Our Nation's Energy Future Coalition (ONE Future)
25 Massachusetts Avenue, NW, Suite 820
Washington, DC 20001
www.onefuture.us

Tom Michels,
Executive Director
Our Nation's Energy Future Coalition, Inc.
25 Massachusetts Avenue, NW
Suite 820
Washington D.C., 20001

November 13, 2015

Carey Bylin
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW (6207-J)
Washington, DC 20460

Via e-mail: methanechallenge@tetratech.com

RE: The U.S. Environmental Protection Agency's Natural Gas STAR Methane Challenge Program Proposal.

Dear Ms. Bylin:

Our Nation's Energy Future Coalition, Inc. (ONE Future) appreciates the opportunity to comment on the U.S. Environmental Protection Agency's (EPA) Proposed Framework for the Natural Gas STAR Methane Challenge Program (Methane Challenge) issued on July 23, 2015, as well as the Supplementary Technical Information released on October 19, 2015, and the Draft Partnership Agreement and Draft Implementation Plan Guidelines released on November 10, 2015.

ONE Future is a unique coalition of leading companies with operations in one or more of the following four principal segments of the natural gas industry: (1) oil and natural gas production and gathering; (2) natural gas processing; (3) natural gas transmission and storage; and (4) natural gas distribution. ONE Future is a non-profit 501(c)(6) trade group that is focused exclusively on improving the management of methane emissions from the wellhead to the burner tip. By bringing together companies from every segment of the natural gas value chain, we aim to deploy innovative solutions to operational and policy challenges that will deliver better results to our customers, increase value to our shareholders, and improve the environment.

ONE Future's flexible and performance-based approach to the management of methane emissions begins with the establishment of an ambitious goal: by the year 2025, our member companies aim to achieve an average annual methane emission intensity[1] rate across our collective operations that, if achieved by all operators across the natural gas value chain would be equivalent to one percent or less of gross U.S. natural gas production. (To put this into perspective, natural gas sector emissions totaled

[1] In this paper, the term "emission intensity" refers exclusively to the average methane (CH4) emission rate over total methane throughput (as reported to the U.S. Energy Information Administration) in a given system.

approximately 1.49 percent of production in 2012.[2]) ONE Future established the one percent emission intensity goal for several reasons, not least of which is that while this goal is ambitious, we believe it is both technically and economically feasible using existing technology and practices. Additionally, recent peer-reviewed research has suggested that an average industry-wide emissions rate of one percent or less would ensure that using natural gas provides immediate greenhouse gas reduction benefits as compared to any other fossil fuel, in any other end-use application.[3]

Importantly, we believe that orienting our activities toward this specific and measurable outcome ensures a sustained focus on identifying the opportunities for emissions abatement that yield the greatest benefit for the least cost. It grants individual companies the flexibility to choose precisely how they can most cost-effectively and efficiently achieve their goal – whether that be by deploying an innovative technology, modifying a work practice, or in some cases, replacing a high-emitting asset with a low-emitting asset. The only essential aspect of our program is that companies transparently demonstrate progress toward their emission intensity goal. (To this end, ONE Future is developing a Methane Emission Intensity Estimation Protocol that will largely follow existing EPA methodologies. A summary of ONE Future's proposed reporting methods is included in Appendix I.)

ONE Future member companies believe strongly that the flexible, performance-based approach we have proposed will accomplish deeper emission reductions among participants at a lower cost than a one-size-fits-all mandatory program. We strongly encourage EPA to ensure that the proactive leadership of ONE Future member companies is acknowledged and recognized as they devise current and future regulatory actions in this arena.

Below, for your consideration, are ONE Future's detailed comments and recommendations on the proposed Methane Challenge program. Although we provide numerous suggestions, ONE Future strongly supports the proposed framework and believes that this innovative collaboration may one day serve as a template to address future challenges. We appreciate the agency's efforts and we are grateful for the thoughtful and professional constructive engagement that the EPA staff has displayed throughout our interactions over the past year. Thank you for your consideration.

Sincerely,

Tom Michels
Executive Director,
ONE Future Coalition

[2] This figure is based on emissions data from the 2012 U.S. EPA inventory of GHG emissions (GHGI), accounting for co-allocation of emissions from associated gas originating at oil wells and lease condensates from gas wells, and 2012 natural gas gross withdrawals as reported by the U.S. Energy Information Administration (EIA).

[3] See for example: Alvarez et al. (2012) "Greater focus needed on methane leakage from natural gas infrastructure." Proceedings of the National Academy of Sciences. (http://www.pnas.org/content/early/2012/04/02/1202407109.abstract) Note that while ONE Future may not accept every conclusion of this study, we believe its findings are sufficiently robust to serve as a guidepost for our aspirational target.

TABLE OF CONTENTS

SUMMARY OF KEY RECOMMENDATIONS

ONE Future appreciates EPA's proposal to establish an official linkage between ONE Future and the Methane Challenge program. By supporting ONE Future as a Methane Challenge commitment option, EPA is promoting the deployment of an innovative, flexible and performance-based approach to managing methane emissions. We believe that the proposed public-private collaboration between EPA's Methane Challenge and the industry-led ONE Future coalition will achieve significant methane reductions at the lowest cost to industry and consumers. Thanks to EPA's support, results will be uniformly tracked and reported in public to assure transparency and credibility, while facilitating performance benchmarking. ONE Future member companies are fully committed to meeting a scientifically robust end-goal through deployment of cost-effective technologies and work practices. EPA's proposal to establish a direct and official linkage between ONE Future and the Methane Challenge program will add to our efforts to achieve meaningful reductions in a transparent manner.

The following is a brief summary of some of our key recommendations:

- An important objective of the Methane Challenge program should be facilitating the use of scientifically rigorous methods to measure and report up-to-date, accurate, and representative methane emissions data.
- EPA should, in partnership with other federal and state regulators, work to establish the regulatory conditions that will incentivize faster emission reductions across the industry.
- EPA should promote the use of simple but effective emission estimation methodologies that facilitate supplemental emissions reporting from Methane Challenge program partners.
- The Methane Challenge program should provide straightforward metrics to recognize and account for the significant reduction potential associated with widely practiced fugitive emission abatement work practices such as Leak Detection and Repair and Directed Inspection & Maintenance programs.
- EPA should ensure that there is a streamlined, science-based process in place to allow for rapid review and approval of proposed alterations to future Best Management Practices and Methane Challenge protocols, so that the program can adapt in pace with technological change.

DETAILED COMMENTS AND RECOMMENDATIONS ON EPA'S METHANE CHALLENGE PROPOSAL

Introduction

In January 2015, the Obama Administration specified an overarching goal of reducing methane emissions from the oil and gas sector by 40 to 45 percent below 2012 levels by the year 2025.[4] Based on our analysis and public statements, we conclude that a reduction goal of 40-45% equates to emission reductions of between 77 and 86 million metric ton of carbon dioxide by 2025[5] – even as the EIA projects that natural gas production will likely grow some 27 percent over that same period.[6] In addition to EPA's Methane Challenge, major components of the Administration's Strategy to Reduce Methane Emissions include the following regulatory actions:

- EPA's proposed performance standards for new and modified sources in the oil and gas sector (OOOOa), which EPA estimates will result in emission reductions equivalent to between 7.7 and 9 million metric tons of carbon dioxide[7];
- EPA's draft Control Techniques Guidelines (CTGs) for reducing VOC emissions from existing equipment and processes in the oil and natural gas industry, which EPA estimates will result in emission reductions equivalent to 5.5 million metric tons of carbon dioxide[8];
- BLM's Venting and Flaring rule, for which no estimates are currently available; and
- PHMSA's future rule for addressing the sector, for which no estimates are currently available.

