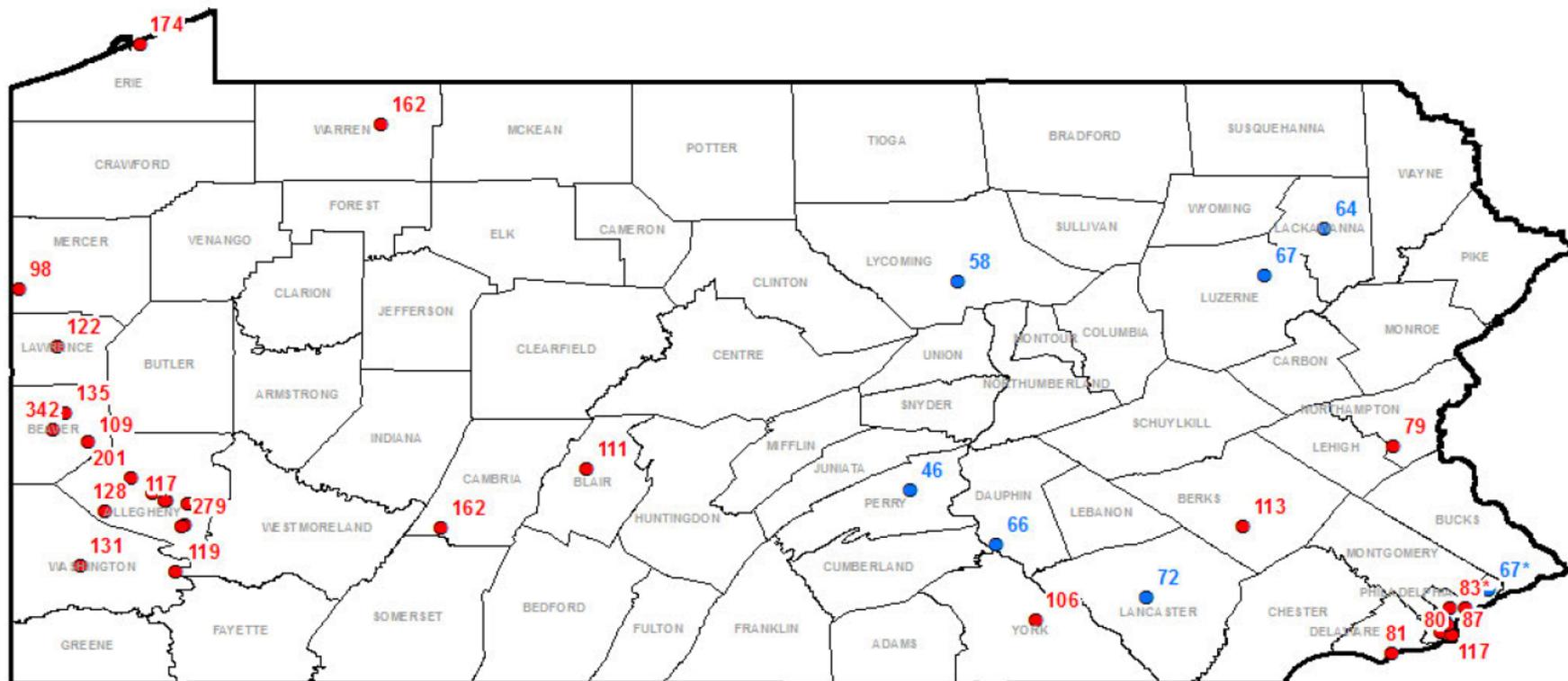
1980 1-hour SO₂ Design Values



Appearing in Red - 1980 1-Hour SO₂ Design Value above 75 ppb (2010 SO₂ Standard)

Appearing in Blue - 1980 1-Hour SO₂ Design Value at or below 75 ppb (2015 SO₂ Standard)

