NATIONAL ASSOCIATION OF Manufacturers

Leading Innovation. Creating Opportunity. Pursuing Progress.

Testimony

of Ross Eisenberg
Vice President
Energy and Resources Policy
National Association of Manufacturers

before the Senate Committee on Environment and Public Works

on "Promoting American Leadership in Reducing Air Emissions Through Innovation"

November 15, 2017

TESTIMONY OF ROSS EISENBERG

BEFORE THE SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

Hearing on:
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NOVEMBER 15, 2017

Good morning, Chairman Barrasso, Ranking Member Carper and members of the Environment and Public Works Committee. My name is Ross Eisenberg, and I am the vice president of energy and resources policy at the National Association of Manufacturers (NAM). The NAM is the nation's largest industrial trade association, representing nearly 14,000 small, medium and large manufacturers in every industrial sector and in all 50 states. I am pleased to represent the NAM and its members and provide testimony on manufacturers' continued commitment to reduce air emissions.

Manufacturers have sharply reduced our impact on the environment through a wide range of innovations, such as increasing energy efficiency, saving and recycling water and implementing successful initiatives to reduce pollution and waste. Through these traditional and innovative measures, manufacturers have helped to usher in a new era of a cleaner and more sustainable environment.

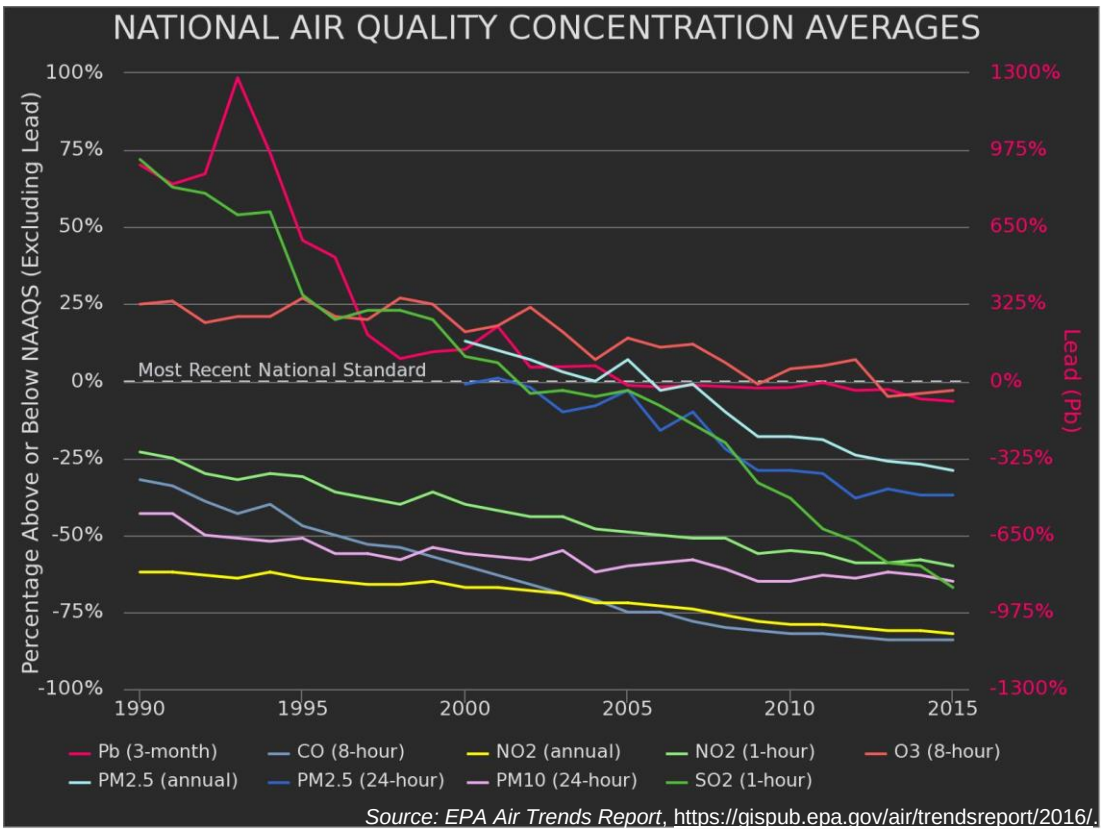
My written statement is broken into three parts. The first reviews air emission trends in the U.S. and the manufacturing sector. The second provides an overview of the technologies and innovative solutions manufacturers have developed to reduce their emissions. The third part identifies barriers that are

preventing manufacturers from doing even more to reduce emissions and increase efficiency.

Part One: U.S. and Manufacturing Sector Air Trends

A. Economy-Wide Emissions

The story of U.S. air pollutant emissions is a positive one. Since 1990, a period spanning four different presidential administrations and 14 different Environmental Protection Agency (EPA) administrators, national pollutant concentrations have dropped dramatically. Carbon monoxide concentrations are down 77 percent; lead 99 percent; nitrogen dioxide 54 percent; ozone 22 percent; coarse particulate matter 39 percent; fine particulate matter 37 percent;

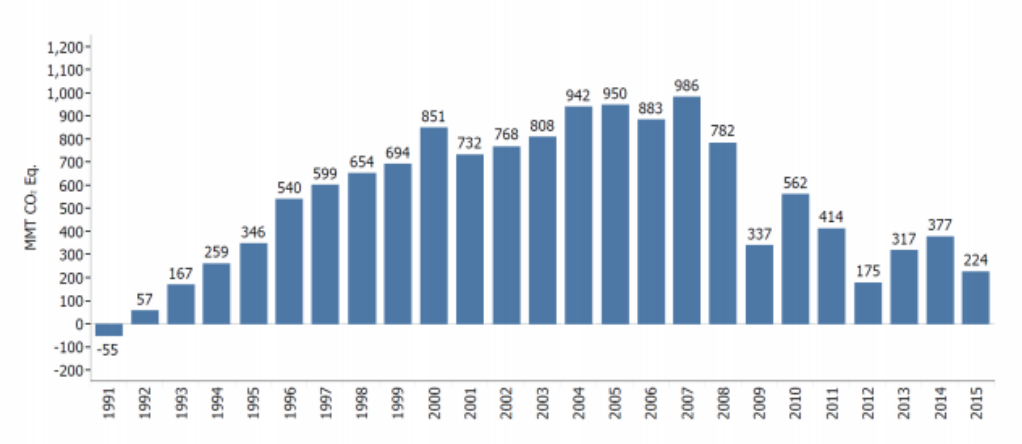


Source: EPA Air Trends Report, https://cfpub.epa.gov/air/trendsreport/2016/.