From these projections, we conclude that a majority of the methane emission reductions associated with meeting the Administration's 40-45% goal are expected to be achieved via voluntary programs such as Methane Challenge. ONE Future has made a commitment to achieve a specific, measurable and ambitious performance target that, if adopted across the industry, would obviate the need for future regulation, while simultaneously improving the reliability of emissions data.

In addition to making specific recommendations surrounding program design and implementation, ONE Future's comments encourage EPA and other federal agencies to acknowledge the significance of our commitment and to consider providing a variety of incentives that would both incentivize participation and reward company achievements in improving their management of methane emissions.

---

[4] See: The White House, "FACT SHEET: Administration Takes Steps Forward on Climate Action Plan by Announcing Actions to Cut Methane Emissions" January 15, 2015. Accessed on November 2, 2015 at: https://www.whitehouse.gov/the-press-office/2015/01/14/fact-sheet-administration-takes-steps-forward-climate-action-plan-anno-1

[5] Source: https://www.whitehouse.gov/energy/climate-change "...achieving this goal would save up to 180 billion cubic feet of wasted natural gas in 2025." Accessed on November 2, 2015. Our calculations indicate that 180 bcf of natural gas is equivalent to approximately 86 million metric tons of CO_2. (Utilizing a Global Warming Potential of 25 and assuming a factor of 19.2 g methane/scf of natural gas.)

[6] U.S. Energy Information Administration, "Annual Energy Outlook 2015", *Table: Natural Gas Supply, Disposition, and Prices*. Accessed on November 2, 2015 at: http://www.eia.gov/beta/aeo/#/?id=13-AEO2015&cases=ref2015

[7] See US EPA, "Proposed Climate, Air Quality and Permitting Rules for the Oil and Natural Gas Industry: Fact Sheet," August 18, 2015. Accessed on November 2, 2015 at: http://www3.epa.gov/airquality/oilandgas/pdfs/og_fs_081815.pdf.

[8] *Ibid.*

Recommendations for Establishing the Conditions that will Incentivize Early Action to Reduce Methane Emissions.

Voluntary programs such as the Methane Challenge have the potential to achieve greater emission reductions at lower cost to both industry and consumers than regulatory actions – if the appropriate incentives are in place to encourage robust industry participation. In many ways, the degree of industry participation in the Methane Challenge is likely to be contingent upon key features of the regulatory environment, such as whether taking early action to eliminate emissions could avoid a company's exposure to costly prescriptive regulations in the future, or conversely, whether taking early action might actually disadvantage a company vis-à-vis competitors who deferred action. We believe that EPA can and should establish straightforward and costless regulatory conditions and incentives that would encourage participation in Methane Challenge without diminishing the agency's ability to assure continuous improvement in the management of methane emissions. Further, we believe that EPA can structure incentives for those companies that go above and beyond minimum program expectations.

Regulatory incentives may be particularly important in the current context surrounding shale gas development, where low commodity prices drive companies to implement cost-cutting measures and avoid initiatives that could result in new costs. EPA should consider regulatory incentives whenever they effectively drive the industry to achieve desired outcomes (i.e. reduce emissions). We believe that enrollment in voluntary programs such as Methane Challenge would be greatly enhanced if EPA and other federal partners worked to deploy federal-level solutions to reduce the costs associated with complying with a patchwork of state and local regulations and requirements.

We look forward to working together with EPA to develop detailed proposals to provide regulatory incentives to companies that demonstrate consistently high performance in methane emissions management. Some current recommendations for consideration include:

Methane Challenge Commitments as Alternative Compliance Measures for proposed EPA regulations.

Given the commitment of Methane Challenge participants to achieve both near-term and long-term deep reductions in methane emissions from all sources – including *new, modified, and reconstructed* sources – it is appropriate for those commitments to serve as alternative means of compliance with currently proposed command-and-control regulations addressing methane and Volatile Organic Compounds (VOCs) from the same facilities:

a. *Methane Challenge commitments as alternative compliance measures under the proposed NSPS OOOOa rule.* In so far as companies participating in the Methane Challenge are adopting corporate-wide commitments, those commitments will apply to new, modified, and reconstructed sources owned and operated by those companies. Therefore, the participating companies should have the opportunity to demonstrate to EPA that implementation of their commitments will achieve reductions in methane (and, as applicable, VOCs) that are equivalent to those achieved by the traditional measures otherwise required under the OOOOa rule under Section 111(b) of the Clean Air Act. Where such a demonstration can be made, the Methane Challenge commitment should have the

status of a valid alternative compliance measure. ONE Future will provide additional detail on this idea in our comments on the proposed OOOOa rule.

b. *Methane Challenge commitments as alternative measures for consideration in Control Technique Guidelines and/or State Implementation Plans*. For the same reasons discussed above with respect to the OOOOa rule, we believe that EPA should consider issuing revised guidance to states that would describe how states may use Methane Challenge commitments as Control Techniques Guidelines (CTGs), in lieu of CTGs, or in addition to CTGs in their State Implementation Plans (SIPs). In the past, EPA has issued guidance to states that suggested how states might consider incorporating voluntary programs into their SIPs so as to "encourage new control strategies for meeting CAA requirements."[9] We suggest that EPA consider updating this guidance to states, through workshops and other mechanisms, to describe how states could integrate Methane Challenge voluntary commitments into their State Implementation Plans for the ozone nonattainment areas and areas within ozone transport regions.

   A noteworthy precedent wherein EPA allowed states to employ voluntary programs as a means of complying with regulatory requirements in their SIPs is the usage of emission reductions from Voluntary Woodstove Changeout Programs.[10] Another innovative action that incentivized voluntary emission reductions can be seen in EPA's Voluntary Airport Low Emission (VALE) program, which provided guidance for generating emission reduction credits at airports under the General Conformity and New Source Review (NSR) programs.[11]

Methane Challenge commitments as an alternative to future Section 111(d) methane regulation of existing sources in the oil and gas sector.

Substantial participation of oil and gas companies in the Methane Challenge could result in a reduction in methane emissions or emissions rates in an amount that would obviate the need for additional regulation of methane emissions from the sector. For this reason, we encourage EPA to consider providing industry partners with assurances that if their proactive investments in emissions abatement measures achieve specified targets, it would obviate the need for future regulation under Section 111(d) of the Clean Air Act.

