

*ONE Future's overarching goal is to ensure the future of natural gas as a long-term sustainable fuel even in a low carbon economy. We do that by demonstrating that the natural gas industry can minimize methane emissions and increase production and throughput while supplying much needed reliable and affordable energy to the U.S. and around the globe for years to come.*

# **ONE FUTURE 2020 METHANE EMISSION INTENSITIES REPORT**



## ONE FUTURE MEMBER COMPANIES



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There are nearly **179 MILLION** natural gas customers in the **USA**



**69 MILLION** homes



**5.5 MILLION** businesses like hotels, restaurants, hospitals, schools and supermarkets



**185,400** factories



**1,825** electric generating units.

Since **2000** electricity generated from natural gas has increased by **19.3%** and has surpassed the amount imported.

### NATURAL GAS COSTS LESS!

Households that use natural gas appliances for heating, water heating, cooking and clothes drying spend an average of **\$879** less per year than homes using electric appliances.

Natural Gas was the largest source of U.S. electricity generation in 2019 – **38%**



On Average, U.S. homes use 175 cubic feet of natural gas per day



Fertilizer used to grow crops is composed almost entirely of natural gas components. U.S. agricultural producers rely on an affordable, stable supply of natural gas.

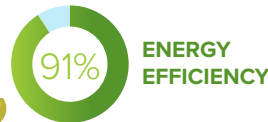


Natural gas exports have climbed past **3.6** trillion cubic feet per year.

Increased use of natural gas is the single largest factor in power sector emissions reductions reaching **25-YEAR LOWS.**



The direct use of natural gas in America's homes and businesses achieves



### NATURAL GAS IS LOCAL!

92% of natural gas consumed in the US is produced domestically



**AND** Shale production now accounts for more than 50% of gas produced.

### NATURAL GAS IS PLENTIFUL!

According to the

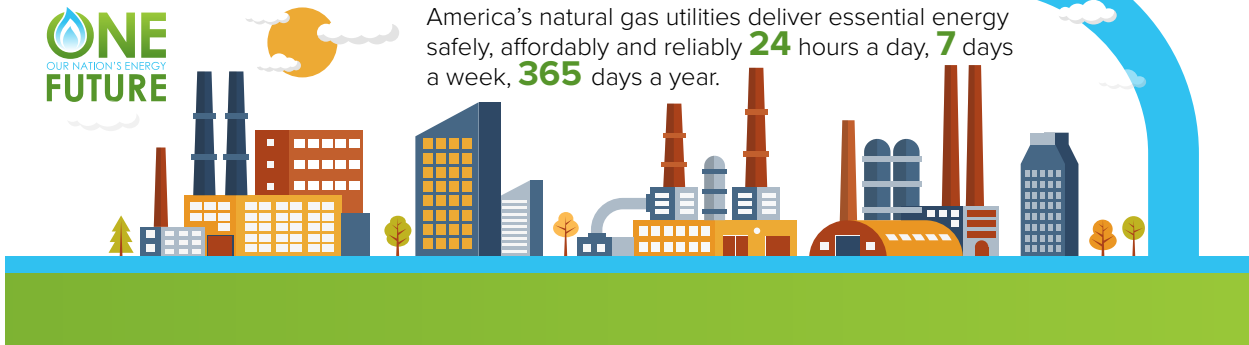


ENERGY INFORMATION ADMINISTRATION

Future supply of natural gas in the US at year end 2018 was **3,374 TRILLION CUBIC FEET (TCF)**. Enough to meet America's energy needs for +110 years.



America's natural gas utilities deliver essential energy safely, affordably and reliably **24** hours a day, **7** days a week, **365** days a year.



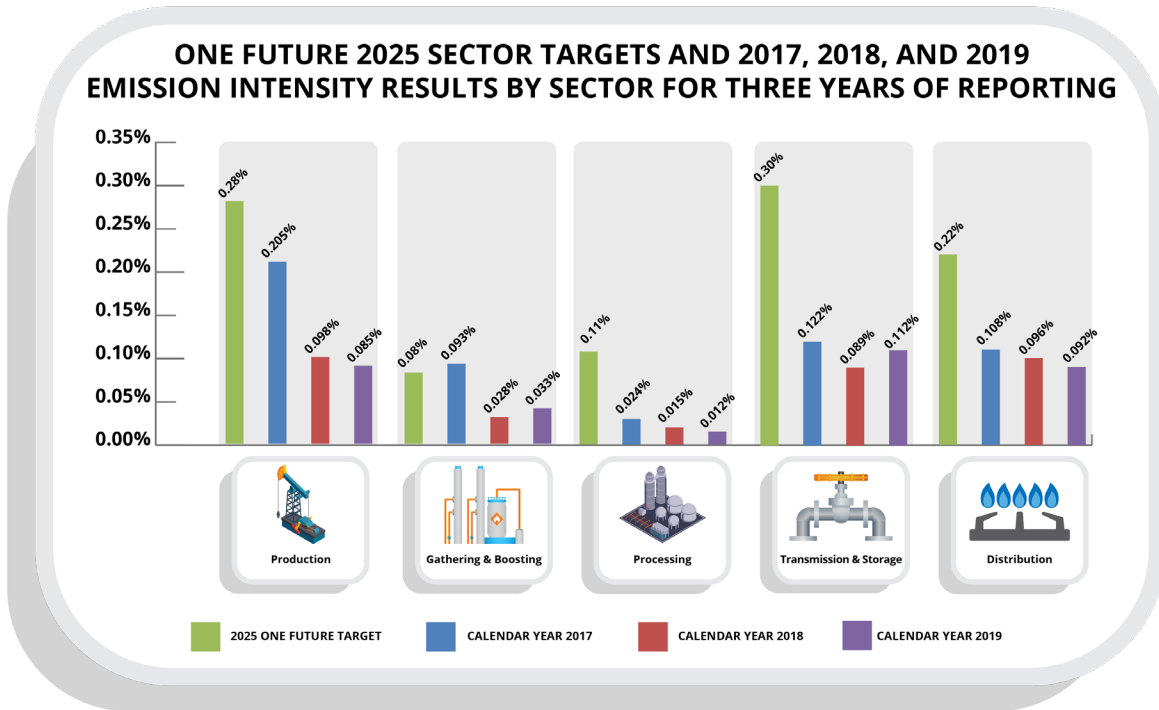
## REPORT HIGHLIGHTS

- ONE Future surpasses goal by 67%; 2019 methane intensity of member companies recorded at 0.334%, versus 2025 goal of 1.0%
- In 2018 seventeen (17) ONE Future members reported their methane intensity; in 2019 twenty-four (24) members reported their methane intensity. Even with the additional seven members reporting, overall methane intensity remained flat, while production increased by 32% and deliveries to customers increased by 58%.
- For the third year in a row the coalition surpassed its 1% goal by a significant amount. These numbers demonstrate that the natural gas industry can minimize methane emissions and increase production and throughput while supplying much needed energy to the U.S. and around the globe for years to come.

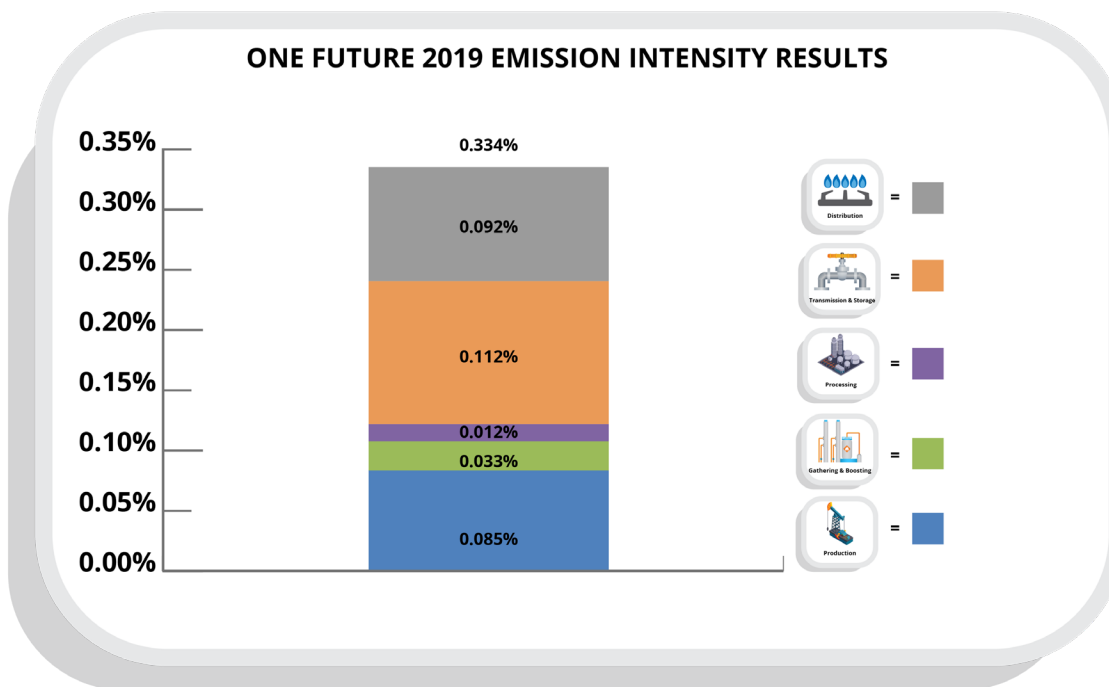
## EXECUTIVE SUMMARY

Our Nation's Energy Future (ONE Future) is a coalition of 32 natural gas companies representing the natural gas value chain focused on implementing an innovative, performance-based approach to the management of methane emissions directed toward a concrete goal of one percent (or less) of total produced natural gas by 2025. This is ONE Future's third annual report, and based on 2019 emissions and throughput, ONE Future's methane intensity is 0.334%. The 2019 ONE Future emissions intensity remained virtually flat year over year while overall the 2019 methane intensity of 0.334% is 67% below the ONE Future goal of 1%. The results from 2017, 2018, and 2019 demonstrate that ONE Future is already significantly below its one percent methane emission intensity 2025 target.