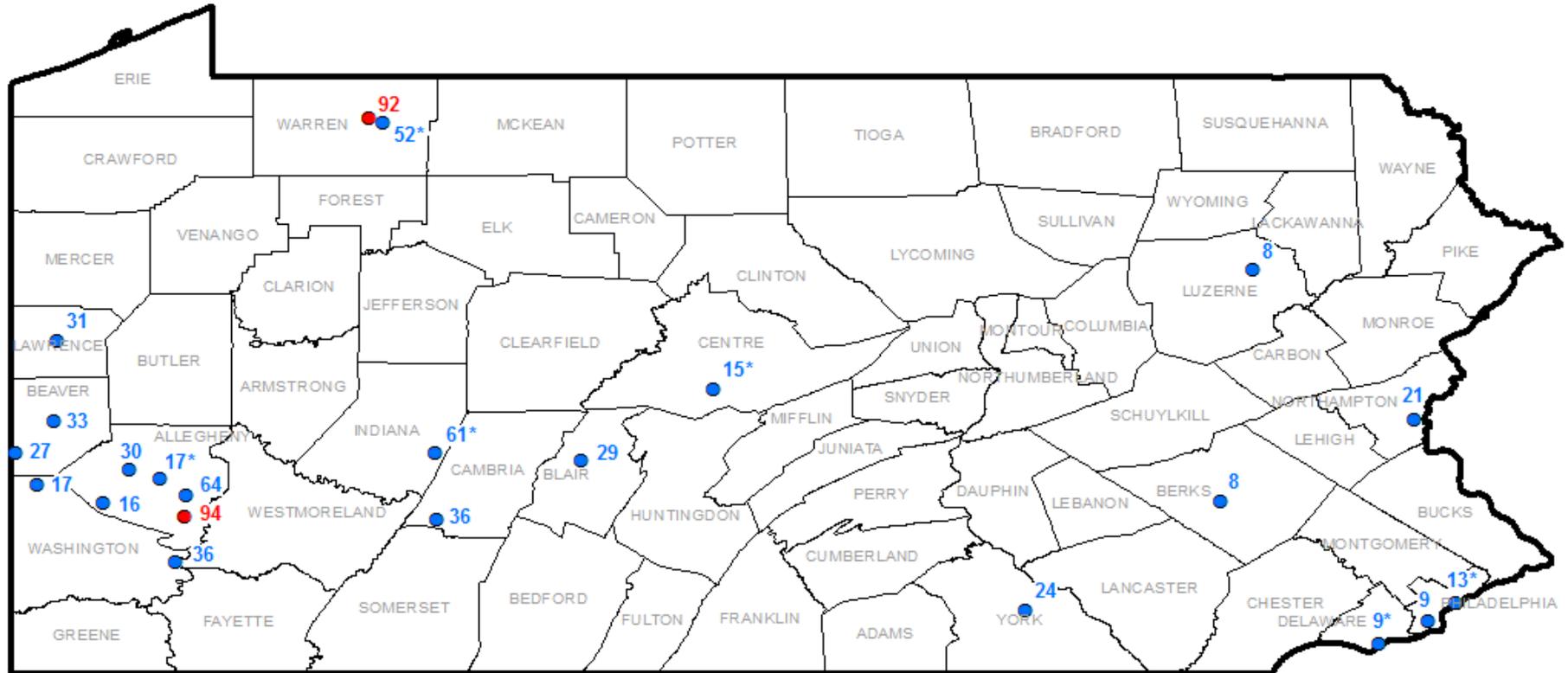
1991 1-hour SO₂ Design Values



Appearing in Red - 1991 1-Hour SO₂ Design Value above 75 ppb (2010 SO₂ Standard)

Appearing in Blue - 1991 1-Hour SO₂ Design Value at or below 75 ppb (2015 SO₂ Standard)