Such an approach has strong legal support. Courts have established that "an agency has broad discretion to choose how best to marshal its limited resources and personnel to carry out its delegated responsibilities."[12] In the recent case of *WildEarth Guardians v. EPA*, the D.C. Circuit

[9] US EPA, *Incorporating Emerging and Voluntary Measures in a State Implementation Plan,* September 2004. Accessed on Nov. 2, 2015: http://www3.epa.gov/ttn/caaa/t1/memoranda/evm_ievm_g.pdf

[10] US EPA, *Guidance for Quantifying and Using Emission Reductions from Voluntary Woodstove Changeout Programs in State Implementation Plans*, January 2006. Accessed on Nov. 2, 2015: http://www3.epa.gov/ttn/caaa/t1/memoranda/guidance_quantfying_jan.pdf

[11] US EPA, *Guidance on Airport Emission Reduction Credits for Early Measures Through Voluntary Airport Low Emission Programs*, Sept. 2004. Accessed on Nov. 2, 2015: https://www.faa.gov/airports/resources/publications/reports/environmental/media/AERC_093004.pdf

[12] *Massachusetts v. EPA*, 549 US 497, 527 (2007).

affirmed EPA's decision not to issue section 111 rules—including both new source rules under section 111(b) and existing source rules under section 111(d)—for methane emissions from coal mines.[13] The D.C. Circuit reasoned that EPA's justification— that EPA was "taking a common-sense, step-by-step approach intended to obtain the most significant greenhouse-gas-emissions reductions through using the most cost-effective measures first"—was a sufficient basis for the court to hold that EPA had not violated its obligations under the Clean Air Act by forgoing regulation.[14]

The commitment being undertaken by ONE Future and other Methane Challenge participants constitutes just such a common-sense approach to achieving significant GHG reductions via the most cost-effective mechanism possible. Therefore, we urge EPA to explicitly and publically recognize that, consistent with the *WildEarth Guardians* holding, sufficient industry participation and successful implementation of the Methane Challenge will reduce methane emissions from existing sources in the oil and gas sector to such a degree that agency resources would be better marshalled by regulating other sources of greenhouse gases. In which case, the agency will exercise its discretion to forgo regulation of existing sources of methane under section 111(d).

Methane Challenge Commitments as an acceptable means of compliance with any future Section 111(d) methane regulation.

Individual companies adopting ambitious commitments under the Methane Challenge should have assurances that their efforts will earn regulatory recognition under any future Section 111(d) methane regulation in the event that the total efforts are not sufficient to avoid such regulation. Absent such assurances, companies evaluating participation in the Methane Challenge will consider the risk that they effectively would be penalized for early action, i.e., by making an investment in voluntary action that their competitors have not made *and* then being required to make further investments under a future regulatory program. If not addressed, this risk could dissuade many companies from participating in the Methane Challenge.[15] In other words, if EPA does not provide such assurances, there is a strong risk that EPA will not achieve its objectives for the Methane Challenge.

EPA could provide assurances of regulatory relief to companies participating in the Methane Challenge in a number of ways. For ONE Future, the preferred way would be for EPA to provide assurances that it will propose in any future Section 111(d) methane regulation for the sector that a company's corporate-wide implementation of its Methane Challenge commitment will constitute compliance with the requirements under the regulation. We recognize that EPA is unlikely to provide binding assurances that will govern or constrain agency actions in future regulatory programs. However, we nevertheless urge the agency to issue a Statement of Policy outlining these elements, and to make clear that it will include them in any proposal for new regulation of existing

[13] *WildEarth Guardians v. EPA*, No. 13-1212, 2014 WL 1887372 (D.C. Cir. May 13, 2014).
[14] *WildEarth Guardians* at 6.
[15] To be sure, companies have a modest incentive to participate in the Methane Challenge if they have reason to believe that widespread participation in the Methane Challenge will forestall inefficient, command-and-control regulation of existing sources. However, this incentive is diminished by a collective action problem: an individual company can only control its own participation, not the participation of other companies. That is why it is important provide benefits of participation that a can company can secure through its own actions alone.

sources. EPA could also integrate them into a Memorandum of Understanding with each participating company.

'Baseline Protection' measures to ensure a level playing field for Methane Challenge participants.
In the event that EPA cannot propose regulatory relief as described above, it should provide assurances that Methane Challenge participants will be recognized – not penalized – for their early voluntary actions. Such recognition could be achieved by providing "baseline protection." For example, the baseline year for any future regulatory program for existing sources of methane emissions in the oil and gas sector should be 2012, the benchmark year against which the Obama Administration is measuring the reductions it expects to achieve from its methane program. In any event, the baseline year should be no later than the launch date for the Methane Challenge program. If, for some reason, EPA is compelled to establish a later baseline year, the Agency at least should adjust upward the historic baseline emission levels for companies participating in the Methane Challenge. Such baseline protection is vital to ensure a level playing field between companies participating in the Methane Challenge and companies that do not. Otherwise, Methane Challenge participants will be penalized for their voluntary investments in methane abatement.

Mitigating or eliminating civil penalties for Methane Challenge participants.
For Methane Challenge participants, we encourage EPA to consider establishing criteria for the elimination or mitigation of civil penalties that result from minor enforcement actions brought under CAA Section 113(b). EPA has (for different reasons) established such criteria for certain small businesses, but in this case we suggest that EPA might justify alleviating civil penalties on the grounds that a company's commitment to make ambitious voluntary methane reductions should be considered a mitigating factor for minor enforcement actions. Alternatively, EPA could consider the Methane Challenge program as a Supplemental Environmental Project (SEP) that an unaffiliated settling party could consider in lieu of penalties under an enforcement action. The EPA's SEP Policy is designed to encourage environmental benefits beyond existing regulations, and is consistent with the design of the Methane Challenge program.

Facilitate the expedited review of related permits and regulatory approvals for Methane Challenge participants.
Utilizing cooperative interagency structures already in place, such as the Interagency Working Group to Support Safe and Responsible Development of Unconventional Domestic Natural Gas Resources, the Administration should consider linking emission reductions achieved under the Methane Challenge with expedited processing of permits and regulatory actions for related activities on federal lands, and streamlined National Environmental Policy Act reviews. Additionally, we encourage the EPA to consider providing expedited review for New Source Review (NSR) permit applications submitted by participants in the Methane Challenge that commit to and demonstrate a level of performance consistent with the ONE Future program's commitments.

Reduce paperwork burdens related to the demonstration of compliance with existing and proposed EPA emission rules.

Companies that achieve specified interim targets for their methane emission intensity should be relieved of many of the paperwork burdens associated with demonstrating their compliance with both the EPA's proposed OOOOa New Source Performance Standards, as well as those that may be associated with a future Existing Source Performance Standard for the oil and gas sector. EPA's own cost/labor estimates associated with the proposed NSPS requirements for industry record keeping and reporting (activities such as writing and submitting the notifications and reports, developing systems for the purpose of processing and maintaining information, and training personnel to be able to respond to the collection of information) indicate an estimated average annual burden of 92,658 labor hours with an annual average cost of $3,163,699.[16] Although some of the data and records are basic, many provisions are purely related to demonstrating compliance. (E.g. EPA requires digital photographs of operators physically performing monitoring surveys with embedded latitude and longitude positions). Stated differently, these reporting provisions exist to prove you committed no crime. We believe that this burden should be waived or mitigated for proactive operators who have good track records for compliance and safe operations and who by enrollment in ONE Future have demonstrated their interest in continuous improvement.

Recommendations on the Reporting Elements Associated with Methane Challenge.

ONE Future generally supports EPA's proposed facility definitions for Methane Challenge.

ONE Future proposes to have member companies report their emissions to EPA via the Methane Challenge reporting platform in order to demonstrate progress toward our emission intensity commitments. Under the ONE Future program, net emissions and emission intensities will be computed from emissions estimated and aggregated at the levels indicated in the table below for all covered emission sources.