This is the third year of ONE Future reporting. The following figure shows the sector intensity results for 2017, 2018, and 2019 compared to 2025 sector targets.



The next figure shows the 2019 industry total intensity results for the ONE Future Member Companies. There were reductions in intensities of three segments between 2018 and 2019, as well as slight increases in intensity for the remaining two segments.



## HIGH-LEVEL SUMMARY

A more detailed description of how the reductions were achieved is discussed in each sector report, but a high-level summary of the changes shown in the figures above are listed here:

- In each sector there are new members who have been included in the sector intensity for the 2019 report. In spite of adding new members, the intensity stayed relatively consistent with the intensity from 2018 because of the work that each new member company has done in the years prior to joining ONE Future. In addition, some existing members have reduced their intensities.
- ONE Future members in each of the sectors show the following 2019 intensity results vs. their 2025 goals:
  - **Production:** Intensity of 0.085% vs. goal of 0.28% - beating goal by 70%
  - **Gathering & Boosting:** Intensity of 0.033% vs. goal of 0.08% - beating goal by 59%
  - **Processing:** Intensity of 0.012% vs. goal of 0.11% - beating goal by 89%
  - **Transmission & Storage:** Intensity of 0.112% vs. goal of 0.30% - beating goal by 63%
  - **Distribution:** Intensity of 0.092% vs. goal of 0.22% - beating goal by 58%
- Overall production increased by 32% and deliveries to customers increased by 58%

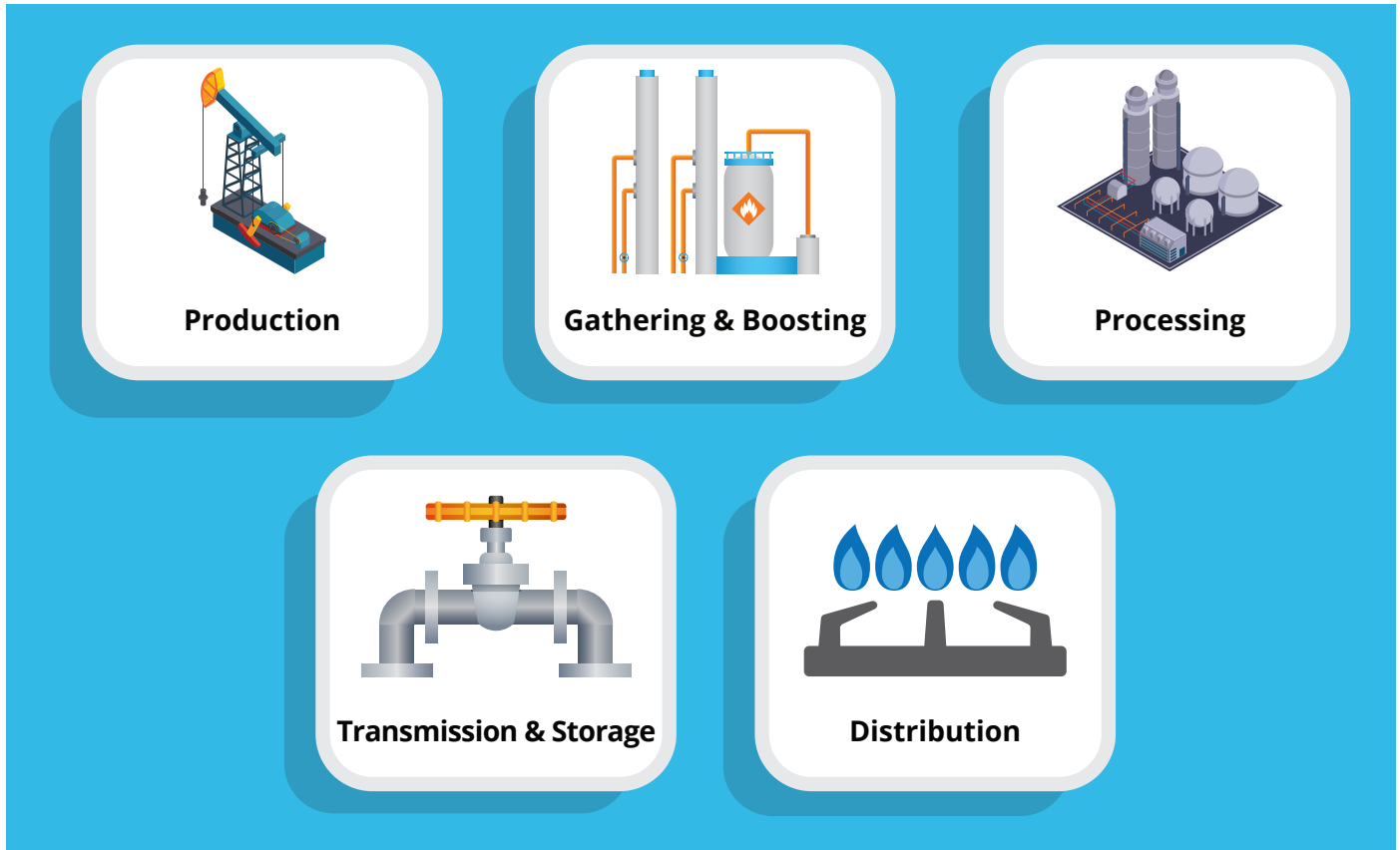
Due to the year-to-year changes in sectors, the net emissions intensity from ONE Future has remained virtually flat, but still is 67% less than our one percent goal. ONE Future's overarching goal is to ensure the future of natural gas as a long-term sustainable fuel and that objective will be assured as additional players in the natural gas value chain continue to step-up and embrace the benefits of reducing methane emissions. We understand that methane emission reduction, when implemented on a flexible performance-based approach selected by each company, is not just good for the environment, but is also good for the natural gas industry, its employees, customers, communities, and investors.

We strive for continuous improvement to ensure that natural gas remains the fuel of choice for all end-use sectors at all times: power – including natural gas delivered by local distribution companies for power generation; residential, commercial and industrial demand; and critical emerging markets like transportation and liquid natural gas (LNG) exports.

We believe that ONE Future's results demonstrate that industry can cost-effectively achieve an average emissions intensity rate of one percent or less. ONE Future believes that targeted investment in abatement technologies today can both yield significant improvements in environmental performance and supply chain efficiency.

# INTRODUCTION TO ONE FUTURE

Leading companies with operations spanning the natural gas value chain.



ONE Future is a unique group of leading companies with operations spanning five sectors of the natural gas value chain: (1) oil and natural gas production; (2) natural gas gathering and boosting (G&B); (3) natural gas processing; (4) natural gas transmission and storage (T&S); and (5) natural gas distribution. Since our formation in 2014, we have grown to 32 companies accounting for some of the largest natural gas producers, transmission and distribution companies in the United States (U.S.).

ONE Future members operate in 13 out of the 38 production basins<sup>1</sup>, and other segments of the value chain operate in multiple regions of the country, hence ONE Future's data represent a geographically diverse and material share of the U.S. natural gas supply chain.

ONE Future's members are listed in Table 1.

<sup>1</sup> TOTAL PRODUCTION BASIN COUNT IS BASED UPON THE NUMBER OF US BASINS WITH PRODUCTION AND EMISSIONS REPORTED TO THE US EPA UNDER THE GHGRP. THE BASINS ARE DEFINED BY THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (AAPG)

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## ONE FUTURE MEMBERS

**TABLE 1: ONE FUTURE MEMBER COMPANIES**

Company	Industry Segments (Reported for Calendar Year 2019)	Year Joined
Antero Resources	Production, G&B	2018
Apache Corporation	Production, G&B	2014
Ascent Resources	Production	2019
Atmos Energy	T&S, Distribution	2020
Berkshire Hathaway Energy Pipeline Group	T&S	2018
BHP	Production	2014
Boardwalk Pipelines	T&S	2019
Caerus Oil and Gas	*	2020
Dominion Energy	Production, G&B, Processing, T&S, Distribution	2018
Duke Energy	*	2020
EagleClaw Midstream	*	2020
Enbridge	T&S	2020
Encino Energy	Production	2020
EQT Corporation	Production	2018
Equinor	Production, G&B	2016
Equitrans Midstream	G&B, T&S	2019
Hess Corporation	Production, G&B, Processing	2014
Kinder Morgan	T&S	2014
National Grid	Distribution	2014
New Jersey Natural Gas	Distribution	2018
Noble Energy	Production, G&B	2018
NW Natural	Distribution	2020
ONE Gas	*	2020
ONEOK	*	2020
Southern Company Gas	Distribution	2014
Southern Star	*	2020
Southwestern Energy	Production	2014
Summit Utilities	T&S, Distribution	2016
TC Energy	T&S	2016
Williams	G&B, Processing, T&S	2019
Woodland Midstream	*	2020
Xcel Energy	*	2020

NOTE: \*CAERUS OIL AND GAS, DUKE ENERGY, EAGLECLAW MIDSTREAM, ONE GAS, ONEOK, SOUTHERN STAR, WOODLAND MIDSTREAM AND XCEL ENERGY JOINED ONE FUTURE AFTER METHANE INTENSITY DATA COLLECTION AND CALCULATIONS TOOK PLACE FOR THIS CALENDAR YEAR 2019 REPORT. THEIR EMISSIONS DATA ARE NOT REFLECTED IN THIS CURRENT REPORT BUT WILL BE INCLUDED IN FUTURE YEARS.