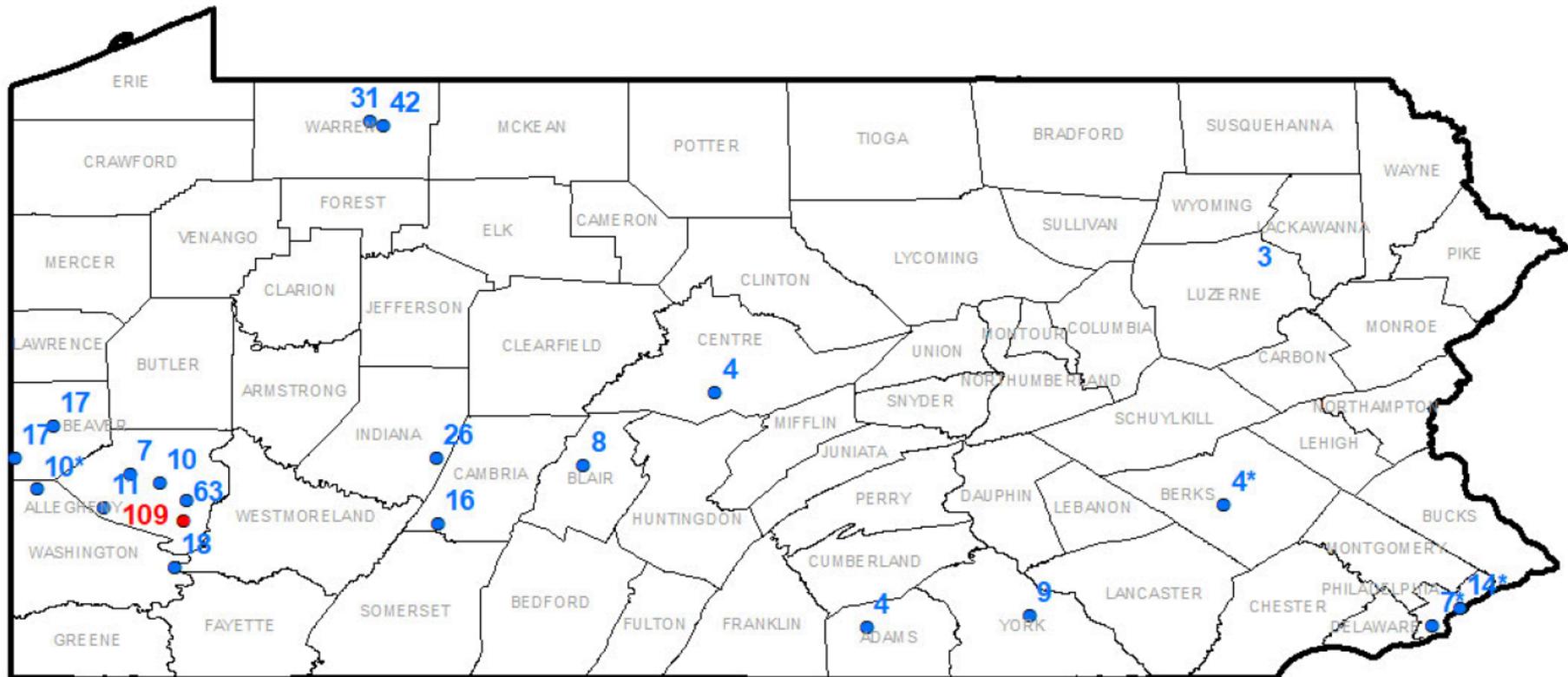
2016 1-hour SO₂ Design Values



Appearing in Red - 2016 1-Hour SO₂ Design Value above 75 ppb (2010 SO₂ Standard)

Appearing in Blue - 2016 1-Hour SO₂ Design Value at or below 75 ppb (2010 SO₂ Standard)

2019 1-hour SO₂ Design Values



Appearing in Red - 2019 1-Hour SO₂ Design Value above 75 ppb (2010 SO₂ Standard)

Appearing in Blue - 2019 1-Hour SO₂ Design Value at or below 75 ppb (2010 SO₂ Standard)

Asterick (*) Appearing Behind the 2019 1-Hour SO₂ Design Value Means the Data is Incomplete During 3-Year Period

Challenges

Of course we still have challenges

- Staffing and funding are always a challenge.
- We have an ozone issue in Philadelphia that will not be easy to solve.
- There are facilities statewide that we spend quite a bit of time on from coke batteries to zinc smelters.
- We have picked the most of the low hanging fruit so future improvements will require a lot more effort.
 - Cars are cleaner.
 - Major facilities have emissions controls.
 - We have taken lead out of gasoline.
- Asthma rates have climbed from 3.1% in 1980 to 10.1% in 2015.
- Approximately 90% of adults from western countries spend almost 22 hours a day INDOORS where air pollution can be many times worse than outdoor air.
- Children spend half the time their parents did playing outside.
- Medical research indicates possible health effects at levels below the current NAAQS.

https://www.cdc.gov/asthma/most_recent_data_states.htm

<https://www.usatoday.com/story/sponsor-story/velux/2018/05/15/indoor-generation-and-health-risks-spending-more-time-inside/610289002/>

<https://www.theguardian.com/environment/2016/jul/27/children-spend-only-half-the-time-playing-outside-as-their-parents-did>