Industry Segment	Reporting Facility
Production & Gathering	Consistent with Subpart W
Processing	Consistent with proposed Subpart W
Transmission & Storage	Reported at each Pipeline level[17]
Distribution	Consistent with Subpart W

[16] See "Oil and Natural Gas Sector: Emission Standards for New and Modified Sources" 80 Fed. Reg. 56,593 (Sep. 18, 2015).

[17] The reporting level for ONE Future's Transmission and Storage industry segment includes the aggregate of the covered emission sources included in the following facility definitions listed in Appendix C of the Methane Challenge Supplementary Technical Information: "Natural Gas Transmission Compression & Underground Natural Gas Storage" and "Onshore Natural Gas Transmission Pipeline".

EPA should facilitate the reporting of emissions from facilities that fall below the Subpart W reporting threshold.

For the relatively small number of facilities that fall below the Subpart W reporting threshold of 25,000 tonnes per year and have no default GHGRP emission factors, it is important that EPA permit emission estimations by means of engineering calculations based on process knowledge, company records, and best available data. For example, EPA has suggested that any voluntary reporting of ONE Future company facilities that are currently below the reporting threshold must be done with the exact same process and rigor as facilities that already must report under the GHGRP regulatory program. This approach could significantly restrict the number of participants in the Methane Challenge program if EPA were to require (for example) that they expand their leak detection, quantification, and reporting to the same level of an existing regulatory program in order to participate in a voluntary program. For those industry segments and emission sources for which appropriate data is available, the Methane Challenge program should allow participants to take advantage of the voluminous GHGRP activity data, leak surveys, measurements, and emissions data collected over the past several years. We recommend that participants also be permitted to utilize their own company-specific measured data (e.g. GHGRP data) or EPA's national emission factors from the GHGI for facilities that fall below the Subpart W reporting threshold. This approach would allow participants to utilize data that still meets the rigor of the GHGRP or GHGI or the direct measurement principles, but at a fraction of the cost and resources that would be needed to meet all the leak detection, quantification, and reporting requirements under certain sections of the GHGRP.

ONE Future encourages EPA to facilitate the use of direct measurements where it might improve data quality.

The ONE Future coalition is committed to working with EPA to help improve both the quantity and quality of emissions data. To this end we believe it is imperative that Methane Challenge participants be both permitted and encouraged to utilize updated emission factors that are based on the latest science or on representative surveys that utilize direct measurements. Although it is important that the Methane Challenge program avoid conflicting with, or unnecessarily overlapping the Greenhouse Gas Reporting Program (GHGRP), companies must have the flexibility to develop customized emission factors that are based on direct measurements employing generally acceptable protocols. Further, other voluntary programs, such as the Climate and Clean Air Coalition (CCAC), to which EPA is providing technical support and even EPA's own Gas STAR program have encouraged direct measurements. The EPA Gas STAR emission reductions are "backed off" from the EPA gross emissions to arrive at the net emissions from US natural gas systems. Employing similar logic, the ONE Future protocol for computing the net emissions intensity solves the concern related to potential conflicts between the data reported under GHGRP using default factors versus direct measurements. The ONE Future protocol for computing net emissions intensity solve the concern related to potential conflicts between the data reported under GHGRP using default factors versus direct measurements. ONE Future provides detailed discussion and recommendations surrounding the usage emissions calculations based on direct measurements in Appendix I entitled "Detailed

Recommendations for Reporting Emissions under the ONE Future Commitment Option of the Methane Challenge Program."

EPA should recognize and account for the reduction potential of fugitive emissions abatement practices such as LDAR and DI&M.

Although it is widely known that work practices such as Leak Detection and Repair (LDAR) and Directed Inspection and Maintenance (DI&M) have been demonstrated to be effective in reducing equipment leaks and fugitive methane emissions, the GHGRP does not account for any reductions achieved via the application of these work practice standards. EPA has indicated that they will recognize reductions related to these programs but has proposed to await finalization of pending regulatory actions before specifying abatement options (or defining emission factors for such options) for fugitive emissions and equipment leaks.

ONE Future opposes such a delay as we believe that there is no reason to link pending regulatory requirements governing fugitives from new sources with voluntary actions on both new and existing sources. To the contrary, one of the key features of a voluntary program is the fact that it can accommodate and encourage the deployment of innovative and customized approaches to emissions abatement. We encourage the EPA not to wait for finalization of the proposed OOOOa to arrive at appropriate reduction estimates for companies utilizing these work practice standards; rather we urge EPA to provide a clear methodology that allows companies to quantify their reductions by implementation of these voluntary practices.

We urge the EPA to refrain from collecting non-pertinent information from ONE Future Methane Challenge partners in an effort to differentiate voluntary actions from mandated actions.

EPA has proposed requesting that Methane Challenge participants submit "Applicable air regulations for included facilities, including a listing of the sources covered in the partner's Methane Challenge commitment that are affected by each regulation." ONE Future opposes this element of EPA's proposal, as it is neither reasonable nor practical to require participants in the Methane Challenge to differentiate voluntary actions from regulatory actions.

As noted throughout, the ONE Future approach was built around identifying a robust, scientifically-determined performance target that is consistent with optimal performance. Even in the unlikely event that a company was to achieve and sustain such a level of performance exclusively by adhering to state and federal mandates, the outcome is what's important: optimal performance.

ONE Future's ambitious one percent goal was adopted before EPA proposed the pending OOOOa rule and Control Techniques Guidelines guidance. The fact that EPA might subsequently mandate some portion of emission reductions through regulation does not diminish the commitment by ONE Future. Even for companies that commit to ONE Future *after* the promulgation of regulations, it is reasonable for EPA to conclude as a matter of policy that the ONE Future commitment is sufficiently ambitious without requiring further reductions to account for regulatory mandates.

EPA should ensure that reporting deadlines for Methane Challenge do not compound workloads related to mandatory EPA reports.

EPA has proposed that annual data submittals would be collected annually in spring of each year. ONE Future recommends a June 30th deadline to submit annual emissions reports under the EPA Methane Challenge program. Companies are currently required to submit their mandatory GHG reports under Subpart W by the end of the first quarter. We encourage EPA to establish a June 30th deadline for Methane Challenge reporting so as to avoid needlessly compounding workloads.

Recommendations on Methane Challenge program administration and design.

Submittal of implementation plans.

ONE Future supports the EPA's proposed Guidelines for Methane Challenge Implementation Plans. ONE Future agrees with the simple and straightforward plan information requirements collected in this plan. We do not believe it prudent or necessary to ask ONE Future companies to identify in advance the timing or nature of specific abatement actions, as a key feature of our performance-based approach is its flexibility to adapt to operational and commercial circumstances. Our program should be judged by its results, not by the processes which led to those results. EPA's proposed plan template matches our needs and expectations.

Branding the Methane Challenge Program.

EPA solicited comment on the proposed name "Natural Gas STAR Methane Challenge Program". It is obviously a minor point, but we would suggest that the proposed Methane Challenge program holds little resemblance or relationship to EPA's Natural Gas STAR program, and in fact marks a significant departure from other approaches to voluntary programs. In order to mark the significance of this new program, we respectfully suggest eliminating "Natural Gas STAR" from the title of the effort, in favor of simply "Methane Challenge."

APPENDIX I. Detailed Recommendations for Reporting Emissions Under the ONE Future Commitment Option of the Methane Challenge Program.