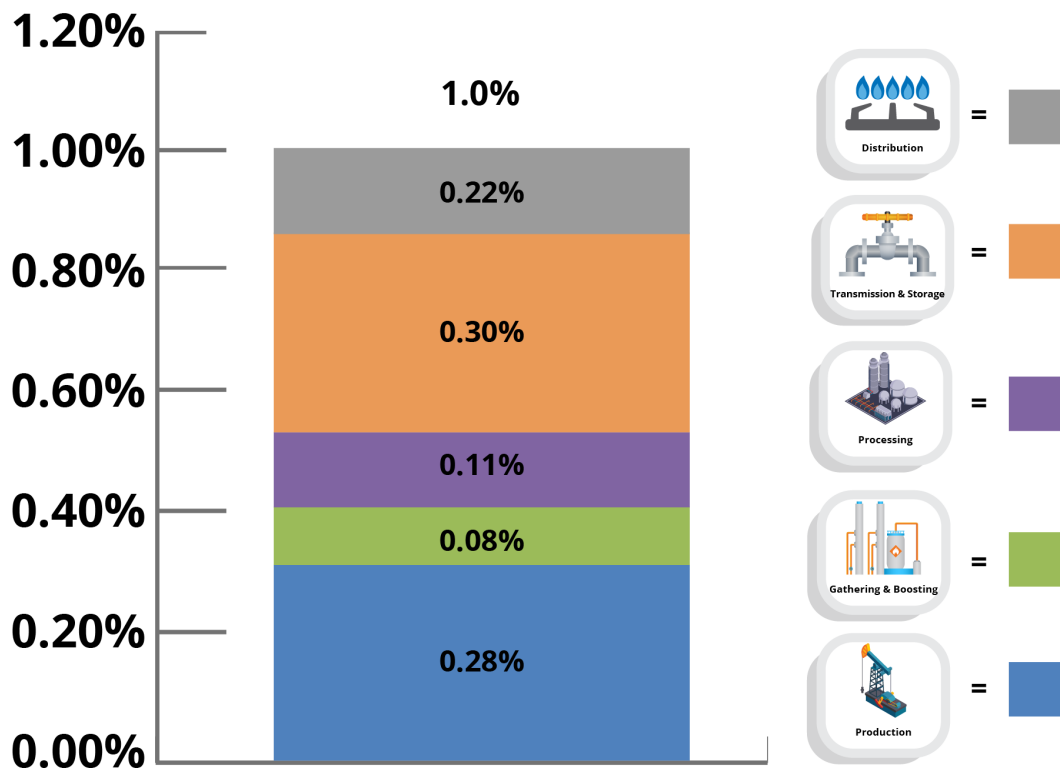
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# ONE FUTURE EMISSIONS INTENSITY APPROACH

Goal oriented, innovative, cost-effective, performance based.

Established as a non-profit 501(c)(6) trade group, ONE Future’s mission is to reduce methane (CH<sub>4</sub>) emissions across all segments of the natural gas value chain by means of innovative, cost-effective, and performance-based actions.

**FIGURE 1 - ILLUSTRATION OF ONE FUTURE 2025 TARGET<sup>5</sup>**



ONE FUTURE REVIEWS OUR TARGET PERIODICALLY AS WE GAIN A BETTER UNDERSTANDING OF THE METHANE INTENSITY DATA COLLECTED EACH YEAR AND THE AREAS THAT NEED CONTINUED IMPROVEMENT FROM A DATA AND METHANE REDUCTION PERSPECTIVE. NO MATTER THE ACTUAL BASE LEVEL NATIONAL EMISSIONS INTENSITY FOR THE ENTIRE U.S., ONE FUTURE MEMBERS AIM TO CONTINUOUSLY EVALUATE AND IMPLEMENT VOLUNTARY ACTIONS TO ACHIEVE AN INTENSITY THAT IS BELOW ITS ONE PERCENT TARGET.

ONE Future's approach is science-based and goal-oriented, but flexible in that member companies can choose how they can cost-effectively and efficiently achieve their methane emissions intensity goal for their particular assets – whether that is by deploying an innovative technology, modifying a work practice, or in some cases replacing or retrofitting high emitting equipment. What is important is that each company demonstrates progress toward its target, which in turn allows the group as a whole to achieve ONE Future's overall emission intensity target (total CH<sub>4</sub> emissions divided by gross production) of one percent or less by 2025<sup>2</sup>.

The original goal of one percent, established by the founding members of the ONE Future Coalition in 2014, was partially based on EPA's 2012 National Greenhouse Gas Inventory<sup>3</sup> (referred to as the GHGI) and its national methane emission intensity rate of 1.44%. ONE Future's one percent goal was ambitious, but the members believed that it was feasible using existing technology and practices. Secondly, peer-reviewed analyses suggested that for natural gas to provide greenhouse gas (GHG) reduction benefits compared to any other fossil fuel in any other end use application, the natural gas industry would have to achieve a methane emission rate of one percent or less across the natural gas value chain<sup>4</sup>. Finally, by orienting our activities toward a specific and measurable outcome (a sustained low rate of methane emissions that is consistent with efficient operations), we focus on identifying the most cost-effective abatement opportunities.

<sup>2</sup> THE NATURAL GAS SUPPLY CHAIN DOES NOT ACTUALLY RECEIVE THE "GROSS GAS PRODUCTION", AS SOME OF THE GAS IS RE-INJECTED FOR RE-PRESSURING BEFORE LEAVING THE PRODUCTION SITE. A "NET GAS PRODUCTION" VALUE CAN BE CALCULATED THAT MORE ACCURATELY REFLECTS THE GAS THAT FLOWS INTO THE SUPPLY CHAIN. THIS NET GAS VALUE SUBTRACTS THE DOE EIA "REPRESSURING" GAS FROM THE GROSS GAS PRODUCTION.

<sup>3</sup> [HTTPS://WWW.EPA.GOV/GHGESSIONS/INVENTORY-US-GREENHOUSE-GAS-EMISSIONS-AND-SINKS-1990-2012](https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2012)

<sup>4</sup> [HTTPS://WWW.IEA.ORG/PUBLICATIONS/FREEPUBLICATIONS/PUBLICATION/WEO-2012---SPECIAL-REPORT---GOLDEN-RULES-FOR-A-GOLDEN-AGE-OF-GAS.HTML](https://www.iea.org/publications/freepublications/publication/weo-2012---special-report---golden-rules-for-a-golden-age-of-gas.html)

<sup>5</sup> FOR THE PURPOSES OF FIGURE 1, INDIVIDUAL SEGMENT INTENSITY TARGETS WERE ROUNDED TO TWO SIGNIFICANT DIGITS.

## ONE FUTURE EMISSIONS INTENSITY APPROACH

**BY REDUCING METHANE EMISSIONS ACROSS THE NATURAL GAS SUPPLY CHAIN, ONE FUTURE MEMBERS WILL DELIVER MORE VALUE TO OUR CUSTOMERS AND SHAREHOLDERS, AND INCREASE SAFETY WHILE MEANINGFULLY REDUCING OUR GREENHOUSE GAS EMISSIONS.**

Natural gas is primarily composed of methane, a clean fuel that emits few air pollutants when burned in stove tops, in power plants to generate electricity, or to power vehicle engines. However, when methane is emitted directly into the atmosphere (and not burned), it is a potent greenhouse gas. By reducing methane emissions across the natural gas supply chain, ONE Future members will deliver more value to our customers and shareholders, and increase safety while meaningfully reducing our greenhouse gas emissions.

Although the organization was formed in 2014, all ONE Future member companies have invested in methane mitigation technologies and work-practices for several decades. This report explains ONE Future's approach through 2019 for quantifying the methane emissions intensity for each Coalition industry sector and presents the resulting methane emission intensity values based on 2019 data.

To enable multiple companies involved in different sectors of the natural gas supply chain to report methane emissions in a manner that is both consistent and transparent, ONE Future has developed a Methane Emissions Estimation Protocol (ONE Future Protocol)<sup>6</sup>. The ONE Future Protocol defines both the annual emissions intensity calculation techniques, as well as the method by which annual results will be compared to the ONE Future sector and overall goals. By using a written protocol, ONE Future members aim to benchmark performance according to a common and uniform set of emission calculations and measurements so that the results are transparent and verifiable.

ONE Future tracks company and program progress by calculating emission intensities at the national, segment, and member levels. Segment and member emission intensities are based on total methane emissions for the particular member or for all ONE Future companies with operations in a particular segment divided by a segment-based throughput. The initial segment intensity values are not additive across different segments because they are referenced to different segment-specific throughput quantities in the denominator.