and sulfur dioxide 81 percent.[1]

On greenhouse gases (GHGs), the United States has made greater reductions over the past decade than any other nation on earth.[2] The following chart from the EPA's most recent *Inventory of U.S. Greenhouse Gas Emissions and Sinks* shows the positive trends.

Figure ES-3: Cumulative Change in Annual Gross U.S. Greenhouse Gas Emissions Relative to 1990 (1990=0, MMT CO_2 Eq.)



Source: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015

B. Manufacturing Sector Emissions

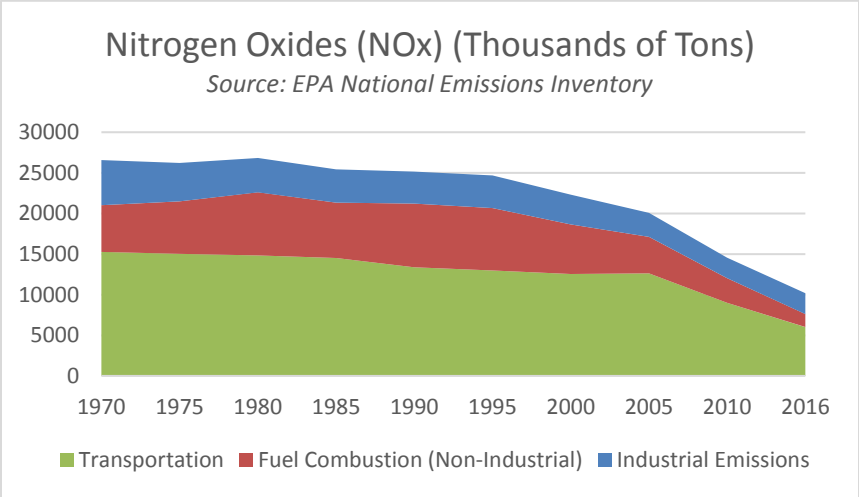
While it is useful to view the emissions reduction trends of the broader economy, it is worth focusing on the industrial sector's emissions and how they have decreased over time. For virtually every air pollutant regulated by the EPA, the manufacturing sector has made dramatic reductions over the past few decades. Today's manufacturing company is a sleek, technology-driven

[1] U.S. EPA, "Our Nation's Air: Status and Trends Through 2015," *available at* https://gispub.epa.gov/air/trendsreport/2016/.
[2] https://www.forbes.com/sites/rrapier/2016/06/19/the-u-s-leads-all-countries-in-lowering-carbon-dioxide-emissions/#7d6790375f48.

operation that looks nothing like the industrial facilities of the past. With that progress has come a smaller environmental footprint.

Nitrogen Oxides (NOx)

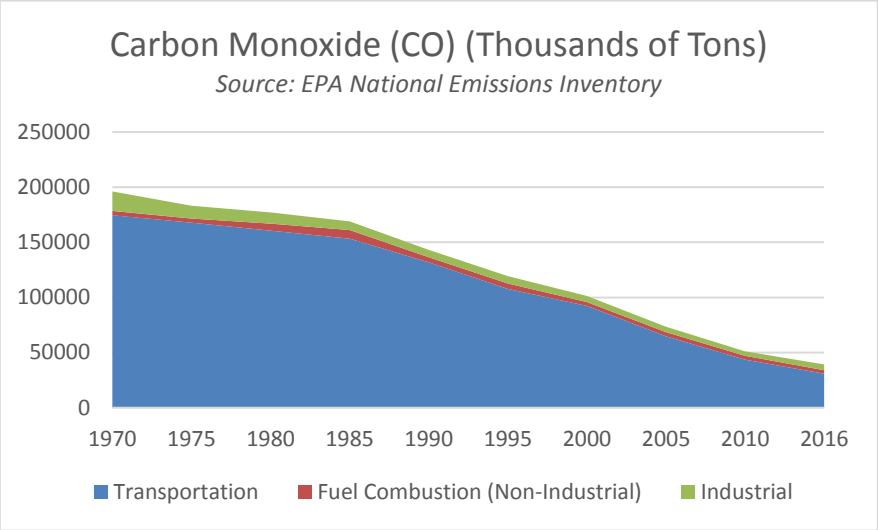
In the case of nitrogen oxides (NOx), a criteria pollutant and the primary precursor of ozone, industrial emissions have dropped by 53 percent since 1970. The vast majority of the decline has come from technologies to reduce NOx emissions at onsite industrial power generation facilities. Industrial NOx emissions have historically represented around 15 to 25 percent of total NOx emissions in the United States.