EPA's View

EPA's View



Our Nation's Air Air Quality Improves as America Grows

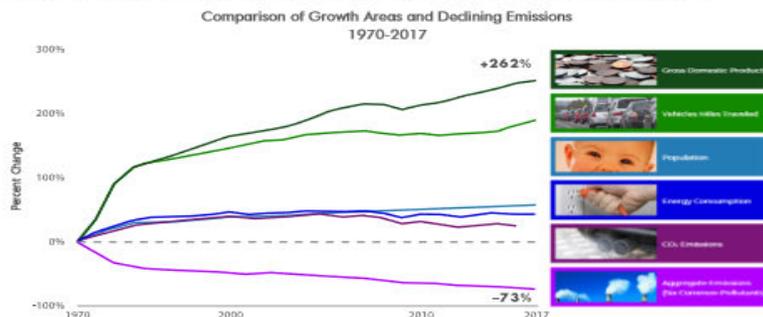
Status and Trends Through 2018



<https://gispub.epa.gov/air/trendsreport/2018>

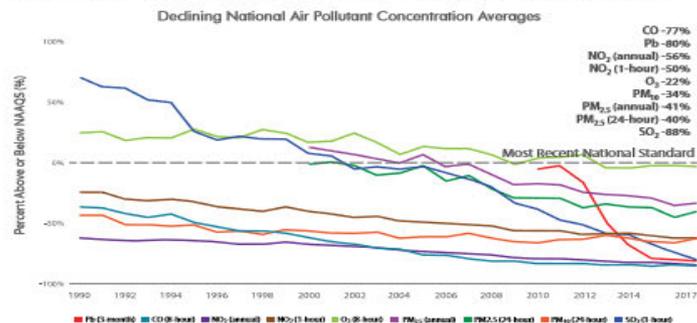
Economic Growth with Clean Air

Between 1970 and 2017, the combined emissions of the six common pollutants (PM_{2.5} and PM₁₀, SO₂, NO_x, VOCs, CO and Pb) dropped by 73 percent. This progress occurred while the U.S. economy continued to grow, Americans drove more miles and population and energy use increased.



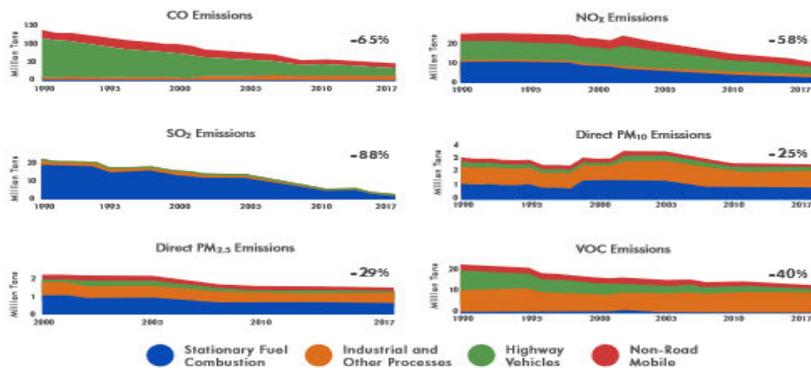
Air Quality Trends Show Clean Air Progress

While some pollutants continue to pose serious air quality problems in areas of the U.S., nationally, criteria air pollutant concentrations have dropped significantly since 1990 improving quality of life for many Americans. Air quality improves as America grows.



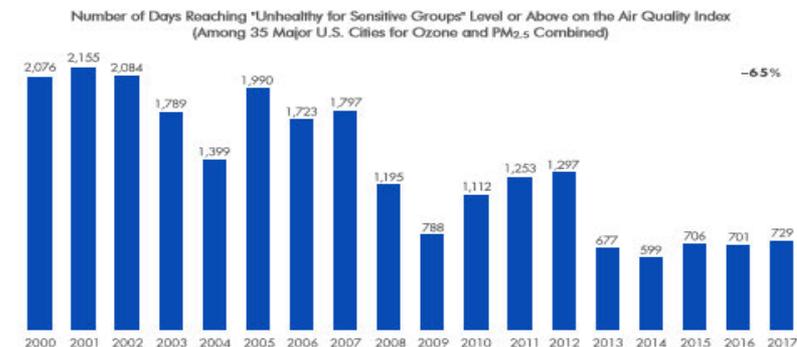
Air Pollutant Emissions Decreasing

Emissions of key air pollutants continue to decline from 1990 levels. These reductions are driven by federal and state implementation of stationary and mobile source regulations.