<sup>6</sup> [HTTPS://ONEFUTURE.US/WP-CONTENT/UPLOADS/2020/09/ONE-FUTURE-METHANE-INTENSITY-PROTOCOL\\_V3\\_3AUG2020.PDF](https://onefuture.us/wp-content/uploads/2020/09/one-future-methane-intensity-protocol_v3_3aug2020.pdf) ONE FUTURE RESERVES THE RIGHT TO UPDATE THE CONTENTS OF THE ONE FUTURE PROTOCOL AT ANY TIME TO MAINTAIN ALIGNMENT WITH EPA DEFINITIONS AND METHODOLOGIES AND REFLECT EPA'S MOST CURRENT GHG EMISSIONS DATA.

However, individual segment intensities can be normalized to total national production rates so that the normalized segment intensities become additive. This normalization using national production rates is described in the protocol. ONE Future uses national gas production rates<sup>7</sup> that are published annually by the U.S. Department of Energy's Energy Information Administration (DOE EIA).

The ONE Future Protocol also provides the procedures that member companies will use to quantify and report their emissions and track their progress. The detailed procedures that companies use to compute their emissions largely follows the EPA's Greenhouse Gas Reporting Program (referred to as the GHGRP)<sup>8</sup> or the national Greenhouse Gas Inventory (GHGI) prepared annually by EPA<sup>9</sup>. ONE Future members have included additional emission sources not required for reporting under the GHGRP and use the latest EPA approved emission factors in their reports.

Recognizing that each member company has unique objectives in addition to the overarching goal of the organization, ONE Future has identified sector-specific targets to benchmark company progress toward their methane reduction goals, as well as to facilitate comparisons among the ONE Future member companies. The segment intensity values are based on segment emissions divided by segment throughput. Segment intensity targets will be used to track the progress of the participant companies and will also be used to scale member emissions to the national level to track progress toward ONE Future's overall emission intensity goal.

<sup>7</sup> FOR THE PURPOSES OF THE ONE FUTURE CALCULATION, NATURAL GAS FROM ALASKAN PRODUCTION IS NOT INCLUDED AS GAS PRODUCTION BECAUSE CURRENTLY IT DOES NOT ENTER THE NATURAL GAS VALUE CHAIN.

<sup>8</sup> [HTTPS://WWW.EPA.GOV/GHGREPORTING](https://www.epa.gov/ghgreporting)

<sup>9</sup> [HTTPS://WWW.EPA.GOV/GHGEMISSIONS/INVENTORY-US-GREENHOUSE-GAS-EMISSIONS-AND-SINKS-1990-2018](https://www.epa.gov/ghgmissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2018)

## SECTOR SUMMARY

**PRODUCTION**

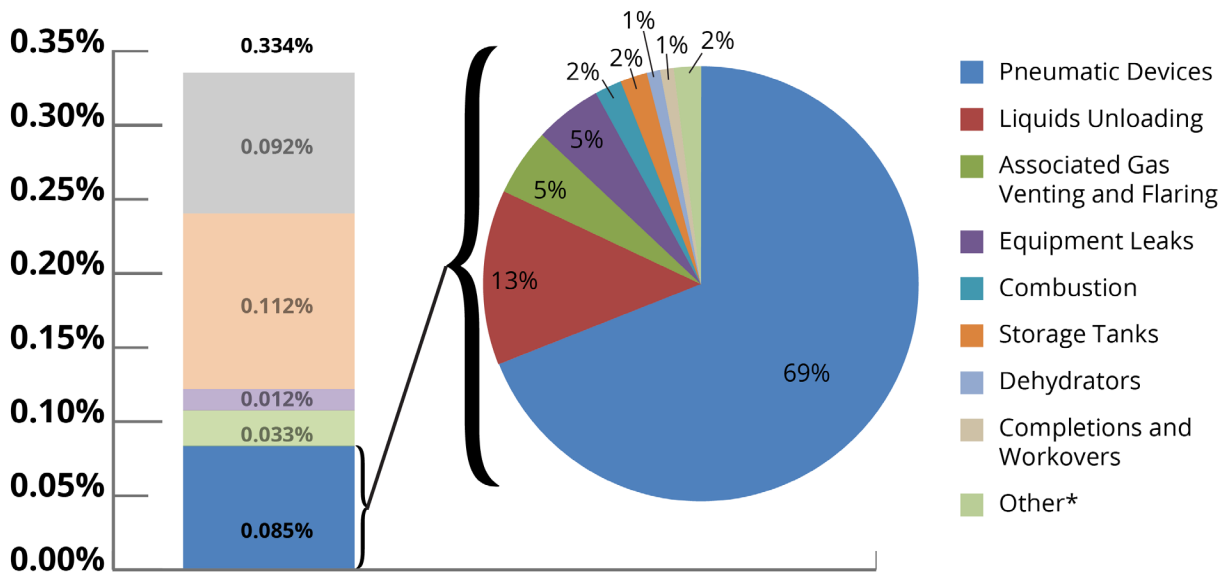
METHANE INTENSITY OF 0.085% VS. GOAL OF 0.28% - BEATING GOAL BY 70%



*ONE Future member companies represent approximately 16% of the total U.S. natural gas production in 2019. The current (2019) ONE Future methane emission intensity value for the production sector is 0.085%.*

The Production sector consists of the exploration of natural gas, wells producing natural gas (including oil wells producing gas), and equipment located at the well site associated with natural gas production. Because wells often co-produce natural gas and crude/condensate, the ONE Future Protocol describes an emission allocation approach using the energy content of the various streams to allocate total emissions to those represented by natural gas production only. This allocation is necessary because the ONE Future emission intensity value is based on the gross production of natural gas (co-produced crude or condensate volumes are not included in the natural gas value chain).

**FIGURE 2. ONE FUTURE'S METHANE EMISSIONS FOR PRODUCTION**



\*Note, Other includes Flare Stacks, Reciprocating Compressors, Centrifugal Compressors, Pneumatic Pumps, Offshore Emissions, PRVs, Vessel Blowdowns, Well Drilling, and Well Testing

ONE Future's methane intensity value for Production reflects the implementation of some of the following types of methane reduction activities with production operations<sup>10</sup>:

- Replace or repair high emitting pneumatic devices with low or no-bleed devices<sup>11</sup>.
- Switch natural gas-powered pneumatic devices to devices that use alternative power, where applicable and/or feasible.
- Replacement of natural gas-powered chemical injection pumps with pumps that use alternate power.
- Voluntary leak surveys and repair programs to identify and fix equipment leaks at aboveground production sites, these surveys include production locations, pneumatics and tanks.
- Addition of continuous emission monitors in some locations.
- Reduce gas well liquids unloading emissions by installing physical systems to remove liquids such as using foaming agents, velocity strings, wellhead compression, plunger lifts, and vent-less restoration.
- Using tankless design at new well sites to reduce emissions from tanks, truck loading, and fugitive components.

Although not part of the natural gas value chain, the co-production of crude and/or condensate with natural gas represents additional opportunities for methane emission reductions.

For transparency, if crude/condensate methane emissions from production operations were included in the ONE Future methane emission intensity calculation, the resulting production sector methane emissions intensity would be 0.093%, as opposed to the emission intensity value (0.085%) that is based on natural gas production operations only. The result of including emissions from crude/condensate production when calculating the overall emissions intensity across all sectors would be approximately 0.343%, or 2.5% higher than the ONE Future value which is based on natural gas production operations only (0.334%).

It is difficult to assess long-term trends since this is only the third year of ONE Future reporting. However, some short-term year-to-year observations can be made. Addition of new member companies as well as acquisitions and divestitures made by existing member companies help explain some of the year-to-year differences. For the production sector, emissions from pneumatic devices remained the largest contributor to this sector's total reported emissions and its contribution to the total emissions increased from Calendar Year 2018 (CY2018) to CY2019. Liquids unloading is now the second largest contributor for CY2019 as it was in CY2017. Equipment leaks went from the second largest contributor in CY2018 to the fourth largest in CY2019. Associated gas venting and flaring remained the third highest contributor for CY2019 as it was in CY2018.

<sup>10</sup> THESE LISTED METHANE REDUCTION ACTIVITIES ARE INTENDED TO REPRESENT EXAMPLES OF ACTIVITIES THAT SOME OF THE ONE FUTURE COMPANIES HAVE IMPLEMENTED IN 2019, BUT EACH COMPANY HAS THE FLEXIBILITY TO DECIDE ON THE ACTIVITIES TO IMPLEMENT BASED ON WHAT IS MOST APPROPRIATE AND FEASIBLE FOR THEIR COMPANY.

<sup>11</sup> GIVEN THAT PNEUMATIC EMISSIONS REPORTED HERE ARE DRIVEN SOLELY BY EPA GHGRP EMISSION FACTORS AND NOT BY DIRECT FIELD MEASUREMENTS, THIS DEVICE REPLACEMENT APPROACH IS THE ONLY WAY TO AFFECT THE LARGE EMISSIONS REPORTED HERE. IN THE FUTURE, ACTUAL FIELD MEASUREMENTS OF PNEUMATICS MAY BE USED WHICH COULD REFLECT REDUCTIONS FROM VOLUNTARY PNEUMATIC DEVICE MONITORING AND REPAIR PROGRAMS.