Carbon Monoxide (CO)

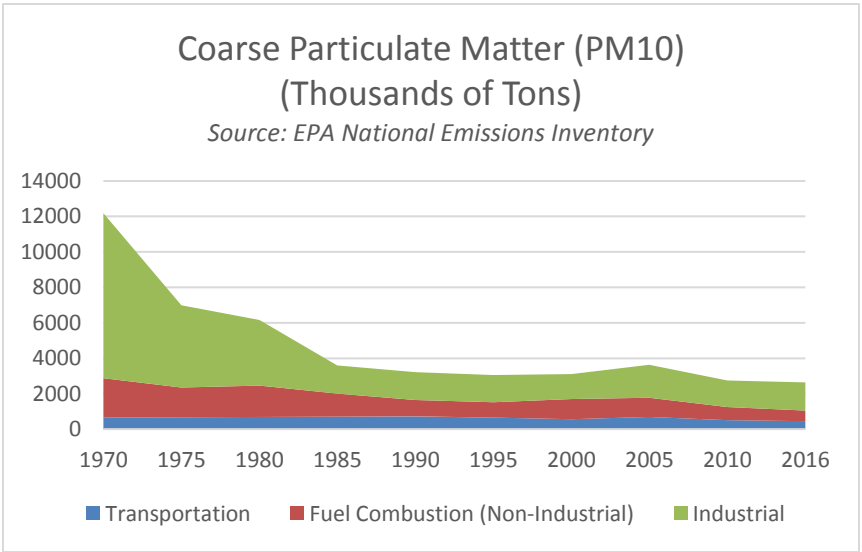
The manufacturing sector's carbon monoxide (CO) emissions have dropped 70 percent since 1970. Most of these reductions have come through improvements to the manufacturing process. The chemical sector has reduced its CO emissions a staggering 96 percent; metals processing has reduced its CO

emissions 83 percent; petroleum and related industries have reduced their CO emissions 61 percent; and waste disposal and recycling industries have reduced their CO emissions 70 percent. Overall, manufacturing CO emissions are relatively small compared to overall CO emissions. However, these emissions have also dropped dramatically over time, a 71 percent reduction.



Coarse Particulate Matter (PM10)

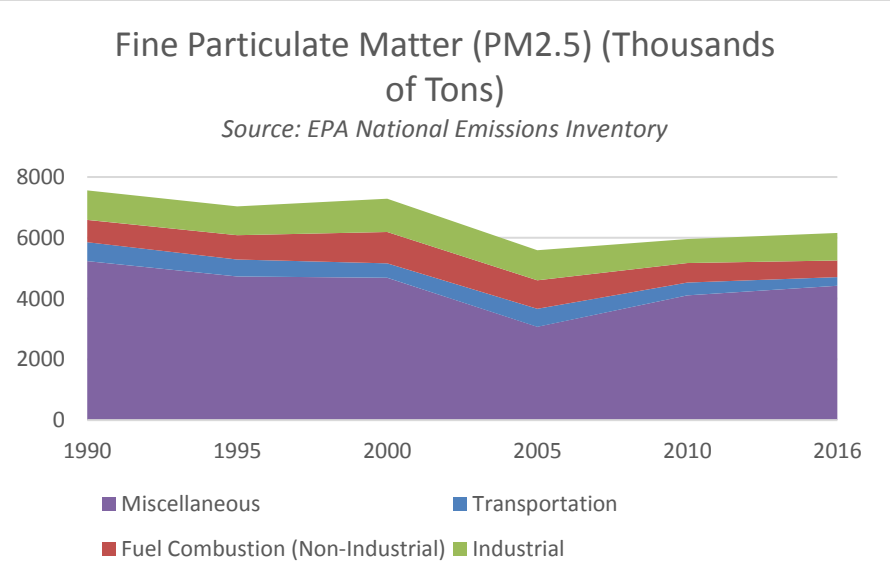
Manufacturers have reduced their emissions of coarse particulate matter, or PM10, by 83 percent since 1970. The vast majority of these reductions have come from changes to the manufacturing process across individual sectors. For instance, chemical manufacturers have reduced their PM10 emissions by 91 percent; metals processing has reduced its PM10



emissions by 96 percent; petroleum and related industries have reduced their PM10 emissions by 87 percent; and waste disposal and recycling industries have reduced their PM10 emissions by 70 percent. It is worth noting that the lion's share of PM10 emissions tracked by the EPA are not from industry, transportation or electricity production; they are what the EPA calls "miscellaneous" PM10, which include wildfires, windblown dust from open lands, wood burning stoves and fireplaces and dust from construction and agriculture. Miscellaneous PM10 represents almost 90 percent of total PM10 in the United States today.

Fine Particulate Matter (PM2.5)

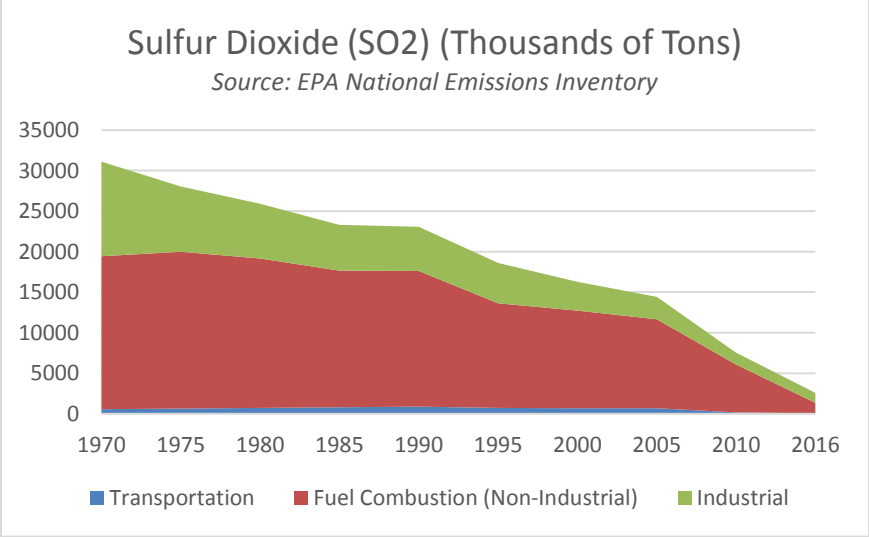
Like PM10, the bulk of the fine particulate emissions measured by the EPA are classified as "miscellaneous," meaning not from industrial, transportation or power generation sources. Overall, total PM2.5 emissions from industrial, transportation and power generation sectors have dropped by 25 percent since 1990, the first year the EPA began measuring this pollutant. The industrial sector has reduced its PM2.5 emissions 6 percent since 1990 and 23 percent since its peak in 1999 and



will continue to reduce its emissions significantly as manufacturers take steps to comply with the 2012 Boiler MACT regulation.

