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The 600 member companies of API represent all facets of America's oil and natural gas industry. Our industry supports 10.3 million American jobs and 7.6 percent of gross domestic product. We also provide most of the energy America needs to power our economy and support our way of life.

Innovation is the lifeblood of our industry. We have successfully developed and advanced technologies to safely and responsibly explore for and produce the oil, natural gas, and natural gas liquids that are vital to every aspect of our economy. This includes the application of emissions reduction technologies to capture both volatile organic compounds (VOCs)and methane. The refining side of our industry likewise continues to invest in emissions reduction technologies. U.S. refiners are producing cleaner gasoline and diesel fuels which, coupled with advanced vehicle technologies, means today's new cars, SUVs and pickup trucks are about 99 percent cleaner for common pollutants than vehicles in 1970. Cleaner fuels played a significant role in a 73 percent reduction of the six Clean Air Act Criteria Air Pollutants between 1970 and 2017 – even as vehicle miles traveled increased 189 percent. Furthermore, the development of ever cleaner fuels is exemplified in our industry's investment in the supply of very low sulfur fuel oil for the marine shipping industry and our support for International Maritime Organization (IMO) 2020 to drive down emissions of sulfur oxides. Because of American ingenuity and engineering prowess, the U.S. is not only firmly established as a global energy superpower, but also as a driver of technologies, best practices and products designed to elevate environmental performance.

Thanks to American technology and innovation, we have witnessed a dramatic transformation of the energy landscape over the past 10 years, both here in the US and globally. Looking back

10 years ago, we spoke in terms of energy scarcity and the expectation was that we would be importing billions of dollars of natural gas from places like the Middle East, Russia and West Africa. The outlook was the same on the petroleum side, with the U.S. expected to see onshore oil production declining or flattening with limited upside potential expected in the deeper waters of the Gulf of Mexico, and a continued and significant dependence on imports expected for years to come.

Fortunately, because of innovation and the advancement of the engineering technologies of hydraulic fracturing and horizontal drilling, we have experienced an energy resurgence and the U.S. is now the world's largest producer of both oil and natural gas. Clearly, we now speak in terms of energy abundance. This has brought with it tremendous benefits for everyday Americans, as we as a nation rely on oil and natural gas in everything that we do – from getting to work and getting our kids to school, to heating and cooling our homes, to using our stovetop to put dinner on the table.

As both the U.S. and global economies grow, the U.S. – with its abundant supplies – now provides economic and energy stability to domestic and global markets through continued and expanded production of oil and natural gas. But our leadership does not stop there. We are also leaders in environmental performance.

As early as 1999, the Department of Energy (DOE) recognized the environmental benefits provided by hydraulic fracturing. In its report titled *Environmental Benefits of Advanced Oil and Gas Exploration and Production Technology,* hydraulic fracturing was identified as an advanced completion and stimulation technology. DOE recognized environmental benefits from the technology to include: increased recovery, lower waste volumes, fewer wells drilled (more resource contacted and ability to drill multiple wells from a single well pad), protection of ground water resources, and less surface disturbance. A June 2016 report from the Western Energy Alliance and the Petroleum Association of Wyoming, titled *Gaining Ground,* shows how technological advances in drilling techniques and operations have dramatically lowered surface

disturbance, which reduces impacts on wildlife and minimizes habitat fragmentation. Today, operators are able to do ever more with less, minimizing their environmental footprint and protecting the surrounding environment.

Our industry is also leading the way in successfully tackling emissions and the story here is the same: we have accomplished this by advancing the technologies to ensure that we are capturing VOCs and methane, which is the primary component of natural gas. We have demonstrated that the solution to addressing methane emissions is through the development and application of technologies through innovation. While oil production has more than doubled since 2005 and natural gas production has increased by nearly 70 percent over the same time period, our industry has developed and implemented technologies and best practices to help drive our emission rates down significantly. Furthermore, from 2000-2016, the U.S. oil and natural gas industry has invested more than $108 billion in low and zero greenhouse gas emission technologies including renewable energy sources, advanced technology vehicles, fugitive gas reduction technologies, combined heat and power, carbon capture and storage, and basic and applied research. Our country has seen its carbon dioxide emissions drop to the lowest levels in 25 years, and this is directly attributable to industry leadership and the increased use of clean-burning, abundant, affordable natural gas in power generation.