## PRODUCTION MILESTONES FOR 2019

*Production - Methane Intensity of 0.085% vs. goal of 0.28% - beating goal by 70%.*

*The methane intensity went from 0.098% in 2018 to 0.085% in 2019, decreasing by 13% while production increased 32%.*

*Production realized a methane intensity decrease of 13% despite gaining two more members in this sector.*

*ONE Future member companies represent approximately 16% of the total U.S. natural gas production in 2019 an increase of 2.3% from 2018.*

## SECTOR SUMMARY

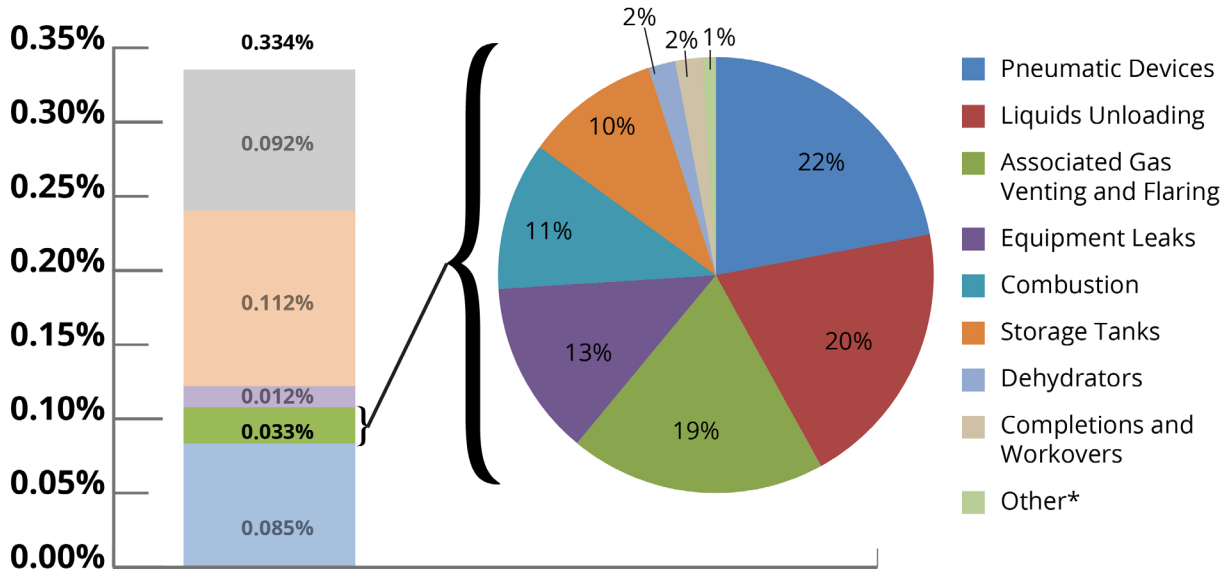
**GATHERING AND BOOSTING****METHANE INTENSITY OF 0.033% VS. GOAL OF 0.08% - BEATING GOAL BY 59%**

ONE Future member companies represent approximately 23% of the total U.S. natural gas produced and handled in G&B<sup>12</sup> in 2019. Based on 2019 emissions data from ONE Future member companies, the methane emission intensity for the G&B sector is 0.033%.

The Gathering and Boosting (G&B) sector includes pipelines and other equipment used to collect natural gas from production facilities, treat the gas as needed through dehydration or acid gas removal, and compress the gas to transport it to a natural gas processing facility, a natural gas transmission pipeline, or to a natural gas distribution pipeline. Methane emissions from equipment leaks, natural gas-operated pneumatic controllers, and blowdowns are the three largest sources of emissions for this sector.

<sup>12</sup>THERE IS NO PUBLISHED NATIONAL GATHERING AND BOOSTING GAS THROUGHPUT VALUE, THEREFORE THE NATIONAL GROSS GAS PRODUCTION VALUE IS USED. THIS SAME NATIONAL PRODUCTION VALUE IS USED WHEN CONVERTING THE G&B SECTOR INTENSITY TO THE ADDITIVE VERSION OF THE INTENSITY, THE DETAILS OF WHICH CAN BE FOUND IN THE ONE FUTURE PROTOCOL.

**FIGURE 3. ONE FUTURE'S METHANE EMISSIONS FOR GATHERING AND BOOSTING**



\*Note, Other includes Reciprocating Compressors and Storage Tanks

ONE Future’s methane intensity value for G&B reflects the implementation of some of the following types of methane reduction activities by ONE Future members with G&B operations<sup>13</sup>:

- Voluntary leak surveys and repair programs to identify and fix equipment leaks at aboveground G&B sites.
- Where possible, replace or repair high emitting pneumatic devices with low or no-bleed devices.
- Including pneumatic controllers in existing Leak Detection and Repair (LDAR) surveys using Optical Gas Imaging (OGI) cameras, in order to detect and repair malfunctioning devices.
- Install electrically operated glycol pumps to replace natural gas operated pumps.
- Program compressor unit controls to reduce pressure prior to venting.
- Maximize the utilization of compressors to optimize combustion performance and fuel efficiency.

- Performance-based maintenance program to determine the need for compressor rod packing replacement. A performance-based program uses the measured leak rate of the rod packing to objectively evaluate whether rod packing needs replacement.
- Continuously monitor operational parameters to quickly notify operators of performance issues and operating conditions.
- Improvement of piping design to eliminate direct venting during compressor blowdowns.
- Full recovery of dehydration still vent low pressure gas stream (post BTEX recovery) using vapor recovery units (VRU).
- Use electrical driven compressor units at some facilities.

Like the Production sector, the Gathering and Boosting sector also handles both gas and liquid streams. Therefore, GHG emissions from gathering and boosting operations are allocated between gas streams and crude/condensate using the energy content of the natural gas relative to the total energy content of all streams. For transparency, if all methane emissions from gathering and boosting operations were included in the ONE Future methane emission intensity calculation, the resulting methane emissions intensity would be only slightly higher at a rate of 0.035%, but still far below its goal of 0.08%.

National data for the G&B sector are limited as U.S. GHGRP reporting for this sector only began in 2016. As a result, the methane emission intensity value for this sector is scaled nationally by gross gas production, just as for the Production sector. This is the same as combining the emissions from Production and G&B operations together.

It is difficult to assess long-term trends since this is only the third year of ONE Future reporting. However, some short-term year-to-year observations can be made. Addition of new member companies as well as acquisitions and divestitures made by existing member companies help explain some of the year-to-year differences. In 2018 the methane intensity was 0.028%, in 2019 the G&B intensity increased 18% while throughput decreased 4%. Emission contributions from blowdowns and equipment leaks were the highest and second highest for this sector's emissions. Blowdowns, equipment leaks, and pneumatic devices remained the top three contributors to emissions in the gathering and boosting segment however, in a slightly different order than in CY2018.

<sup>13</sup> THESE LISTED METHANE REDUCTION ACTIVITIES ARE INTENDED TO REPRESENT EXAMPLES OF ACTIVITIES THAT SOME OF THE ONE FUTURE COMPANIES MAY HAVE IMPLEMENTED IN 2019, BUT EACH COMPANY HAS THE FLEXIBILITY TO DECIDE ON THE ACTIVITIES TO IMPLEMENT BASED ON WHAT IS MOST APPROPRIATE AND FEASIBLE FOR THEIR COMPANY.

## GATHERING & BOOSTING MILESTONES FOR 2019

*Gathering & Boosting registered a methane intensity of 0.033% vs. goal of 0.08% - beating goal by 59%.*

*ONE Future member companies represent approximately 23% of the total U.S. natural gas production in 2019.*

## SECTOR SUMMARY

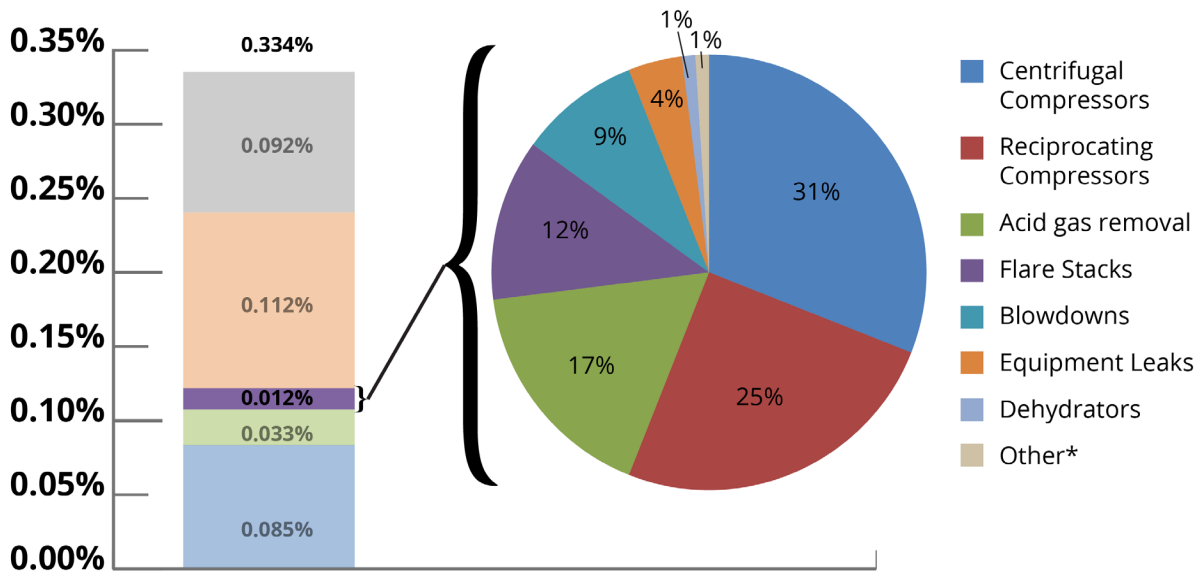
**PROCESSING****METHANE INTENSITY OF 0.012% VS. GOAL OF 0.11% - BEATING GOAL BY 89%**

*ONE Future members reporting emissions for the Gas Processing segment make up approximately 8% of the total national volume of gas processed. The methane emission intensity for the processing sector is 0.012% on a net gas produced basis.*

The Processing sector is made up of gas processing plants where hydrocarbons and fluids in produced natural gas are separated to result in natural gas that meets pipeline specifications. Equipment associated with the gas processing segment includes all equipment inside a gas processing plant, such as: absorption units or cryogenic expanders, fractionators, dehydrators, acid gas removal units, and compressors. Based on the EPA's national greenhouse gas inventory (GHGI)<sup>14</sup>, equipment leaks and engine exhaust from uncombusted natural gas are the largest sources of methane emissions for the processing sector.