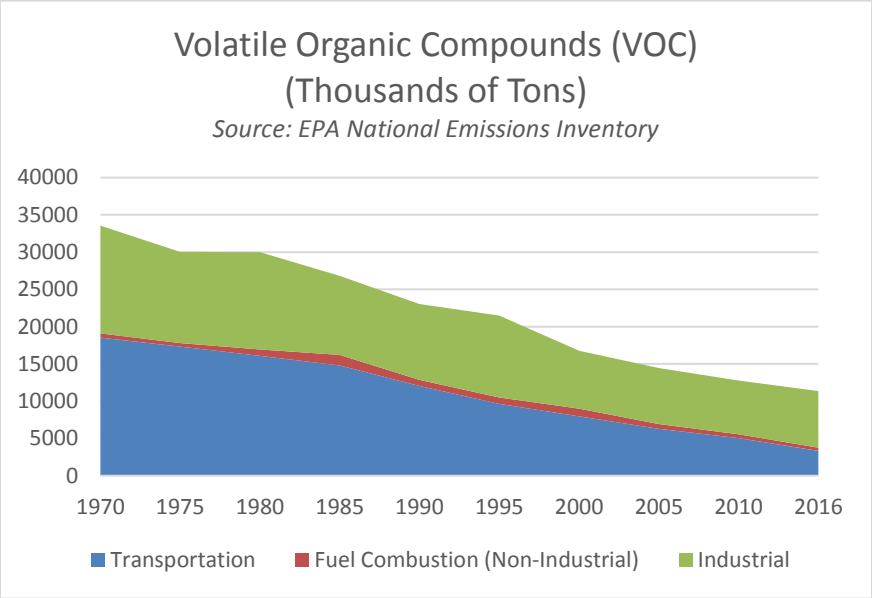
Sulfur Dioxide (SO2)

Sulfur dioxide (SO2) emissions have dropped precipitously over the past four decades. Since 1970, the industrial sector has reduced its SO2 emissions by 90 percent; electric utilities and other fuel combustion sources have reduced their SO2 emissions by 93 percent; and the transportation sector has reduced its SO2 emissions by 91 percent. Within manufacturing specifically, the chemical sector has reduced its SO2 emissions by 80 percent; metals processing has reduced its SO2 emissions by almost 98 percent; petroleum and related industries have reduced their SO2 emissions by 88 percent; and other industrial processes reduced their SO2 emissions by 80 percent. Manufacturers accomplished these dramatic reductions through technologies that allowed them to burn energy with less emissions, as well as technologies that reduced the SO2 emissions in the manufacturing process.



Volatile Organic Compounds (VOCs)

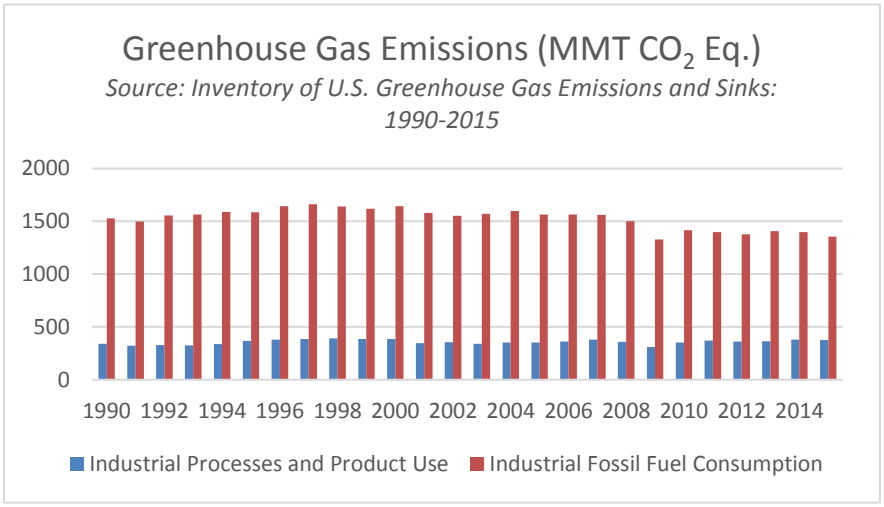
Emissions of volatile organic compounds (VOCs), which mix with NOx to form ground-level ozone, have also been reduced considerably. Since 1970, manufacturers have reduced their VOC emissions by 47 percent; the transportation sector has reduced its VOC emissions by 82 percent; and the power generation fleet has reduced its already-small emissions of VOCs by 26 percent. The vast majority of the manufacturing sector's VOC reductions have come through changes to the manufacturing process; the introduction of new chemicals, feedstocks and technologies; or reformulation of products. For instance, California's South Coast Air Management District reports that VOCs from architectural coatings in the Los Angeles area decreased more than 50 percent between 2008 and 2014.[3]



[3] http://www.paint.org/about-our-industry/environmental-footprint/.

Greenhouse Gases (GHGs)

The manufacturing sector emits greenhouse gases (GHGs) in two ways: during energy production and through industrial processes and product use. The good news is that the industrial sector actually produces *less* emissions than it did in 1990, a considerably different story compared to the broader U.S. economy.[4] Just over the past decade, manufacturers have reduced our GHG emissions by 10 percent while increasing our value to the economy by 19 percent. Many of those reductions have come from improved energy efficiency and changes to the mix of fuels manufacturers use.



Part Two: The Innovations Manufacturers Are Using to Clean Up the Air

The aforementioned charts are not meant to suggest that our environmental problems are over. Despite best-in-class efforts, the United States and the world continue to face serious environmental and sustainability challenges. There are forces far beyond the control of manufacturers in the United States that are driving changes to the global environment. The world's

[4] Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2015, *available at* https://www.epa.gov/sites/production/files/2017-02/documents/2017_complete_report.pdf.

population is expected to grow from 7.6 billion people today to 9.7 billion by 2050; 795 million people in the world do not have enough food to lead a healthy, active life; 1.3 billion people lack access to electricity; and droughts and other natural disasters threaten many already environmentally and economically stressed parts of the world. Mitigating the impacts of climate change, protecting the air, feeding the world's growing population and ensuring adequate supplies of drinking water are just a few of the significant issues facing current and future generations.