As discussed briefly in the Introduction to these comments, the ONE Future framework calls for tracking company progress and program progress by computing CH_4 emission intensities from natural gas systems at the national industry level, segment level,[18] and participating company level. At the national level, ONE Future's overall program goal is to reduce CH_4 emissions by 2025 to one percent of gross U.S. natural gas production. This is ONE Future's National Intensity Target. The target will be based on emissions data from the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks (GHGI) and production data from the U.S. Energy Information Administration (EIA). Based on 2012 emissions and production data, emissions from the natural gas sector were approximately 1.49 percent of production in 2012.[19] By the year 2025, it is ONE Future's collective goal to achieve an average annual methane emission intensity[20] rate across our operations that, if achieved by all U.S. operators across the natural gas value chain would be equivalent to one percent or less of gross U.S. natural gas production.

To enable diverse companies involved in different segments of the natural gas supply chain to report CH_4 emissions in a manner that is both consistent and transparent, ONE Future will develop a Methane Emissions Intensity Estimation Protocol.[21] In order to minimize reporting burdens and provide consistent and transparent reporting, this protocol will rely in large part on existing EPA estimation and reporting mechanisms – principally the U.S. EPA's Greenhouse Gas Reporting Program, 40 CFR Part 98 Subpart W (GHGRP) and the national Greenhouse Gas Inventory (GHGI). The focus of this Appendix is to summarize key elements of our proposed Methane Emissions Intensity Estimation Protocol and provide recommendations to EPA specifying both which emissions sources ONE Future's framework would track and how we recommend that companies be permitted to measure and report their emissions under Methane Challenge. In this manner, the ONE Future framework would significantly streamline reporting requirements consistent with existing U.S. reporting requirements and minimize additional burdens for participating companies.

What follows are ONE Future's specific recommendations as to the delineation of emissions sources and the proposed method by which emissions be reported for each of the four principal industry segments. We look forward to feedback from the EPA and plan to incorporate necessary revisions to our final Methane Emissions Intensity Estimation Protocol.

[18] The four principal industry segments are: (1)production and gathering; (2) processing; (3)transmission and storage; and (4)distribution.

[19] This figure is based on emissions data from the 2012 U.S. EPA inventory of GHG emissions (GHGI), accounting for co-allocation of emissions from associated gas originating at oil wells and lease condensates from gas wells, and 2012 natural gas gross withdrawals as reported by the EIA.

[20] In this paper, the term "emission intensity" refers exclusively to the average methane (CH4) emission rate over total methane throughput (as reported to the EIA) in a given system.

[21] The scope of this protocol is limited to CH_4 emissions reporting and progress tracking. Specific program elements for company engagement in the EPA Methane Challenge Program, such as memorandums of understanding (MOU) between participating companies and the EPA, implementation plans, and specific data submission and management software to support emissions reporting, will be defined by EPA or are outside the scope of this document.

TABLE OF CONTENTS –EMISSIONS REPORTING APPENDIX

1. Production Segment

Table 1 outlines the emission sources applicable to natural gas production operations and included in the GHGI for Natural Gas Systems. Table 1 provides a reference to the rule language that addresses the sources included in the GHGRP and indicates which sources are not included in the GHGRP.

Table 1. Production Segment Emission Sources

Emission Source	GHGRP Reference
Vented Emission Sources	
Gas Well Completions and Work overs with Hydraulic Fracturing	98.232(c)(6), 98.232(c)(8)
Gas Well Completions and Work overs without Hydraulic Fracturing	98.232(c)(5), 98.232(c)(7)
Well Venting for Liquids Unloading	98.232(c)(5)
Pneumatic Controller Vents	98.232(c)(1)
Chemical Injection Pump Vents	98.232(c)(3)
Dehydrator Vents	98.232(c)(14)
Storage Tanks Vents	98.232(c)(10)
Tank Vent Malfunctions	98.232(c)(10)
Well Testing Venting	98.232(c)(12)
Associated Gas Venting	98.232(c)(13)
Acid Gas Removal	98.232(c)(17)
Well Drilling	Not included
Vessel Blowdowns	Not included
Pipeline Blowdowns	Not included
Compressor Blowdowns	Not included
Compressor Starts	Not included
Pressure Relief Valves	Not included
Mishaps	Not included
Fugitive Emission Sources	
Reciprocating Compressors	98.232(c)(11)
Centrifugal Compressors	98.232(c)(19)
Well site Fugitive Emissions	98.232(c)(21)
Combustion Emission Sources	
Internal Combustion Units	98.232(c)(22)
External Combustion Units	98.232(c)(22)
Flare Stacks	98.232(c)(9)
Well Testing Flaring	98.232(c)(12)
Associated Gas Flaring	98.232(c)(13)

1.1 Subpart W Sources and Methods

For production operations, the GHGRP requires reporting emissions for the sources shown in Table 1.2. The estimation method(s) required by the GHGRP is also summarized in the table. ONE Future proposes to report emissions based on metric tons of CH_4 emissions for the sources listed below.

Table 1.2. GHGRP CH_4 Emission Sources for Production Operations

CH4 Emission Source	GHGRP Subpart	CH4 Estimation Method
Vented Emission Sources		
Gas well venting during completions and workovers without hydraulic fracturing	989.233(h)	Default emission factor
Gas well venting during completions and workovers with hydraulic fracturing	98.233(g)	Measured flowback gas volume vented or flared
Well venting for liquids unloading	98.233(f)	Engineering estimation or direct measurement
Pneumatic Controllers	98.233(a)	Default emission factors based on type of pneumatic controller
Pneumatic Pumps	98.233(c)	Default emission factor
Dehydrator Vents	98.233(e)	Dehydrators >0.4 MMscf use modeling. Dehydrators <0.4 MMscf use default emission factor. Desiccant dehydrators use an engineering equation.
Kimray Vents		
Storage Tanks	98.233(j)	For throughput > 10 barrels/day: Process simulator or engineering estimate based on liquid composition. For throughput <10 barrels/day: default emission factor.
Separator liquid dump valves	98.233(j)	Based on tank emissions and time the dump valve is not closing properly
Well Testing Venting and Flaring	98.233(l)	Engineering estimate based on gas to oil ratio or gas production rate
Associated Gas Venting and Flaring	89.233(m)	Engineering estimate based on gas to oil ratio
AGR Vents	98.233(d)	No CH4 emissions are required to be reported for AGR vents
Fugitive Emission Sources		
Reciprocating Compressors – Fugitive	98.233(p)	Default emission factor
Centrifugal Compressors - Fugitive	98.233(o)	Default emission factor
Well Site - Fugitive	98.233(q)	Default component counts and default emission factors
Combustion Emissions Sources		
External combustion sources > 5 MMBTU/hr	98.233(z)	Fuel combustion rates and gas composition
Internal combustion sources >1 MMBTU/hr	98.233(z)	Fuel combustion rates and gas composition
Flare Stacks	98.233(n)	Flow measuring device on the flare or use of engineering calculations based on process knowledge, company records, and best available data

1.2 Non Subpart W Sources and Methods

We propose that for emissions for facilities that are under the reporting threshold of 25,000 tonnes/year and/or are not subject to the GHGRP will be based on the participant's emissions data from the facilities that do report to the GHGRP. Where a participant does not have specific emissions data to apply to these facilities, default GHGRP emission factors will be applied, or average GHGRP emission factors will be developed from the publicly available GHGRP data. This approach applies to this category of 'below-threshold' emission sources for all segments.