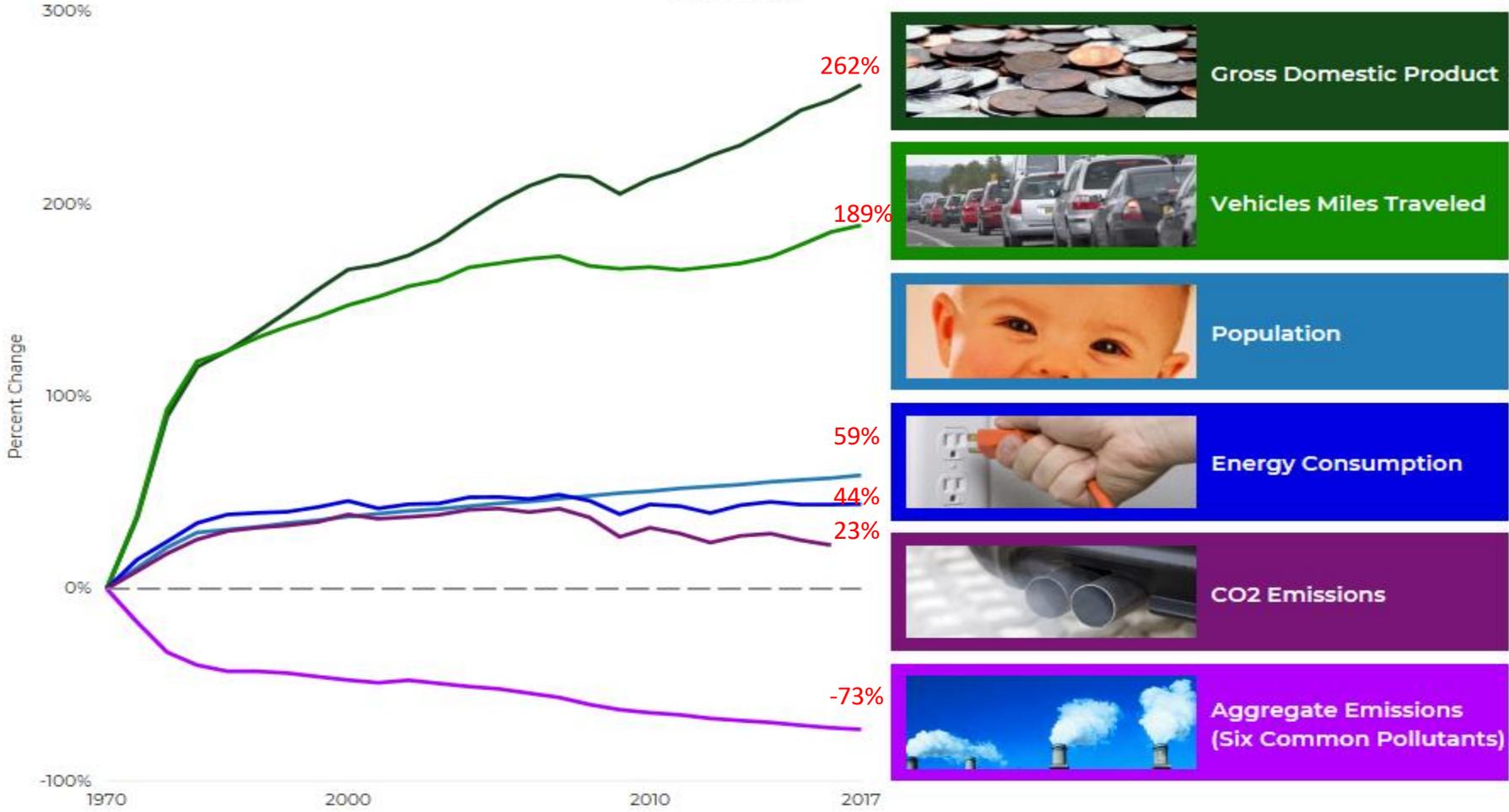
Unhealthy Air Quality Days Trending Down

The Air Quality Index (AQI) is a color-coded index EPA uses to communicate daily air pollution for ozone, particle pollution, NO₂, CO, and SO₂. A value in the unhealthy range, above national air quality standard for any pollutant, is of concern first for sensitive groups, then for everyone as the AQI value increases. Fewer unhealthy air quality days means better health, longevity, and quality of life for all of us.