Manufacturers have demonstrated a commitment to protecting the environment through greater sustainability, increased energy efficiency and reducing emissions. We will continue to lead by minimizing environmental footprints, reducing emissions, conserving critical resources, protecting biodiversity, limiting waste and providing safe products and solutions so others in the economy can do the same.

For instance, to control SO2, acid gas and particulate matter emissions, manufacturers develop and install wet scrubbers, dry scrubbers with fabric filters, dry sorbent injection technologies and electrostatic precipitators. These technologies have been effective in controlling emissions on industrial boilers, at cement kilns, petroleum refineries, glassmaking facilities, lime kilns, coke manufacturing, chemical plants, pulp and paper facilities, brickmaking plants, asphalt and ferrous metals plants. Manufacturers have developed cost-effective

technologies that can remove up to 95 percent of PM, 95 percent of SO2 and 90 percent of acid gases.[5]

To control VOCs, manufacturers develop and install technologies such as ventilation air methane systems, afterburners, regenerative oxidizers, catalytic systems, recuperative oxidizers and absorbers. Controls are deployed over a wide range of industries—including petrochemical, chemical, pharmaceutical, wood products, painting, coating, electronics and oil and gas—and are capable of up to 99 percent VOC destruction.

To control NOx and CO, manufacturers develop and install Selective Non-Catalytic Reduction (SNCR) technologies, catalysts, Low-NOx Burners and Catalytic Reduction technologies. These are used on combustion sources, such as boilers, turbines, engines, process heat, iron and steel, lime kilns, glass and cement. These technologies control for CO up to 99 percent efficiency at more than 1,000 power plants and industrial boilers across the United States and can remove greater than 95 percent of NOx at temperatures ranging from 300˚F to 2,000˚F.

Controlling GHGs is a considerably different task than the conventional pollutants above. There is no ready-made, bolt-on technology solution to reduce GHGs from industrial operations or the products we manufacture. This is forcing manufacturers to get creative to achieve strong GHG reductions. Manufacturers of all shapes and sizes are setting GHG targets to 2020, 2025 and beyond—and

[5] *See, e.g.*, The Institute of Clean Air Companies, Domestic Conventional Pollutants Division and Emissions Management Division, Issue Brief, *available at* http://www.icac.com/?page=DomConvPollutants.

are often beating them several years early. They are doing this by innovating, taking risks, driving efficiencies, streamlining their processes and relying on internal experts who know their businesses best.

Every manufacturer's operation is unique. That diversity is part of the challenge, but it can also lead to breakthroughs and innovation. We asked our members to send us examples, in their own words, of success stories in deploying environmental solutions at their facilities. Here are their stories.

MGK is a Minneapolis-based manufacturer that develops branded and custom insect control solutions. It recently lowered the VOC load in its aerosol and liquid products by levels between 30 and 70 percent. Some of this was done by shifting from solvent-based formulas to water-based formulas, and some came from lowering the use of hydrocarbon propellants in aerosols. MGK also lowered conventional pollutant emission rates by adding scrubbers to its stacks and reduced its use of methylene chloride by amending its production process to require fewer clean-out events and finding alternate solvents to use in clean-outs.

Gerdau Long Steel North America is in the process of upgrading its steel mill in Rancho Cucamonga, California—the only steel mill in the state—with a $23 million emissions control system that will be used to meet new South Coast Air Quality Management District air emission regulations, which are some of the most stringent in North America. This state-of-the-art environmental control system project took two years to design, and the design process alone cost $2 million. When completed, the system will capture 99.9 percent of contaminants in

the emissions from the mill, making the Gerdau Rancho Cucamonga steel mill one of the world's greenest.

Xerox has taken strong steps to reduce its environmental footprint. The company has focused on reducing the emissions that originate from the production of imaging supplies, such as toner, photoreceptor drums and belts and fuser rolls. Xerox has managed to reduce emissions through process modification, lower production volumes of legacy products coated using organic solvents and producing components with longer life spans, which results in fewer replacement components produced. The release of materials used in Xerox's worldwide operations is evaluated annually and reported to government agencies under national toxic chemical release reporting regulations, such as the U.S. TRI, the Canadian National Pollution Release Inventory and the European Pollutant Release and Transfer Register. Releases for reporting year 2016 remained unchanged compared to 2015 levels and were 75 percent lower than 2007 levels.

Nucor pioneered a new way of steelmaking when it introduced the mini-mill, an electric arc furnace with a considerably smaller environmental footprint than a traditional blast furnace: per ton of steel, the mini-mill results in a 99.2 percent reduction in particulate matter, an 86 percent reduction in SO2, an 80 percent reduction in NOx, a 91 percent reduction in CO and a 71 percent reduction in VOCs.[6] The company recently introduced the micro-mill, a facility

[6] http://www.nucor.com/responsibility/sustainability/highlights/.

with an even smaller environmental footprint than mini-mills, and it announced this fall that it is seeking to build a new micro-mill in the United States.[7]

At the chemical manufacturer Olin Corporation, employees within manufacturing and engineering, logistics and supply chain are encouraged to conceptualize, develop and execute productivity enhancement projects each year. The top 60 projects that deliver significant productivity gains are then presented by the global project teams to the company's top leadership in a conference setting. Providing an opportunity to leverage ideas, share opportunities and recognize the efforts and achievements of the project teams, the event serves as both a valuable development opportunity for employees and helps build further best practices for productivity and efficient, sustainable manufacturing practices throughout the organization.