Our industry uses a collaborative approach to advancing solutions to any issue that may arise, whether it be an issue related to production, safety, habitat conservation, air, water or waste. The establishment and growth of The Environmental Partnership ("The Partnership") is a tremendous example of our industry working together in a process of learning, collaborating and taking action, and this important program has helped to drive strong environmental performance for the broader industry.

The Partnership is a new coalition of oil and natural gas production companies, which came together recognizing that more could be accomplished through a collective effort, with the

participating companies actively committing to continuously improve the industry's environmental performance. The program started with 26 participants at the end of 2017 and has significantly grown to 67 members strong, representing every major onshore production basin in the U.S. The program includes the largest U.S. energy producers as well as the smallest energy producers among its participants. Participants include 18 of the top 20 natural gas producers in the country, and 32 of the top 40. This is quite impressive considering The Partnership has only been around for a short time, and this demonstrates industry's continued commitment to emissions reduction.

The program is built upon three key principles: taking action, learning about best practices and technologies, and fostering collaboration. The Partnership's initial focus is to further reduce the industry's air emissions. That means further reducing methane, a greenhouse gas, and volatile organic compounds which can lead to the formation of ground level ozone.
To accomplish this, The Partnership developed three separate Environmental Performance Programs that participating companies are implementing to further reduce emissions from operations. Companies are using advanced monitoring technologies to find and repair leaking equipment, replacing or modifying higher-emitting process control equipment, and implementing best practices to minimize emissions associated with the removal of liquids from natural gas wells as they age.

In July, The Partnership released its first Annual Report to track and share program participants progress, as well as highlight our performance programs, and the learning and collaboration fostered by The Partnership. One of the most important aspects of The Partnership has been the three performance programs that participants are implementing, focused on making improvements regarding the three primary sources of industry methane emissions. According to EPA data, the three primary sources of industry methane emissions are equipment leaks, pneumatic control devices and leaks that may occur when excess liquids are unloaded from a natural gas well.

Participants in The Partnership's Leak Detection and Repair Program reported a leak occurrence rate of just 0.16 percent, or 1.6 components for every 1,000, and that figure comes from more than 156,000 surveys across more than 78,000 production sites. This is an important signal that ongoing industry efforts to identify and fix emissions sources are working.

Other data is also encouraging. In 2018, The Partnership companies replaced, retrofitted or removed from service more than 3,000 high-bleed pneumatic controllers, which leak small amounts of natural gas as part of their normal operations. This is on top of the 28,000 pneumatic controllers that were already replaced by participating companies prior to 2018. Today, 38 companies in The Partnership report that they have completely removed these controllers from their operations.

In addition, participants in The Partnership reported monitoring more than 132,000 manual liquids unloading events in 2018. This type of monitoring makes a big impact in ensuring that natural gas and its components like methane are not unnecessarily released into the atmosphere.

We know these actions are making a difference. EPA estimates have shown that finding and fixing leaks can lead to a 40% emissions reduction. Replacing high-bleed pneumatic controllers with an alternative device can lead to a 60% reduction in emissions, and likely much greater. In fact, between 2011-2017, producers of oil and natural gas reduced methane emission rates by nearly 60% across four large natural gas producing regions (Anadarko, Appalachian, Eagle Ford and Permian), even as output increased significantly.

Equally as important as its performance programs, however, are The Partnership's efforts to foster greater learning and collaborating within the industry. The Partnership held workshops in the Permian and in Oklahoma City this year. In 2018, The Partnership conducted workshops in Pennsylvania, Texas and Colorado. All of these workshops provided the industry with the opportunity to take a closer look at the latest technologies and best practices being used to

detect leaks. These workshops were open to any oil or natural gas producer and included lengthy question-and-answer periods where company representatives freely shared knowledge gained from their experiences in the field.

The Environmental Partnership and its companies also benefited from collaboration with METEC, a research and testing facility located at Colorado State University. The Partnership provided a grant and helped to facilitate research that METEC was undertaking into optical gas imaging cameras, and also organized a tour for companies of the METEC site.