EPA's View

Comparison of Growth Areas and Declining Emissions 1970-2017



Source: Various

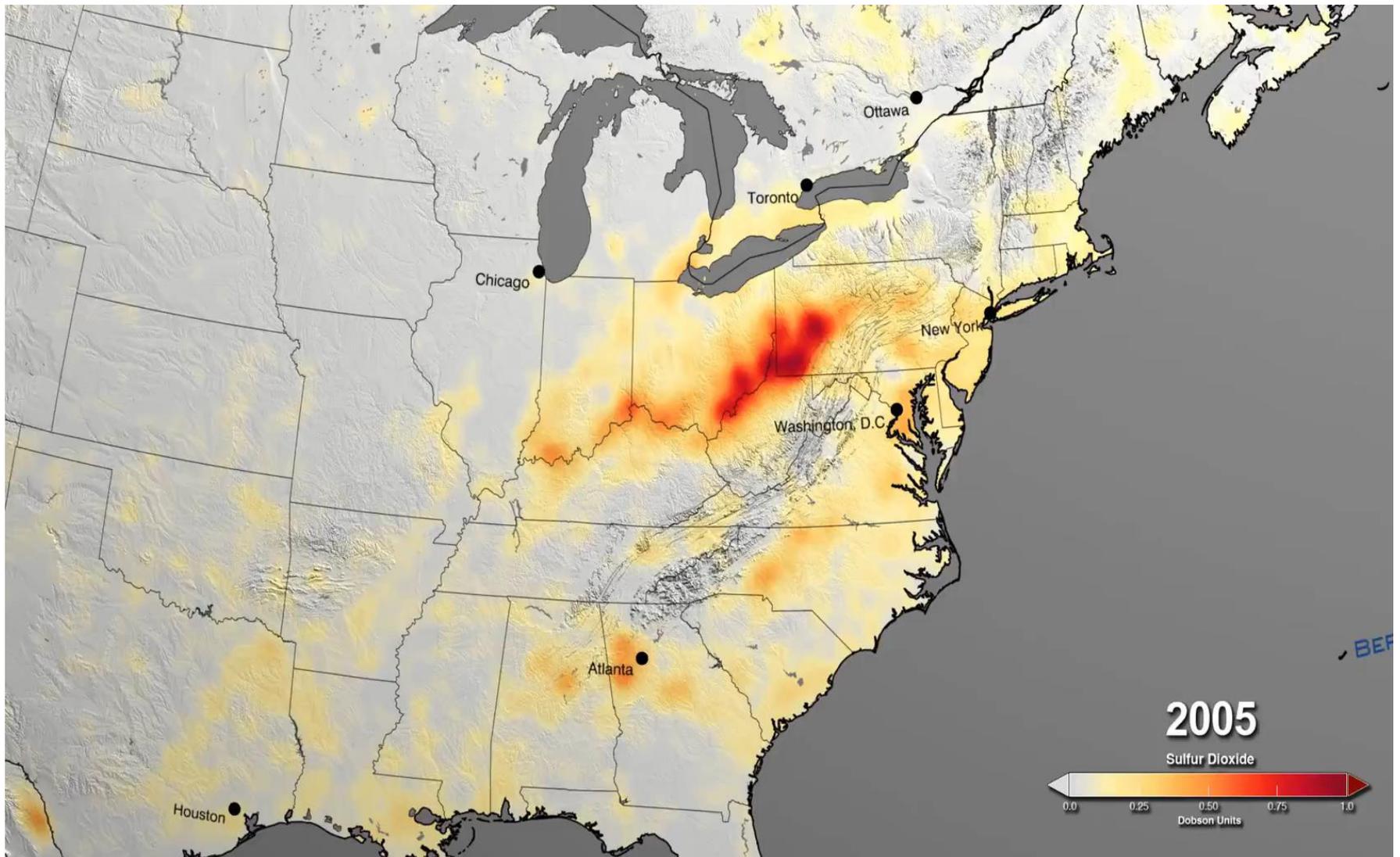
EPA's View

Nationally, concentrations of air pollutants have dropped significantly since 1990:

- Carbon Monoxide (CO) 8-Hour, ↓ 77%
- Lead (Pb) 3-Month Average, ↓ 80%
- Nitrogen Dioxide (NO₂) Annual, ↓ 56%
- Nitrogen Dioxide (NO₂) 1-Hour, ↓ 50%
- Ozone (O₃) 8-Hour, ↓ 22%
- Particulate Matter 10 microns (PM₁₀) 24-Hour, ↓ 34%
- Particulate Matter 2.5 microns (PM_{2.5}) Annual, ↓ 41%
- Particulate Matter 2.5 microns (PM_{2.5}) 24-Hour, ↓ 40%
- Sulfur Dioxide (SO₂) 1-Hour, ↓ 88%
- Numerous air toxics have declined with percentages varying by pollutant

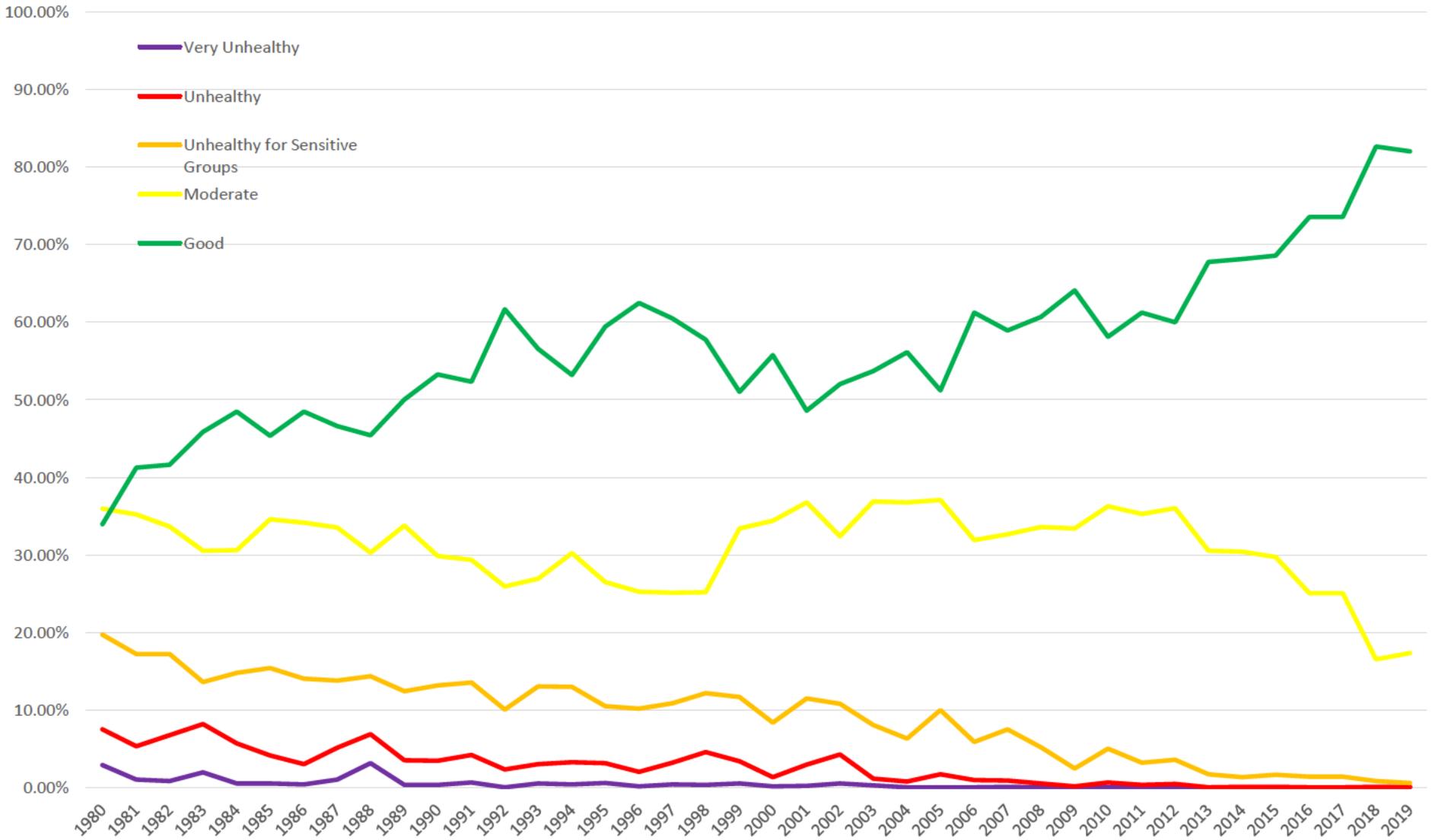
During this same period, the U.S. economy continued to grow, Americans drove more miles and population and energy use increased.