Air Products and Chemicals has reduced its hazardous air pollutant (HAP) emissions by 82 percent and SO2 emissions by 60 percent since 2010. The company also develops a wide range of products and technologies that help manufacturers reduce their own emissions. Air Products' Helia® advanced oxidation technology reduces VOC emissions from wastewater treatment plants; it produces hydrogen used in refining to produce cleaner transportation fuels and to power advanced fuel cell vehicles; and its biogas membrane separators purify methane from farm waste, manure and municipal waste and help turn it into energy.[8]

[7] https://www.prnewswire.com/news-releases/nucor-board-of-directors-approves-steel-bar-micro-mill-project-and-merchant-bar-operations-expansion-300520418.html.
[8] http://www.airproducts.com/~/media/Files/PDF/company/2017-sustainability-report.pdf?la=en.

Covestro, formerly Bayer MaterialScience, committed to reduce its 2005 carbon dioxide (CO_2) levels by 40 percent by 2020. The company has already beaten that goal and set a new goal to cut CO_2 emissions in half again by 2025. It accomplished this by making numerous production improvements at Covestro facilities across the globe, including a $120 million investment at its largest facility in Baytown, Texas, to improve energy efficiencies, minimize waste and reduce natural resource consumption. Covestro developed a new manufacturing process that allows it to replace petrochemical feedstock with CO_2 and recently opened a new plant that will utilize this technology to make polyurethane foam for mattresses and furniture.

In the fall of 2012, steel manufacturer ArcelorMittal partnered with the federal government to install a 38-megawatt combined heat and power system to utilize previously wasted blast furnace gas (BFG), a by-product of the iron making process, to produce electricity on-site at its Indiana Harbor, Indiana, complex, the largest steelmaking facility in North America. The $63.2 million waste energy recovery system captures approximately 46 billion cubic feet of BFG from the facility's No. 7 blast furnace and uses it to produce steam to generate electricity. The installation lowered the facility's annual energy costs by nearly $20 million and reduced annual CO_2 emissions by 340,000 tons. In addition, the project created approximately 360 manufacturing and construction jobs and helped retain 4,850 employees at the facility by lowering the production costs of steel by $5 per ton.

BASF's global leadership in emissions reduction technologies for the automotive industry began in the 1960s with the creation of the catalytic converter by scientists working in Iselin and Union, New Jersey. In 2002, BASF's scientists earned an award for their work on the three-way catalyst, a key contributor to cleaner air for billions of people in the United States and around the world. More recently, BASF has continued to move the industry forward with the development of a four-way conversion catalyst that will reduce emissions of PM in addition to CO, NOx and HCl. The three-way catalysts are produced at BASF's Huntsville, Alabama, facility, a site that walks the talk of environmental stewardship and recently celebrated the production of the 400 millionth catalyst. All 650 employees are actively engaged in not only producing sustainable solutions for the automotive industry but also ensuring their own operations are just as sustainable. This summer, they were certified a virtual zero waste to landfill facility, one of only three manufacturing facilities in all of North America that is currently valid to UL Environment's UL 2799 certification. Their overall material management and recycling activities saved more than 35,000 metric tons of CO_{2e} emissions and 1,500 metric tons of non-methane VOCs. Last month, they were awarded the Air Pollution Control Achievement Award by the city of Huntsville for their recent site-wide LED conversion lighting project, which saved more than 1,000,000 kilowatt-hours per year of electricity (a 57 percent reduction) and reduced greenhouse gas emissions by more than 730 metric tons per year.

Calgon Carbon Corporation is a global leader in innovative solutions, high-quality products and reliable services designed to protect human health and the environment from harmful contaminants in water and air. As a leading manufacturer of activated carbon, with broad capabilities in ultraviolet light disinfection, Calgon Carbon provides purification solutions for drinking water, wastewater, pollution abatement and a variety of industrial and commercial manufacturing processes. One of the company's signature achievements has been the development of activated carbon-based products to control mercury emissions from coal-fired power plants, industrial boilers and cement kilns. Although the status of the regulations was an uncertain and winding road over the past decade, Calgon Carbon proactively invested more than $30 million to develop a better understanding of the issue, new products that delivered necessary mercury capture performance and new production capacity to meet the uncertain future demand. These products are being used by electric utilities to comply with the Mercury and Air Toxics Standard Rule.

Global engine manufacturer Cummins has a long history of setting and exceeding energy and GHG reduction goals at its facilities and operations. At the company's high-horsepower engine plant and technical center in Seymour, Indiana, Cummins made a $5 million investment in advanced energy-efficiency technology called regenerative dynamometers, which convert engine power from test cells to electricity that can be used onsite and exported to the grid. This innovative approach to energy efficiency will help Cummins reduce electricity consumption by 14,000 MWh per year and reduce electricity costs by $1.2 million

per year. The ability to net-meter this energy and to sell energy back to the grid has allowed Cummins to make this investment worthwhile. Cummins' engine plant in Jamestown, New York, recently showcased its latest initiative, a $47 million block machining line that utilizes on-demand hydraulics, coolant and pneumatics to reduce energy consumption as it produces the company's high-efficiency diesel and natural gas heavy-duty engines. Among other improvements, the plant in recent years has also replaced nearly 3,000 fluorescent lights with advanced LED lighting and a Wi-Fi-enabled control system that can automatically shut the lights off in parts of the plant not in use. National Grid, one of the largest investor-owned energy companies in the world, partnered with Cummins to invest $692,000 into the project as part of an effort to incentivize customers to use energy-efficient lighting, controls, heating and air-conditioning equipment and more. The plant's roof, meanwhile, has a nearly 2MW solar panel installation that on a sunny day will produce more than 20 percent of the facility's electric power needs.