1.3 Emissions for Sources Not Included in the GHGRP

Table 1.3 indicates emission sources that are not currently included in the GHGRP. An example of sources intentionally not included in GHGRP would be blowdown emissions in Production. Table 1.3 provides recommended emission factors for sources not currently included in the GHGRP for onshore production operations. ONE Future proposes that the emission factors for this category of sources be revised to align with future changes to the GHGI and/or GHGRP, as appropriate.

Table 1.3. Recommended CH4 Emission Factors for Missing Emission Sources in Onshore Production Operations

CH_4 Emission Source	Recommended CH_4 Emission Factor	Units	Data Source
Well Drilling	2,698	scfy CH_4/well	GHGI 2012
Vessel Blowdowns	82.6	scfy CH_4/vessel	GHGI 2012
Pipeline Blowdowns	327.1	scfy CH_4/mile	GHGI 2012
Compressor Blowdowns	3,967	scfy CH_4/compressor	GHGI 2012
Compressor Starts	8,149	scfy CH_4/compressor	GHGI 2012
Pressure Relief Valves	36.1	scfy CH_4/PRV	GHGI 2012
Mishaps	708.1	scfy CH_4/mile	GHGI 2012

At present date, the GHGRP does not currently require reporting for gas gathering pipelines and central gas handling facilities that exist between natural gas production operations and gas processing plants (emissions from these operations are expected to be added to the GHGRP in 2016, with reporting due in 2017). Table 1.4 provides recommended emission factors to account for the missing emission sources for Gathering operations. The emission factors shown are primarily default factors for gathering equipment as outlined in the proposed rule from December 2015[22], or emission factors derived from GHGRP data for similar equipment in production operations.

Table 1.5 outlines recommended emission factors for gathering sources which do not have similar emissions data from production operations in the GHGRP. GHGI emission factors are applied for these sources. We recommend that both Tables 1.4 and 1.5 be updated as reporting requirements under the GHGRP expand to include gathering operations and emissions data are available publicly.

[22] FR Vol. 79, 73148, December 9, 2014, Proposed Rules

Table 1.4. Recommended CH4 Emission Factors for Gathering Operations

CH_4 Emission Source	Recommended CH_4 Emission Factor	Units
Vented Sources		
Pneumatic Controllers	Low-bleed: 1.39 High bleed: 37.3 Intermittent bleed: 15.3	scfh gas/controller
Chemical Injection Pumps	13.3	scfh gas/pump
AGR Vents	6,083	scfd CH_4/AGR
Kimray Vents	1,297	Scf CH_4/MMscf throughput
Dehydrator Vents		
Storage Tank Vents	50,639 for throughput > 10 bbl/day	scf CH_4/sep-yr
	4,200 for crude throughput <10 bbl/day	scf CH_4/sep-yr
	17,600 for condensate throughput <10 bbl/day	scf CH_4/sep-yr
Tank Vent Malfunctions	To be developed from GHGRP data released in 2015	
Fugitive Emission Sources		
Reciprocating Compressors	9.48×10^3	scfy CH_4/compressor
Centrifugal Compressors	1.2×10^7	scfy CH_4/compressor
Gathering Pipeline	2.81	scf gas/hour/mile of pipeline
Heaters	Apply default component counts per equipment and default component emission factors from GHGRP	scfh gas/equipment
Separators		
Dehydrators		
Meters/Piping		
Combustion Emission Sources		
External combustion sources > 5 MMBTU/hr	55,652	scf CH_4/unit-yr
Internal combustion sources >1 MMBTU/hr	Not available until September 2015	scf CH_4/unit-yr
Flare Stacks	4,396	Mscf CH_4/flare-yr

Table 1.5. Recommended CH4 Emission Factors for Missing Emission Sources in Onshore Gathering Operations

CH4 Emission Source	Recommended CH4 Emission Factor	Units	Data Source
Vessel Blowdowns	82.6	scfy CH4/vessel	GHGI 2012
Pipeline Blowdowns	327.1	scfy CH4/mile	GHGI 2012
Compressor Blowdowns	3,967	scfy CH4/compressor	GHGI 2012
Compressor Starts	8,149	scfy CH4/compressor	GHGI 2012
Pressure Relief Valves	36.1	scfy CH4/PRV	GHGI 2012
Mishaps	708.1	scfy CH4/mile	GHGI 2012

2. Processing Segment

Table 2.1 outlines the CH_4 emission sources applicable to natural gas processing operations. For gas processing, all emission sources from the national GHGI are included in the GHGRP except pneumatic controllers.

Table 2.1. Processing Segment Emission Sources

Emission Source	GHGRP Reference
Vented Emission Sources	
Blowdown Vent Stacks	98.232(d)(3)
Dehydrator Vents	98.232(d)(4)
Acid Gas Removal Vents	98.232(d)(5)
Pneumatic Controllers	Not included
Fugitive Emission Sources	
Reciprocating Compressors	98.232(d)(1)
Centrifugal Compressors	98.232(d)(2)
Plant Fugitive Emissions	98.232(d)(7)
Combustion Emission Sources	
Internal Combustion Units	Subpart C
External Combustion Units	Subpart C
Flare Stacks	98.232(d)(6)

2.1 Subpart W Sources and Methods

For gas processing operations, the GHGRP requires reporting emissions for the emission sources shown in Table 2.2. The estimation method(s) required by the GHGRP is also summarized in the table.

Table 2.2. GHGRP CH4 Emission Sources for Gas Processing Facilities

CH_4 Emission Source	GHGRP Subpart	CH_4 Estimation Method
Vented Emission Sources		
Blowdown Vent Stacks	98.233(i)	Engineering estimation
Kimray Vents	98.233(e)	Dehydrators >0.4 MMscf use modeling. Dehydrators <0.4 MMscf use default emission factor. Desiccant dehydrators use an engineering equation.
Dehydrator Vents		
AGR Vents	98.233(d)	No CH_4 emissions are required to be reported for AGR vents
Pneumatic Controllers	Not included	Not included for gas processing
Fugitive Emission Sources		
Reciprocating Compressors – Fugitive	98.233(p)	Emissions are based on annual measurement of compressors in the mode found for reciprocating rod packing vents, unit isolation valve vents, and blowdown valve vents
Centrifugal Comp. (wet seals) – Fugitive	98.233(o)	Emissions are based on annual measurement of compressors in the mode found for all vents, including wet seal oil degassing vents, unit isolation valve vents, and blowdown valve vents
Centrifugal Comp (dry seals) – Fugitive		
Plants - Fugitive	98.233(q)	Equipment leaks from valves, connectors, open ended lines, pressure relief valves, and meters are calculated based on a leak detection survey and default leaker emission factors
Combustion Emission Sources		
Gas Engines	Subpart C	Fuel combustion rates and measured or default HHV or carbon content
Gas Turbines		
Flare Stacks	98.233(n)	Flow measuring device on the flare or use of engineering calculations based on process knowledge, company records, and best available data

2.2. Non Subpart W Sources and Methods

Refer to Section 1.2

2.3. Emissions for Sources Not Included in the GHGRP

For gas processing, emissions from pneumatic controllers are included in the GHGI, but are not included in Subpart W of the GHGRP. Exhaust emissions from gas engines and turbines are reported under Subpart C which does not currently enable emission factor development. In addition, although Acid Gas Removal units are reported in the GHGRP, only CO_2 emissions are required to be reported. Table 3.8

provides recommended emissions factors for these sources based on emission factors from the GHGI. ONE Future proposes that the emission factors for this category of sources be revised to align with future changes to the GHGI and/or GHGRP, as appropriate.