<sup>14</sup> U.S. EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2016, EPA 430-R-18-003, APRIL 2018.

**FIGURE 4. ONE FUTURE’S METHANE EMISSIONS FOR PROCESSING**



\*Note, Other includes Combustion and Pneumatic Devices

ONE Future’s methane intensity value for Processing reflects the implementation of some of the following types of methane reduction activities by the ONE Future companies with processing operations<sup>15</sup>:

- Where possible, replace or repair high emitting pneumatic devices with low or no-bleed devices.
- Perform leak surveys and repair programs to identify and fix equipment leaks.
- Add vapor recovery controls on some dehydrators.
- Add vapor recovery controls on some tanks.

<sup>15</sup> THESE LISTED METHANE REDUCTION ACTIVITIES ARE INTENDED TO REPRESENT EXAMPLES OF ACTIVITIES THAT SOME OF THE ONE FUTURE COMPANIES MAY HAVE IMPLEMENTED IN 2019, BUT EACH COMPANY HAS THE FLEXIBILITY TO DECIDE ON THE ACTIVITIES TO IMPLEMENT BASED ON WHAT IS MOST APPROPRIATE AND FEASIBLE FOR THEIR COMPANY.

Although, the Gas Processing sector also handles both gas and liquid streams, the volume of natural gas liquids (NGL) and the corresponding energy content is small compared to natural gas. Allocating methane emissions between natural gas and NGL on an energy basis has a small impact on the Gas Processing sector methane emissions intensity, changing the intensity value from 0.012% to 0.013% which is still far lower than its 0.11% goal.

It is difficult to assess long-term trends since this is only the third year of ONE Future reporting. However, some short-term year-to-year observations can be made. Addition of new member companies as well as acquisitions and divestitures made by existing member companies help explain some of the year-to-year differences. The emission intensity for 2018 was 0.015%, and in 2019 the intensity dropped 19% while throughput increased by 7%. Emissions from centrifugal compressors and reciprocating compressors continued to be the highest two contributors to total emissions in the processing sector. The centrifugal compressors' emission contribution increased by roughly a third and moved from second highest contributor in CY2018 to first highest contributor in CY2019. For CY2019, methane emissions from acid gas removal and uncombusted methane emissions from flare stacks remained the third and fourth highest, respectively, as they were in CY2018.

<sup>15</sup> THESE LISTED METHANE REDUCTION ACTIVITIES ARE INTENDED TO REPRESENT EXAMPLES OF ACTIVITIES THAT SOME OF THE ONE FUTURE COMPANIES MAY HAVE IMPLEMENTED IN 2019, BUT EACH COMPANY HAS THE FLEXIBILITY TO DECIDE ON THE ACTIVITIES TO IMPLEMENT BASED ON WHAT IS MOST APPROPRIATE AND FEASIBLE FOR THEIR COMPANY.



## **GAS PROCESSING MILESTONES FOR 2019**

*Methane Intensity of 0.012% vs. Goal of 0.11% - beating goal by 89%.*

*The methane intensity went from 0.015% in 2018 to 0.012% in 2019, decreasing by 19% while processing throughput increased 7%.*

*Processing realized a methane intensity decrease of 19% and one member sold their assets in this sector.*

*ONE Future member companies represent approximately 8% of the total U.S. natural gas processed in 2019.*

## SECTOR SUMMARY

**TRANSMISSION AND STORAGE**

METHANE INTENSITY OF 0.112% VS. GOAL OF 0.30% - BEATING GOAL BY 63%

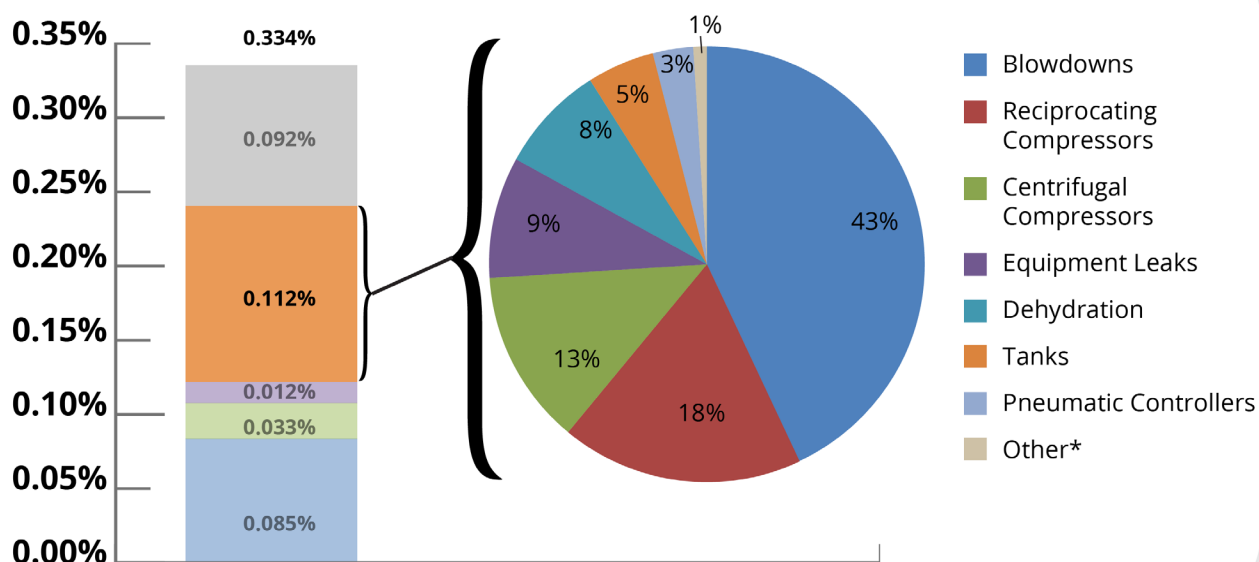


*Based on 2019 emissions data from ONE Future T&S companies, the methane emission intensity for the T&S sector is 0.112%. ONE Future Member companies represent approximately 57% of the total U.S. natural gas transmission pipeline miles.*

The Transmission and Storage (T&S) sector is comprised of high pressure, large diameter pipelines that transport natural gas from production and processing to natural gas distribution systems or large-volume consumers such as power plants or chemical plants. This includes interstate and intrastate facilities. Storage facilities, such as underground storage in expended gas reservoirs are used by transmission companies to hold gas and allow for seasonal demand differences. EPA combines T&S into one segment since many of the storage facilities are owned and operated by transmission companies, and since, in some cases the surface facilities (compression at underground storage, for example) are similar to other transmission facilities. Compression of natural gas is a significant operation for the T&S sector, and therefore emissions from compressors, including fugitive components, components designed to vent gas, and compressor exhaust play a larger role in methane emissions.

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**FIGURE 5. ONE FUTURE'S METHANE EMISSIONS FOR TRANSMISSION AND STORAGE**



\*Note, Other includes Combustion and Flare Stacks

ONE Future’s methane intensity value for T&S reflects the implementation of some of the following types of methane reduction activities by the ONE Future companies with T&S operations<sup>16</sup>:

- Voluntary leak surveys and repair programs to identify and fix equipment leaks at aboveground T&S sites.
- Performance-based monitoring and replacement for reciprocating compressor rod packing.
- Use of dry seals for centrifugal compressor installations.
- Replacement of four stroke lean burn engines with more efficient turbines with lower methane slip rates.
- Use of compressors driven by electric motors as an alternative to gas-fired compressors.

<sup>16</sup> THESE LISTED METHANE REDUCTION ACTIVITIES ARE INTENDED TO REPRESENT EXAMPLES OF ACTIVITIES THAT SOME OF THE ONE FUTURE COMPANIES MAY HAVE IMPLEMENTED IN 2018, BUT EACH COMPANY HAS THE FLEXIBILITY TO DECIDE ON THE ACTIVITIES TO IMPLEMENT BASED ON WHAT IS MOST APPROPRIATE AND FEASIBLE FOR THEIR COMPANY.

- Conversion of reciprocating engine and turbine gas starters to electric or air operated starters.
- Reduction of maintenance blowdown emissions by operating practice changes (such as increasing the length of pressurized hold times on compressors to reduce number of compressor unit blowdowns to atmosphere).
- Reduction of blowdown emissions by implementing pipeline pump-down techniques to lower the pipeline pressure prior to transmission pipeline blowdowns and conducting regulatory required Emergency Shutdown tests (ESDs) utilizing “vents blocked” tests.
- Use of sleeves and composite wraps to repair pipelines, eliminating the need to blowdown the pipeline. Use of pipeline isolation systems and hot taps to make new connections, eliminating the need to blowdown the pipeline.
- Where possible, replacing or repairing high emitting pneumatic devices with low or no-bleed devices.
- Use of cathodically protected pipe.