In 2013, ConocoPhillips' Eagle Ford fugitive emissions team began to identify and eliminate equipment emission sources, beginning with leaks from tank thief hatches, wellsite controllers and flares. The team uses infrared camera technology to find emission leaks and follows up to ensure problems are addressed. The program has evolved into a planned preventive maintenance program encompassing all field sites. The fugitive team or a follow-up crew repairs the leaks. Data are recorded in the SAP work order system, and a detailed worksheet documents the emission history and associated work

performed. Documentation includes confirmation that the observed problems were addressed. A preventive maintenance schedule ensures that every site is inspected at least once a year. This proactive model demonstrating an effective way to manage fugitive emissions has been adopted across the company's Lower 48 business unit. In addition, Eagle Ford Operations has installed automation and centralized alarming to proactively maintain lit flares. All flares are alarmed to register flare-outs and to signal the Eagle Ford Integrated Operations of the Future team of any incident.

Owens Corning has set an aggressive target for reducing its GHG emissions—50 percent below 2010 levels by 2020—and is taking its commitment one step further, reducing the embodied carbon emitted throughout the product lifecycle, including raw material extraction, transportation and manufacture. Just last week, the company announced three new types of insulation made with 100 percent–certified wind energy. These products are intended to give commercial architects and specifiers, builders and even homeowners the option of lower-carbon products to build greener structures.

Energy Transfer Partners (ETP) operates from the position that emission reductions are rooted in building and operating safe, well-maintained and reliable facilities to prevent accidents from happening. ETP has for several years utilized FLIR infrared cameras to survey for natural gas leaks at its natural gas compression stations and treating plants. The program originated as a safety initiative to ensure that hazardous conditions did not exist for employees and has also evolved into an operations reliability program to reduce lost product and

identify maintenance issues. ETP was surveying for natural gas leaks long before regulations were promulgated by the EPA. ETP also utilizes LIDAR aerial technology to survey pipelines for leaks. This early detection technology can identify very small leaks by measuring vegetation disturbance and/or using hydrocarbon detection. This program prevents larger spills and releases and reduces repair and cleanup costs that are associated with a pipeline failure. Finally, at ETP's King Ranch Gas Processing Plant, ETP's engineering and safety requirements led the company to replace two in-service Light Petroleum Distillate (LPD) tanks with state-of-the-art pressurized tanks. Replacement of the original tanks with new pressurized tanks essentially eliminated all VOC emissions associated with storage of the LPD product—a net reduction of approximately 10 tons per year of VOC.

Johnson Controls has made substantial emissions reductions across its U.S. manufacturing portfolio. A key part of this has been its engagement with the Department of Energy's (DOE) Better Plants program, which helps manufacturers improve the energy efficiency of their operations. The Better Plants program offers a variety of solutions and resources for partners, including materials, tools, webinars and on-site visits to help identify energy savings opportunities. Johnson Controls joined the DOE Better Buildings Better Plants Challenge in 2013, and it set a goal of a 25 percent reduction in energy intensity in 10 years, using a 2009 baseline, for its manufacturing facilities located in the United States. This year, Johnson Controls was recognized by the Better Plants program with two awards: (1) the Better Plants, Better Practice Award for

establishing a company-wide Energy Hunt program as part of the Johnson Controls Manufacturing System that resulted in a threefold increase in identified energy savings projects; and (2) the Better Plants Goal Achievement Award for achieving its 25 percent energy intensity reduction goal across its U.S. industrial facilities, three years ahead of schedule, with a 26 percent reduction by end of 2016. Johnson Controls has implemented its Energy Hunt program across its U.S. manufacturing locations, including plants in Delaware, Illinois, Kansas, Oklahoma and Oregon.

Illinois Tool Works (ITW), one of the world's leading diversified manufacturers of specialized industrial equipment, consumables and related service businesses, is taking steps to phase out the refrigerants containing high global warming potential (GWP) in the commercial kitchen appliances it manufactures. ITW began its equipment transition early and is ahead of schedule to meet EPA compliance dates, by either using refrigerant alternatives with a lower GWP value or developing products using "natural" refrigerants like propane that have no GWP impact if emitted into the atmosphere.

Schneider Electric, a leader in process efficiency and automation, is driving emissions savings at fifteen of its own U.S. plants, from Smyrna, Tennessee to its headquarters in Massachusetts, reducing the equivalent of 5,788 tons of carbon in 2016.[9] Schneider Electric has a sustainability objective of becoming carbon neutral by 2030. The company developed an Internet-of-Things, cloud-enabled platform called EcoStruxure to make buildings, power

[9] https://www.energy.gov/sites/prod/files/2017/05/f34/Schneider_Electric_EWA_Case_Study_5-12-17.pdf.

plants, and facilities smarter, improve processes, and save on down time, energy and water costs—a technology solution the company believes will be a useful compliance tool for power plant GHG policies. Schneider Electric recently helped implement enterprise-wide energy management solutions in 43 of Ford Motor Company's U.S. locations, leading to 40 percent energy efficiency savings.

Part Three: Barriers to Innovation and Progress in Reducing Emissions

The stories above, and the hundreds like them across the manufacturing sector, are impressive. However, there remain barriers to accomplishing even more. New Source Review, EPA policy on MACT standards, continuity problems for federal support programs and trade policy all present challenges that prevent manufacturers from making even deeper emissions reductions.

New Source Review

The New Source Review (NSR) program is a federal air permitting program under the Clean Air Act that applies to new facilities or major modifications to facilities. The purpose of NSR, according to the EPA, is to require industrial facilities "to install modern pollution control equipment when they are built or when making a change that increases emissions significantly."[10] In practice, however, NSR often stands in the way of efficiency upgrades and the installation of modern pollution control equipment.

[10] https://www.epa.gov/sites/production/files/2015-12/documents/nsrbasicsfactsheet103106.pdf.

For instance, if a manufacturer installs selective catalytic reduction technology to reduce NOx emissions, the component will trigger NSR for the entire source, requiring review of *all* emissions. Practically speaking, that means the manufacturer will need 12 to 18 months to obtain NSR permits, tying up investment capital and delaying the economic benefits from expansion projects. The program requires expensive air modeling that frequently delays projects and can cost $100,000 or more to complete. It can lead to citizen suits—not just during NSR but again during renewal of the facility's Title V operating permit—and enforcement actions. And that is assuming the manufacturer actually gets the permit.