Critical to the progress The Partnership has made is its model for information sharing and collaboration on technologies and techniques to reduce methane emissions. The feedback on the experience of our participants is telling. For example, we've heard from smaller operators that otherwise wouldn't have access to the kind of resources or information on cutting edge technology to reduce their environmental impact.

When one smaller company became involved with The Partnership, they were still finalizing their emissions detection and repair program. Through The Partnership, they were able to learn from and collaborate with larger and various other companies who already had successful programs in place. Being able to see the depth and details of those programs helped springboard their own, enabling the company to operate their facilities at a higher level. These opportunities to learn, collaborate and take action in order to responsibly develop our nation's essential oil and natural gas resources are at the foundation of The Partnership's mission.

Our industry's innovation has also played a constructive role in the development of the regulatory framework for addressing emissions. API's working relationship with EPA is a constructive one that has enabled industry to share information about rapidly changing technologies while hosting site visits so that EPA staff can best understand emissions sources and how to control them. The U.S. energy revolution is a technology revolution, with extensive innovations for addressing emissions that include reduced emission completions, low-emission

valves and leak detection through sophisticated optical gas imaging cameras. Our industry has been using many of these technologies for years. EPA's own regulations now incorporate many of these innovations and API supports having these regulatory emission control requirements in place.

API and the oil and gas industry have also been at the forefront of developing guidance documents for estimating greenhouse gas emissions from operations and for sustainability reporting. In 2001, API was among the first organizations in the world to release guidance for estimating GHG emissions from oil and natural gas operations, a tool that is vital for understanding emissions so that we can take steps to manage and reduce them. Soon after issuing that important guidance, API released its SANGEA software platform for estimating and reporting greenhouse gas emissions, an important tool that's relied upon around the world for calculating and compiling GHG emissions and energy usage data from exploration and production, gas processing, refining and marketing, petrochemicals, transportation, electricity consumption, manufacturing, coal mining, and other activities. On top of that, API has collaborated with IPIECA and the International Oil & Gas Producers Association, two global industry organizations, in the publishing of *Oil and Gas Industry Guidance on Voluntary Sustainability Reporting*, a critical tool that guides the industry in its reporting of GHG emissions.

In addition, through its Global Industry Services Division, API drives safety, environmental protection, and sustainability across the oil and gas industry by setting world-class standards and best practices, and administering certification, training, events, publications, and safety programs for global industry operations. API was formed in 1919 as a standards-setting organization and is the global leader in convening subject matter experts to establish, maintain, and distribute consensus standards for the oil and gas industry. Environmental and operational safety is at the core of the energy development that's critical to America's economy and energy security – something that can be seen in the more than 700 standards API developed in its first 100 years, including the 100-plus exploration and production standards created or

strengthened since 2010. API standards have been cited 750 times in U.S. EPA, OSHA, Coast Guard, FTC, PHMSA, and BSSE regulations. API standards have been referenced about 225 times by regulatory bodies.

The commitment and progress of the U.S. oil and natural gas industry to safe and responsible operations positions our country very well for continued production of the oil and natural gas Americans need here at home. As recent events in Saudi Arabia demonstrate, U.S. energy production strengthens our energy and national security and helps put downward pressure on prices, while also providing many thousands of new jobs for Americans and billions of dollars in additional revenue for our government. According to the Energy Information Administration (EIA), we produced an average of 5 million barrels of oil a day in 2008, and we are now producing over 12 million barrels per day. Simultaneously, we have reduced the amount of oil that we import. But we can and should do more.

As we have seen throughout this current energy resurgence, increased production of U.S. oil and natural gas drives many benefits for the country, including billions of dollars in capital investments, creation of thousands upon thousands of well-paying jobs, continued improvement in our balance of trade, and increased energy security for the U.S. and our allies abroad. U.S. production has reached a point where it provides an effective buffer against unplanned supply disruptions in the global crude oil market. The recent attack on the Saudi oil processing facility immediately took more than 5 million barrels of oil off the global market, yet the global market exhibited newfound resilience that is directly attributable to the U.S. oil boom.