ONE Future member companies represent approximately 57% of the total U.S. natural gas transmission pipeline miles. Since the same natural gas can pass through multiple transmission pipelines before being delivered to downstream users, the total overall throughput volume reported to EIA for this sector exceeds the total volume of natural gas produced. Because the same gas can be recorded as throughput multiple times within this sector, ONE Future made an additional adjustment to total throughput in addition to being scaled to gross gas production as outlined in the ONE Future Protocol. This adjustment was intended to more closely represent the throughput solely within the ONE Future T&S companies by scaling nationally based on average gas volume per pipeline mile using data collected from PHMSA and the EIA.

It is difficult to assess long-term trends since this is only the third year of ONE Future reporting. However, some short-term year-to-year observations can be made. The emission intensity was increased from 0.089% in 2018 to 0.112% in 2019 and throughput increased by 52%. Addition of new member companies as well as acquisitions and divestitures made by existing member companies help explain some of the year-to-year differences. For the transmission and storage sector, blowdowns remained the highest contributor from CY2018 to CY2019. Reciprocating compressors now have the second highest emission contribution in CY2019 whereas it had the fourth highest in CY2018. Centrifugal compressors remained the third highest contributor to this sector’s emissions from CY2018 to CY2019.

## TRANSMISSION & STORAGE MILESTONES FOR 2019

*Transmission and Storage – Methane Intensity of 0.112% vs. goal of 0.30% – beating goal by 63%.*

*T&S realized a methane intensity increase from 0.089% in 2018 to 0.112% in 2019 while gaining four more members in this sector, with one member selling all their T&S assets; throughput increased by 52%.*

*ONE Future member companies represent approximately 57% of the total U.S. natural gas transmission pipeline miles in 2019 an increase of 46% from 2018.*

## SECTOR SUMMARY

**DISTRIBUTION****METHANE INTENSITY OF 0.092% VS. GOAL OF 0.22% - BEATING GOAL BY 58%**

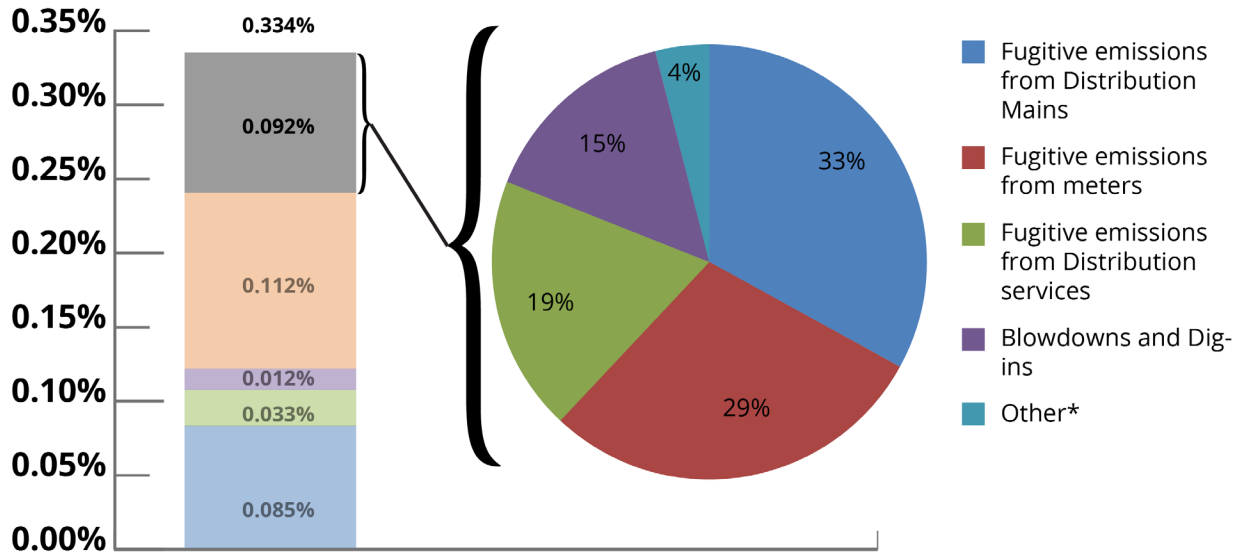
*The ONE Future member companies represent 18% of the total U.S. natural gas delivered by local distribution companies and 20% of the total national miles of distribution mains. Based on 2019 emissions data from ONE Future member companies, the methane emission intensity for the Distribution sector is 0.092%*

The Distribution sector covers natural gas pipelines that take high-pressure gas from the transmission system, reduce the pressure, and distributes the gas through primarily underground mains and service lines to individual end users. This segment includes natural gas mains and services, metering and pressure regulating stations, and customer meters.

Fugitive emissions from distribution mains and services are the most significant source of methane emissions for the distribution sector and are a function of system age and pipeline materials. ONE Future members include companies with large inventories of aged infrastructure, including cast iron pipe and unprotected steel pipe. This is reflected in the 2019 methane emission intensity value of 0.092% (based on gross gas production) for the distribution sector.

<sup>12</sup> U.S. EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2016, EPA 430-R-18-003, APRIL 2018.

**FIGURE 6. ONE FUTURE'S METHANE EMISSIONS FOR DISTRIBUTION**



\*Note, Other includes Fugitive Emissions from Distribution Stations and PRV Releases

As can be seen in Figure 6, the majority of emissions for the Distribution sector come from distribution mains fugitives. Within this category, the highest contributor is fugitive emissions from unprotected steel mains. The second and third highest contributors are fugitive emissions from protected steel mains and cast iron mains, respectively. The lowest contributor is fugitive emissions from plastic mains, while plastic mains have the largest mileage reported of the four types of distribution mains.

ONE Future's methane intensity value for Distribution reflects the implementation of some of the following types of methane reduction activities by the ONE Future companies with distribution operations<sup>17</sup>:

- Making significant progress in replacing leak-prone pipe and having ongoing initiatives that are replacing pipelines to reduce methane emissions.
- Increasing leak survey frequency.
- Voluntary leak surveys and repair programs to identify and fix equipment leaks at aboveground surface facilities.
- Using pipeline pumpdown procedures to minimize emissions when mains must be repaired or retired.
- Where possible, replacing or repairing high emitting pneumatic devices with low or no-bleed devices.
- Implementing damage prevention programs.
- Efforts to reduce/eliminate the Grade 3 leak backlog.

It is difficult to assess long-term trends since this is only the third year of ONE Future reporting. However, some short-term year-to-year observations can be made. This sector's intensity decreased from 0.096% in 2018, to 0.092% in 2019, while throughput increased by 58%. Addition of new member companies as well as acquisitions and divestitures made by existing member companies help explain some of the year-to-year differences. In the distribution sector, all emissions sources remained in the same order of magnitude of emissions contribution for CY2018 and CY2019.

<sup>17</sup> THESE LISTED METHANE REDUCTION ACTIVITIES ARE INTENDED TO REPRESENT EXAMPLES OF ACTIVITIES THAT SOME OF THE ONE FUTURE COMPANIES MAY HAVE IMPLEMENTED IN 2019, BUT EACH COMPANY HAS THE FLEXIBILITY TO DECIDE ON THE ACTIVITIES TO IMPLEMENT BASED ON WHAT IS MOST APPROPRIATE AND FEASIBLE FOR THEIR COMPANY.



## DISTRIBUTION MILESTONES FOR 2019

*Distribution – Methane Intensity of 0.092% vs. goal of 0.22% - beating goal by 58%.*