EPA rules on netting of emissions under NSR unnecessarily delay, and sometimes prevent, manufacturers from replacing older fossil fuel boilers with newer, environmentally beneficial units. In addition, the EPA has required manufacturers to go through NSR when they replace relatively minor equipment (like a water pump) with a newer model, taking the position that only replacement with the original, inefficient, outdated part qualifies as "routine maintenance" that could avoid onerous permitting regulations.

The desire to avoid NSR can therefore create several perverse incentives: (1) an incentive for manufacturers to operate their plants exactly as they were built and only to replace parts with the exact same part that existed when the plant was built; and (2) an incentive to keep a plant's overall emissions high in order to "save" them for use in a future project. One manufacturer reports that customers have asked it to de-optimize performance in a suite of efficiency

upgrades in order to avoid triggering NSR. Any rule that results in companies affirmatively taking steps *not* to optimize efficiency puts those companies at a competitive disadvantage.

An NAM member company manufactures gas turbine upgrade technology that could improve the vast majority of in-service gas turbines by 2.6 percent and reduce their total CO_2 emissions per MWh by 6.5 percent; however, many manufacturers are choosing not to install this equipment simply because it triggers NSR. The same can be said for steam turbine upgrades, which would ensure higher grid efficiency, lower emissions and reduced wear and tear that is occurring from a rapidly changing electric grid.

NSR also presents a huge impediment to the installation of more efficient technologies that would ultimately combat climate change. An inability to define what is "routine maintenance" has resulted in NSR Notices of Violation being issued for environmentally beneficial projects like economizer replacement, steam turbine upgrades, feed water heater replacements and similar activities. In comments to the EPA's draft Clean Power Plan, the Utility Air Regulatory Group (UARG) cited *more than 400 instances* in which a regulated entity took on a project to improve the energy efficiency of a power generation unit, only to be targeted by the EPA or citizen suits alleging that it had violated NSR.[11]

This cannot possibly be what Congress intended. In response to recent stakeholder outreach by the Department of Commerce and the EPA on

[11] Comments of the Utility Air Regulatory Group on Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, Docket ID EPA-HQ-OAR-2013-0602-22768, Attachment A (Dec. 1, 2014).

regulatory impediments to manufacturing, commenters from aerospace, insulation, pulp and paper, hard rock mining, iron and steel, clean energy power generation, boiler manufacturing and many other sectors raised NSR as a serious regulatory impediment. The NAM urges this committee to work with the EPA to fix NSR so that it functions properly and does not stand in the way of efficiency upgrades or environmentally beneficial projects.

Maximum Available Control Technology (MACT) Once-In-Always-In Policy

The EPA's existing policy is that once a manufacturer is subject to a MACT standard, it will *always* be subject to that MACT standard and the regulatory obligations that go along with it—even if the manufacturer installs pollution control technologies that reduce its emissions below the threshold levels that originally triggered MACT applicability to begin with. Practically speaking, this means once a manufacturers' emissions are below the MACT-required limits, there are very few regulatory reasons why the manufacturer would drive them even lower.

Ups and Downs of Federal Programs and Partnerships

While a competitive market is generally the best way to encourage the development of transformational technologies, the reality is that both the public and private sectors have roles to play. For instance, the government can play a positive role in support of the research and development (R&D) of alternative energy sources or technologies at a pre-commercial stage. There is also an

important federal role to be played in basic R&D of new high-risk energy efficiency and waste minimization technologies in energy-intensive industries, particularly where private-sector incentives may be inadequate.

Over the past 15 years, Congress has repeatedly enacted and enhanced programs that provide assistance to manufacturers in modernizing their plants and the products they make in them. These programs, with names like ARPA-E, ATVM, DERA, Energy Star, Better Buildings and Better Plants, are all regularly used by manufacturers and contribute to many of the innovations described above. Scores of manufacturers participate in programs such as the EPA's Climate Leaders Program, the DOE's Better Buildings, Better Plants Challenge and the Clean Energy Manufacturing Initiative, and with the help of these programs, these companies have not only met but exceeded their emissions goals. Continuity challenges for these programs, which often become subjects of Congressional scrutiny, can stand in the way of long-term progress for the manufacturers that rely on them.

Environmental Goods Agreement

The world's most pressing environmental problems do not exist solely within our own borders. There is a trillion-dollar market for environmental goods, and manufacturers in the United States make some of the best pollution control technologies on the planet. Unfortunately, many of our trading partners charge tariffs as high as 50 percent on these goods. The NAM has been a longtime supporter of efforts by the U.S. Trade Representative to negotiate an

Environmental Goods Agreement (EGA). A properly structured EGA would create jobs for U.S. manufacturers, who could then sell their best-in-class pollution control technologies to the rest of the world.

In the EGA talks, the United States, China and 15 other World Trade Organization members are considering a list of more than 350 environmental products that the NAM hopes will form the basis for an ambitious agreement. In particular, NAM members are seeking an EGA that eliminates tariffs on products including air pollution equipment, catalytic incinerators, energy-efficiency materials, environmental monitoring equipment, renewable energy products and equipment, turbines for electrical power generation and water treatment equipment.

The benefits of a robust EGA to manufacturers in the United States are crystal clear: it will boost U.S. manufacturing and our broad environmental goals as a country, supporting jobs and growth throughout the supply chain. It will also be an important catalyst to increased trade and innovation in technologies that will improve the environment, from providing cleaner water to reducing pollution, and support the growth of the manufacturing industries that produce these technologies. In the United States, such technologies are manufactured throughout the country, providing well-paying jobs.

Conclusion

Manufacturers have established a strong record of environmental protection and strive to reduce the environmental footprint of our operations and

to become more sustainable. The results are already impressive, and they get better with each passing year. However, as my testimony shows, barriers still exist. The NAM hopes it can work with this committee to reduce these barriers and help solve the environmental challenges of current and future generations.