SO2 Satellite Imagery



Air Quality Index

Historic AQI



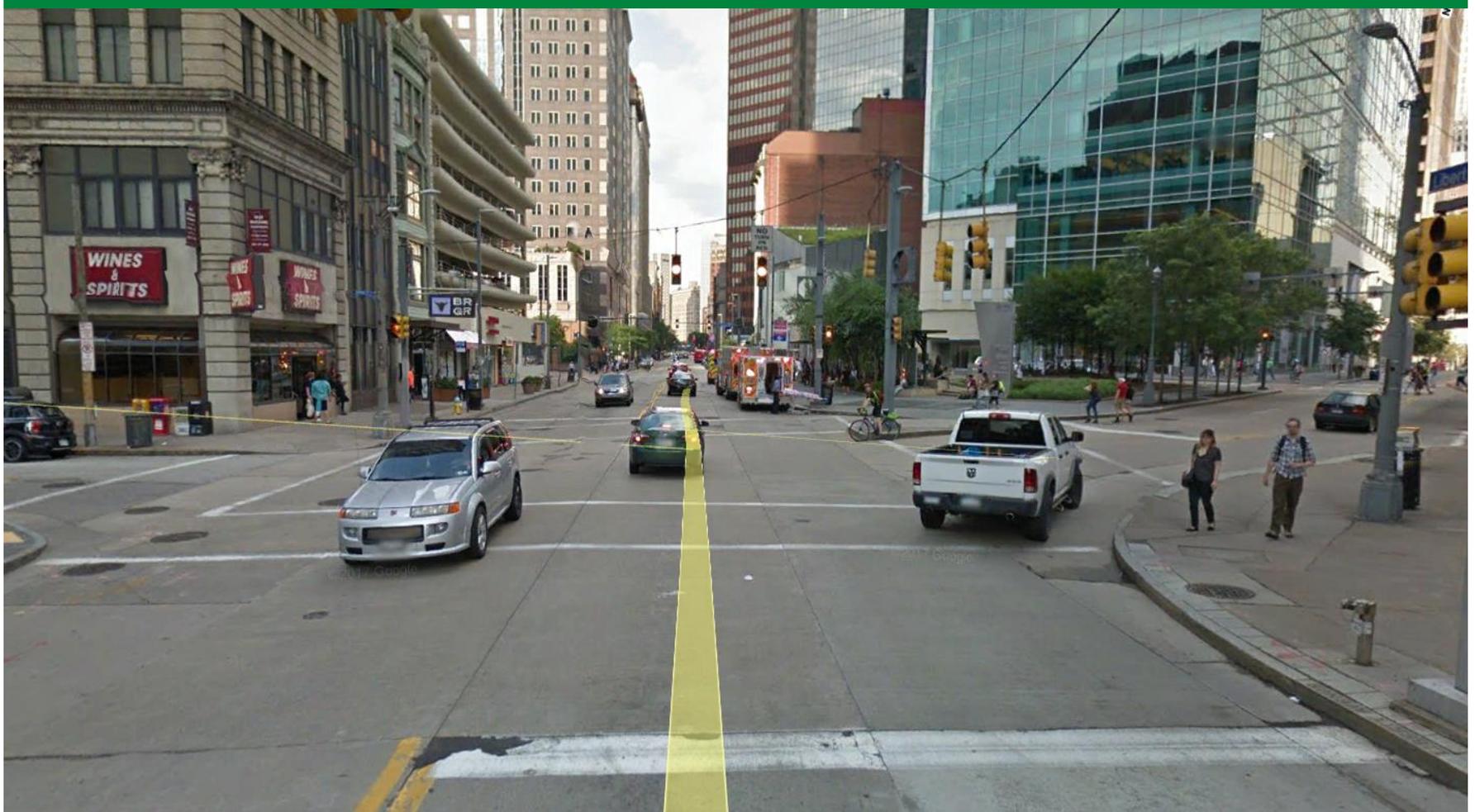
Then and Now

Corner of 5th and Liberty circa 1940



Corner of Liberty and Fifth Avenue (Archives Services Center, U. of Pittsburgh)

Corner of 5th and Liberty Today





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