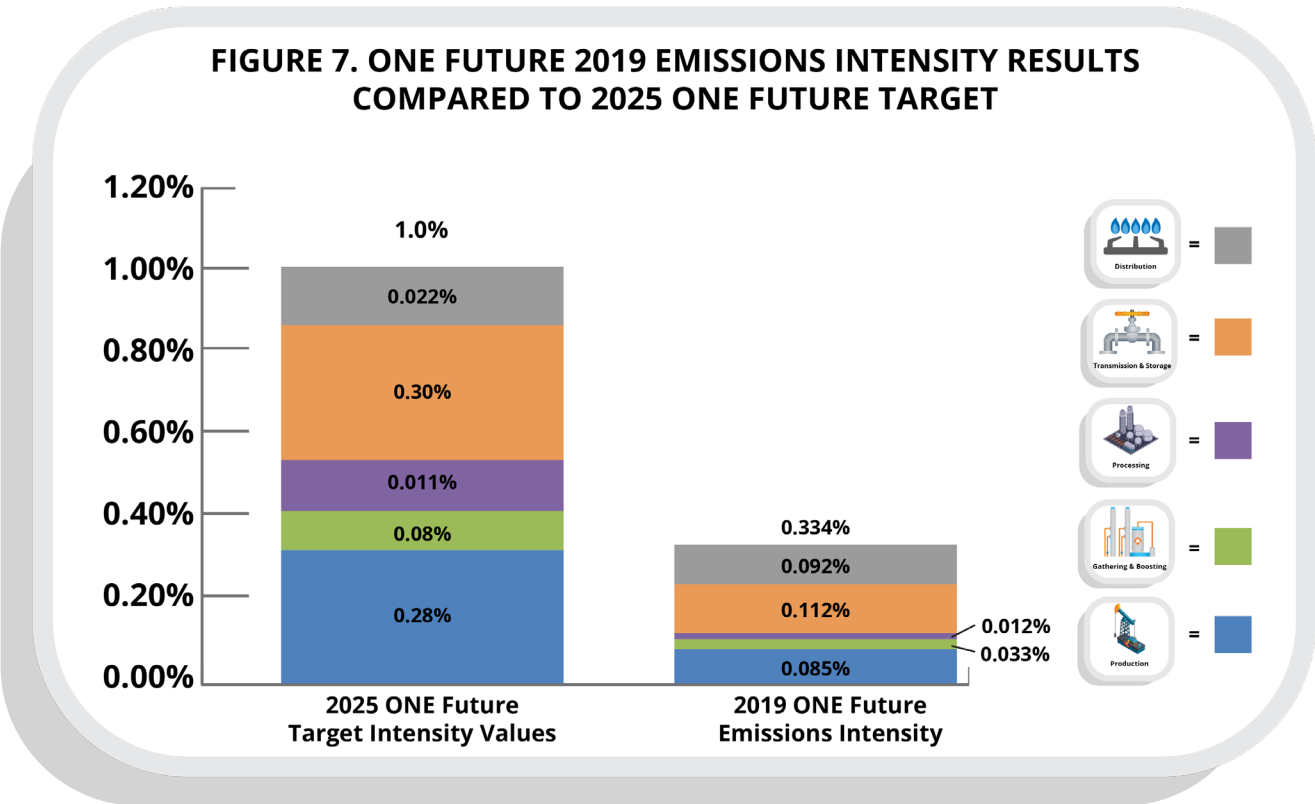
*The methane intensity went from 0.096% in 2018 to 0.092% in 2019, decreasing by 4% while quantity of gas delivered to end users increased 58%.*

*Distribution realized a methane intensity decrease of 4% despite gaining two more members in this sector.*

*ONE Future member companies represent 18% of the total U.S. natural gas delivered by local distribution companies and 20% of the total national miles of distribution mains.*

# CONCLUSIONS

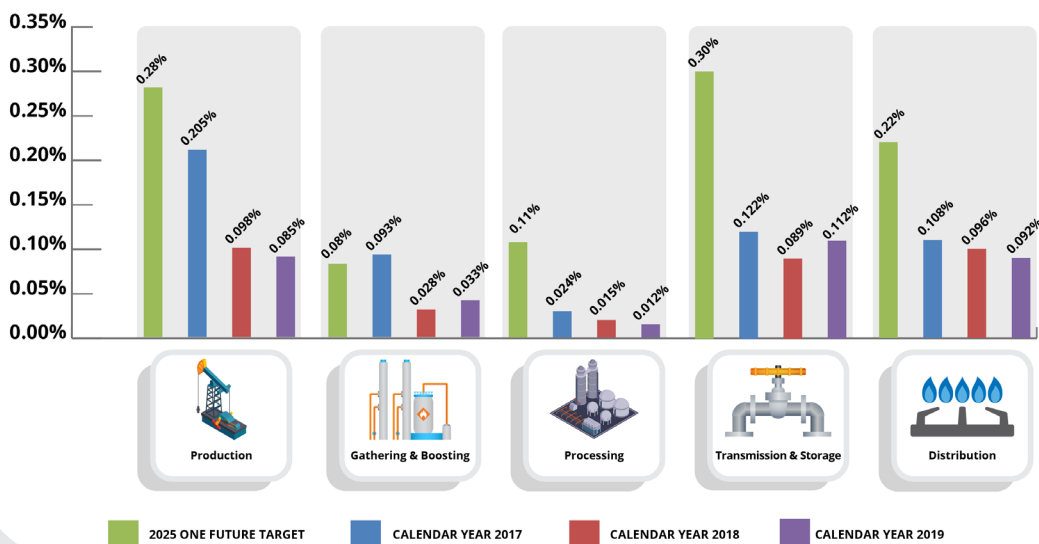
ONE Future is pleased to present the current consolidated progress of our member companies toward our collective goal of achieving an average rate of methane emissions across the entire natural gas value chain of one percent or less of the methane portion of gross natural gas produced. ONE Future member companies' collective emissions intensity is already better than the 2025 goal, and we encourage other natural gas companies to join us to continue reducing the emissions intensity of the entire natural gas value chain.



Although ONE Future’s 2019 data resulted in a methane emission intensity value well below the one percent target, ONE Future members are committed to continual improvements and ongoing methane emission reduction activities as well as openly and transparently sharing best practices through technical reports and workshops to enable others across the industry to capture the key learnings from ONE Future’s successful initial results.

This is the third year of ONE Future reporting, Figure 8 shows the 2025 sector intensity targets as well as the sector intensity results comparing 2017, 2018, and 2019. There were reductions in intensities of three segments, Production, Processing, and Distribution, as well as minor increases in intensity for the remaining two segments.

**FIGURE 8. ONE FUTURE 2025 SECTOR TARGETS AND 2017, 2018, AND 2019 EMISSION INTENSITY RESULTS BY SECTOR FOR THREE YEARS OF REPORTING**



Some explanation of the changes shown in Figure 8 are listed here:

**PRODUCTION**

There was an increase in the number of companies reporting; two new companies were added. One production company slightly decreased their production while decreasing methane emissions by roughly sevenfold. Other members also sold production assets, as well as acquired assets. The number of offshore production assets remained the same as 2018, which generally have lower reported emissions, and has a high allocation of emissions to oil production.

**GATHERING & BOOSTING**

There was an increase in the number of companies reporting; one new company was added. Some members have sold gathering and boosting assets and there were a number of significant changes in emissions and throughputs for the companies that reported last year as well.

**GAS PROCESSING**

There was a decrease in the number of companies reporting; one member company sold their processing assets and the intensity dropped slightly from 2018.

**TRANSMISSION & STORAGE**

There was an increase in the number of companies reporting; we added four new members, and one member sold their transmission and storage assets. This year, within this sector, the throughput and emissions increased from 2018.

**DISTRIBUTION**

Two new members were added in 2019, and the change to the overall intensity decreased.

**OVERALL SUPPLY CHAIN**

Overall methane intensity remained flat year over year.

Due to the year-to-year changes in sectors and adding seven companies to this year's reporting, the 2019 emissions intensity from ONE Future was 0.334%. The ONE Future 2019 intensity of 0.334% is virtually flat year over year, but still 67% below the overall goal of 1%. ONE Future's overarching goal is to ensure the future of natural gas as a long-term sustainable fuel and that objective will be assured as additional players in the natural gas value chain continue to step up and embrace the benefits of reducing methane emissions. Our responsibility to safely and reliably provide sustainable natural gas to our customers and communities is our core business, and reducing methane losses aligns with those goals. We understand methane emission reduction is not just good for the environment, but is also good for the natural gas industry, its employees, customers, communities, and investors.

<sup>15</sup> THESE LISTED METHANE REDUCTION ACTIVITIES ARE INTENDED TO REPRESENT EXAMPLES OF ACTIVITIES THAT SOME OF THE ONE FUTURE COMPANIES MAY HAVE IMPLEMENTED IN 2018, BUT EACH COMPANY HAS THE FLEXIBILITY TO DECIDE ON THE ACTIVITIES TO IMPLEMENT BASED ON WHAT IS MOST APPROPRIATE AND FEASIBLE FOR THEIR COMPANY.

## APPENDIX A

### FUTURE CONSIDERATIONS AND IMPROVEMENTS FOR THE PROGRAM

Considerations for ONE Future improvements between now and 2025 are expected to include the following:

- Addition of new member companies, expanding our representation and our flexible emission reduction principles.
- Additional reductions, as companies continue to make improvements in data collection efforts, emission estimates, and reducing methane emissions.
- Updates to the national emission intensity basis (as EPA makes updates to the methodology) and updates to GHGRP and GHGI emission factors.
- Addition of company measured data where it can rigorously supplant the emission factors used. This may raise or lower net emissions from ONE Future companies. (This is especially important for large categories like pneumatic controller emissions, which may not be well represented by the simple emission factor approach currently used by the EPA).
- Annual review of the ONE Future Protocol to determine the need to incorporate improvements as described in the above items.
- Periodic review of the methane intensity targets to determine whether adjustments to targets are needed based on data collected and actual methane intensities reported by ONE Future.

## APPENDIX B

### YEAR-TO-YEAR CHANGES IN THE EMISSION CALCULATION APPROACH

Since ONE Future members begin with their reported emissions to the EPA's GHGRP, it is important to comment on any calculation approach changes that were adopted by the EPA for CY2019 as well as any changes or updates to ONE Future's calculation methodology. Between CY2018 and CY2019, there were no changes to calculation methodology pertaining to EPA's GHGRP. Calculation methodologies used in this report unrelated to EPA's GHGRP also did not change from CY2018 to CY2019.

# NATURAL GAS



## POWERS AMERICA

There are nearly 179 million natural gas customers across the U.S. Natural gas was the largest source of U.S. electricity generation in 2019 – 38%.



## LOCAL AND PLENTIFUL

The U.S. produces more natural gas than any other nation in the world, enough to meet America's energy needs for more than 110 years.



## AFFORDABLE

The affordability of natural gas has led to \$50 billion in savings for American households since 2015 and \$121 billion in savings for American businesses, since 2009.



OUR NATION'S ENERGY

**FUTURE**

**ONEFuture.us**