Table 2.3. Recommended CH4 Emission Factors for Missing Emission Sources in Gas Processing Operations

CH_4 Emission Source	Recommended CH_4 Emission Factor	Units	Data Source
Acid Gas Removal Units	5,376.4	Scfd CH_4/AGR	GHGI 2012
Pneumatic Controllers	145,524	scfy CH_4/plant	GHGI 2012
Exhaust from Gas Engines and Turbines	306.8	tonnes CH_4/plant-yr	Derived from GHGI 2012 data

3. Transmission and Storage Segment

Table 3.1 and 3.2 outline the emission sources applicable to natural gas transmission and storage operations, respectively. The tables indicate which sources are included in the GHGRP and those that are not.

Table 3.1. Transmission Segment Emission Sources

Emission Source	GHGRP Reference
Vented Emission Sources	
Transmission Storage Tanks and compressor scrubber dump valve leakage	98.232(e)(3)
Blowdown Vent Stacks	98.232(e)(4)
Pneumatic Controllers	98.232(e)(5)
Dehydrator Vents	Not included
Pipeline Venting	Not included
Fugitive Emission Sources	
Reciprocating Compressors	98.232(e)(1)
Centrifugal Compressors	98.232(e)(2)
Station Fugitive Emissions	98.232(e)(7)
Pipeline Leaks	Not included
Combustion Emission Sources	
Internal Combustion Units	Subpart C
External Combustion Units	Subpart C
Flare Stacks	98.232(e)(6)

Table 3.2. Storage Segment CH4 Emission Sources

Emission Source	GHGRP Reference
Vented Emission Sources	
Pneumatic Controllers	98.232(f)(3)
Dehydrator Vents	Not included
Storage Station Venting	Not included
Fugitive Emission Sources	
Reciprocating Compressors	98.232(f)(1)
Centrifugal Compressors	98.232(f)(2)
Station Fugitive Emissions	98.232(f)(5)
Storage Wells	98.232(f)(5)
Combustion Emission Sources	
Internal Combustion Units	Subpart C
External Combustion Units	Subpart C
Flare Stacks	98.232(f)(4)

3.1 Subpart W Sources and Methods

For transmission operations, the GHGRP requires reporting CH_4 emissions for the emission sources shown in Table 3.3. Emission sources reported under the GHGRP for Storage operations are shown in Table 3.4. The estimation method(s) required by the GHGRP is also summarized in the tables.

Table 3.3. GHGRP CH4 Emission Sources for Transmission Facilities

CH_4 Emission Source	GHGRP Subpart	CH_4 Estimation Method
Vented Emission Sources		
Transmission Storage Tanks - compressor scrubber dump valve leakage	98.233(k)	Annual monitoring and measurement where the tank vapors from the vent stack are continuous for 5 minutes
Blowdown Vent Stacks	98.233(i)	Engineering estimation or flow meters
Pneumatic Controllers	98.233(a)	Default emission factors based on type of pneumatic controller
Fugitive Emission Sources		
Reciprocating Compressors – Fugitive	98.233(p)	Emissions are based on annual measurement of compressors in the mode found for reciprocating rod packing vents, unit isolation valve vents, and blowdown valve vents
Centrifugal Compressors – Fugitive	98.233(o)	Emissions are based on annual measurement of compressors in the mode found for all vents, including wet seal oil degassing vents, unit isolation valve vents, and blowdown valve vents

Plants - Fugitive	98.233(q)	Equipment leaks from valves, connectors, open ended lines, pressure relief valves, and meters are calculated based on a leak detection survey and default leaker emission factors
Combustion Emission Sources		
Gas Engines	Subpart C	Fuel combustion rates and measured or default HHV or carbon content
Gas Turbines		
Flare Stacks	98.233(n)	Flow measuring device on the flare or use of engineering calculations based on process knowledge, company records, and best available data

Table 3.4. GHGRP CH4 Emission Sources for Storage Facilities

CH_4 Emission Source	GHGRP Subpart	CH_4 Estimation Method
Vented Emission Sources		
Pneumatic Controllers	98.233(a)	Default emission factors based on type of pneumatic controller
Fugitive Emission Sources		
Reciprocating Compressors – Fugitive	98.233(p)	Emissions are based on annual measurement of compressors in the mode found for reciprocating rod packing vents, unit isolation valve vents, and blowdown valve vents
Centrifugal Compressors – Fugitive	98.233(o)	Emissions are based on annual measurement of compressors in the mode found for all vents, including wet seal oil degassing vents, unit isolation valve vents, and blowdown valve vents
Stations - Fugitive	98.233(q)	Equipment leaks from valves, connectors, open ended lines, pressure relief valves, and meters are calculated based on a leak detection survey and default leaker emission factors
Storage Wellheads - Fugitive	98.233(q)	Equipment leaks from valves, connectors, open ended lines, and pressure relief valves are calculated based on a leak detection survey and default leaker emission factors
Combustion Emission Sources		
Gas Engines	Subpart C	Fuel combustion rates and measured or default HHV or carbon content
Gas Turbines		
Flare Stacks	98.233(n)	Flow measuring device on the flare or use of engineering calculations based on process knowledge, company records, and best available data

3.2 Non Subpart W Sources and Methods

Refer to Section 1.2.

3.3 Emissions for Sources Not Included in the GHGRP

Table 3.5 lists CH_4 emission sources that are not currently included in the GHGRP for the transmission and storage segments and provides suggested emission factors to account for the missing emission

sources. ONE Future proposes that the emission factors for this category of sources be revised to align with future changes to the GHGI and/or GHGRP, as appropriate.

Table 3.5. Recommended CH_4 Emission Factors for Missing Emission Sources in Transmission and Storage Operations

CH_4 Emission Source	Suggested CH_4 Emission Factor	Units	Data Source
Transmission			
Dehydrator Vents	93.72	Scf CH_4/MMscf	GHGI 2012
Pipeline Venting	31.65	Mscfy CH_4/mile	GHGI 2012
Pipeline Leaks	1.55	Scfd CH_4/mile	GHGI 2012
Storage			
Dehydrator Vents	117.18	scf CH_4/MMscf	GHGI 2012
Storage Station Venting	4,359	Mscfy CH_4/station	GHGI 2012
Transmission and Storage Combustion			
Engine Exhaust	10,525	scf CH_4/station	GHGI 2012
Turbine Exhaust	100	scf CH_4/station	GHGI 2012

4. Distribution Segment

Table 4.1, 4.2 and 4.3 outline the emission sources applicable to LNG storage, LNG import and export terminals, and natural gas distribution operations, respectively. The tables indicate sources that are included in the GHGRP and those that are not.