Market disruptions are not new. According to the Energy Information Administration (EIA), market disruptions reached 3.6 million barrels per day in May 2016, and more recently reached 3.3 million barrels a day in February and July of this year. U.S. production growth has made all the difference in mitigating against these disruptions, helping to offset the loss from unplanned

production outages around the world and put downward pressure on prices to the great benefit of American consumers and businesses.

Fundamentals of economics are quite evident in oil and natural gas markets, with growing U.S. supplies putting downward pressure on the price of oil and natural gas. The Henry Hub price of natural gas has remained at $6.00 per mmBtu or less since December 2008, with most months since then with an average price in the $2 to $4 range. Abundant supplies of natural gas in the U.S. and the ability of U.S. producers to efficiently produce these resources has led the EIA and other analysts to predict that natural gas prices will remain relatively low for many years. Between 2007 and 2017, household energy spending fell 10.5 percent, even while expenditures for health care, education and food increased significantly.

Similarly, the price of crude oil has declined significantly. The spot price for West Texas Intermediate crude oil averaged $95 per barrel in January 2014. By December 2014 it was down to $59, and in January 2016 it was at $32. According to EIA, in 2017 drivers saved an average of $220 per capita in fuel costs compared with 2007. Even with the recent events in the Middle East, the price of West Texas Intermediate has recently remained near $60 per barrel. Affordable energy helps drive the economy, and affordability comes with increased access to U.S. oil and natural gas supplies.

The U.S. energy boom has also been a catalyst to resurgent manufacturing and petrochemical sectors, which rely on low cost energy to fuel operations and on natural gas and natural gas liquids as feedstocks for production. For example, the American Chemistry Council (ACC) identified 334 chemical industry investment projects valued at $204 billion that have been announced as of May 2019. According to ACC, during peak investment years, these projects could support 431,000 jobs and $292 billion in new economic output by 2025.

To maintain these benefits, we must plan for the future, and the most sensible approach is to pursue safe and responsible energy development here at home. Given expected global

economic and population growth, more total energy will be needed both in the U.S. and globally. The EIA forecasts that U.S. energy demand will grow by 9 percent between 2017 and 2050, with more than two-thirds of the energy demand expected to be met by oil and natural gas, as is the case today.

Globally, the change in energy demand is much greater and, when it comes to liquid petroleum products, the U.S. competes on a global basis for these resources. Recent forecasts by the International Energy Agency (IEA) estimate that the global economy from 2017 to 2040 will require an expansion of over 11 million barrels per day in global oil supplies. The growth in demand for natural gas worldwide is expected to be even larger, increasing by 44 percent from 2017 to 2040. Despite significant growth of renewable energy and improvements in energy efficiency, in 2040 more than half the world's energy demand is projected to be met by oil and natural gas, as is the case today.

In the U.S., we have a tremendous resource base with which to meet our growing energy needs. Based upon conservative estimates, we have enough oil and natural gas resources to fuel more than 200 million cars for 50 years and heat 70 million households for more than four centuries. And there is very likely much more oil and natural gas than previously known in areas where the industry has been unable to explore, and new technologies allow us to access resources previously thought unreachable. The Bureau of Ocean Energy Management estimates that there is more than 50,000 Tcf of gas hydrates in-place in the lower 48 states. That's more than 1,500 years of consumption.

Technological innovations and industry leadership have propelled the oil and natural gas industry forward. Additionally, the oil and natural gas industry remains committed to smart regulatory structures that promote safety, environmental protection, and responsible operations and also provide the flexibility to incentivize innovation and enhance the deployment of new technologies.

In his book “The Quest”, the Pulitzer-prize winning historian Daniel Yergin points out that “[p]olicies related to access to energy and its production can have major impact on the timeliness of investment and the availability of supply – and thus on energy security.” Seventy-eight percent of U.S. voters support increased domestic oil and natural gas production. We know that Americans also expect that we produce our energy with safeguards for our workers, communities and the environment. With the right policies and right leadership, through innovation and the deployment of advanced technologies, we can produce American oil and gas resources in a safe and environmentally responsible way, securing our own energy supplies, advancing our mutual environmental objectives, and bolstering America’s economic and energy security. The success of The Environmental Partnership is proof positive of this.