Table 4.1. LNG Storage Segment CH_4 Emission Sources

Emission Source	GHGRP Reference
Vented Emission Sources	
Storage Station Venting	Not included
Fugitive Emission Sources	
Reciprocating Compressors	98.232(g)(1)
Centrifugal Compressors	98.232(g)(2)
Station Fugitive Emissions	98.232(g)(3)
Combustion Emission Sources	
Internal Combustion Units	Subpart C
External Combustion Units	Subpart C
Flare Stacks	98.232(g)(4)

Table 4.2. LNG Import/Export Segment CH4 Emission Sources

Emission Source	GHGRP Reference
Vented Emission Sources	
Blowdown Vent Stacks	98.232(h)(3)
Fugitive Emission Sources	
Reciprocating Compressors	98.232(h)(1)
Centrifugal Compressors	98.232(h)(2)
Station Fugitive Emissions	98.232(h)(4)
Combustion Emission Sources	
Internal Combustion Units	Subpart C
External Combustion Units	Subpart C
Flare Stacks	98.232(h)(5)

Table 4.3. Distribution Segment CH4 Emission Sources

Emission Source	GHGRP Reference
Vented Emission Sources	
Pneumatic Controllers	Not included
PVR Releases	Not included
Pipeline Blowdowns	Not included
Dig-ins	Not included
Fugitive Emission Sources	
Station Fugitive Emissions	98.232(i)(1)
Below Grade Transmission-Distribution Transfer Stations	98.232(i)(2)
Above Grade Metering-Regulating Stations	98.232(i)(3)
Below Grade Metering-Regulating Stations	98.232(i)(4)
Distribution Mains	98.232(i)(5)
Distribution Services	98.232(i)(6)
Residential Meters	Not included
Commercial Meters	Not included
Industrial Meters	Not included
Combustion Emission Sources	
Internal Combustion Units	98.232(i)(7)
External Combustion Units	98.232(i)(7)

4.1 Subpart W Sources and Methods

Emission source reported under the GHGRP for LNG Storage operations are shown in Table 4.4 and Table 4.5 for LNG import/export operations. For distribution operations, the GHGRP requires reporting emissions for the emission sources shown in Table 4.6.

Table 4.4. GHGRP CH4 Emission Sources for LNG Storage Facilities

CH_4 Emission Source	GHGRP Subpart	CH_4 Estimation Method
Fugitive Emission Sources		
Reciprocating Compressors – Fugitive	98.233(p)	Emissions are based on annual measurement of compressors in the mode found for reciprocating rod packing vents, unit isolation valve vents, and blowdown valve vents
Centrifugal Comp. (wet seals) – Fugitive	98.233(o)	Emissions are based on annual measurement of compressors in the mode found for all vents, including wet seal oil degassing vents, unit isolation valve vents, and blowdown valve vents
Centrifugal Comp (dry seals) – Fugitive		
Storage Station Fugitive Emissions	98.233(q)	Equipment leaks from valves, pump seals, connectors, and "other" are calculated based on a leak detection survey and default leaker emission factors. .
	98.233(r)	Default emission factor is provided for vapor recovery compressors
Combustion Emission Sources		
Gas Engines	Subpart C	Fuel combustion rates and measured or default HHV or carbon content
Gas Turbines		
Flare Stacks	98.233(n)	Flow measuring device on the flare or use of engineering calculations based on process knowledge, company records, and best available data

Table 4.5. GHGRP CH_4 Emission Sources for LNG Import/Export Facilities

CH_4 Emission Source	GHGRP Subpart	CH_4 Estimation Method
Vented Emission Sources		
Blowdown Vent Stacks	98.233(i)	Engineering estimation
Fugitive Emission Sources		
Reciprocating Compressors – Fugitive	98.233(p)	Emissions are based on annual measurement of compressors in the mode found for reciprocating rod packing vents, unit isolation valve vents, and blowdown valve vents
Centrifugal Comp. (wet seals) – Fugitive	98.233(o)	Emissions are based on annual measurement of compressors in the mode found for all vents, including wet seal oil degassing vents, unit isolation valve vents, and blowdown valve vents
Centrifugal Comp (dry seals) – Fugitive		
Station Fugitive Emissions	98.233(q)	Equipment leaks from valves, pump seals, connectors, and "other" are calculated based on a leak detection survey and default leaker emission factors.
	98.233(r)	A default emission factor is provided for vapor recovery compressors.
Combustion Emission Sources		
Gas Engines	Subpart C	Fuel combustion rates and measured or default HHV or carbon content
Gas Turbines		
Flare Stacks	98.233(n)	Flow measuring device on the flare or use of engineering calculations based on process knowledge, company records, and best available data

Table 4.6. GHGRP CH4 Emission Sources for Distribution Operations

CH4 Emission Source	GHGRP Subpart	CH4 Estimation Method
Fugitive Emission Sources		
Equipment leaks from above grade transmission-distribution transfer stations	98.233(q)	Equipment leaks from connectors, block valves, control valves, pressure relief valves, orifice meters, regulators, and open ended lines are calculated based on a leak detection survey and default leaker emission factors.
Equipment leaks from below grade transmission-distribution transfer stations	98.233(r)	Emission factors are calculated based on all surveyed above grade transmission-distribution transfer stations
Equipment leaks from above grade metering-regulating stations	98.233(r)	Emission factors are calculated based on all surveyed above grade transmission-distribution transfer stations
Equipment leaks from below grade metering-regulating stations	98.233(r)	Default emission factors are provided for below grade M&R stations
Distribution main equipment leaks	98.233(r)	Default emission factors are provided by pipeline material type.
Distribution services equipment leaks	98.233(r)	Default emission factors are provided by pipeline material type.
Combustion Emission Sources		
External combustion sources > 5 MMBTU/hr	98.233(z)	Fuel combustion rates and gas composition
Internal combustion sources >1 MMBTU/hr	98.233(z)	Fuel combustion rates and gas composition

4.2 Non Subpart W Sources and Methods

Because all natural gas distribution companies are required to report under Subpart NN of the GHGRP, all companies also have to report under Subpart W. Therefore, Subpart W reporting includes emissions from all natural gas distribution companies.

4.3 Emissions for Sources Not Included in the GHGRP

For LNG Storage and Import/Export operations, exhaust emissions from gas engines and turbines are reported under Subpart C which does not currently enable emission factor development. Table 4.7 provides recommended CH_4 emission factors for these sources.

Table 4.7. Recommended CH_4 Emission Factors for Missing Emission Sources Associated with LNG Operations

CH_4 Emission Source	Suggested Emission CH_4 Factor	Units	Data Source
Combustion Emission Sources			
LNG Engines	0.24	scf CH_4/HP-hr	GHGI 2012
LNG Turbines	0.0056	scf CH_4/HP-hr	GHGI 2012

Table 4.8 provides recommended CH_4 emission factors for emission sources that are included in the GHGI but are not currently reported under Subpart W for distribution operations. ONE Future proposes

that the emission factors for this category of sources be revised to align with future changes to the GHGI and/or GHGRP, as appropriate.

Table 4.8. Recommended CH_4 Emission Factors for Missing Emission Sources in the Distribution Segment

CH_4 Emission Source	Suggested Emission Factor	Units	Data Source
Vented Emission Sources			
PVR Releases	0.0502	Mscf CH_4/mile	GHGI 2012
Pipeline Blowdowns	0.1023	Mscf CH_4/mile	GHGI 2012
Dig-ins	1.595	Mscf CH_4/mile	GHGI 2012
Fugitive Emission Sources			
Residential Meters	143.3	scfy CH_4/meter	GHGI
Commercial Meters	47.9	scfy CH_4/meter	GHGI
Industrial Meters	47.9	scfy CH_4/meter	GHGI