

THE DISCLOSURE DIVIDE

Revisiting *Rising Risk* and Methane Reporting
in the U.S. Oil & Gas Industry

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About EDF & Acknowledgements

About this Report

The purpose of this report is to examine the current state of methane emission disclosure in the oil and gas industry as compared to the findings in Environmental Defense Fund's *Rising Risk* report published in 2016.¹ This new report will demonstrate the need for methane management to remain a priority for stakeholders in the industry, including investors and companies alike.

This analysis finds the industry split into two camps on methane disclosure, those continuously improving reporting practices, and those lagging behind. While non-reporters leave their stakeholders uninformed on the risks methane bears, industry leaders have stepped forward and demonstrated robust disclosure is possible.

Our goal is that this report helps stakeholders, particularly in the investor community, engage constructively with companies to ensure the industry is both appropriately managing methane risk and seizing the opportunities that proper methane management provides. While the report is aimed at public equity investors, we hope this document can also be useful for investors in private companies, and energy lenders such as investment banks and insurance companies, who may be looking to assess methane performance as they implement Environmental, Social and Governance (ESG) management policies. Likewise, this guide can be a reference for oil and gas companies to analyze their operations and identify best management and operational practices.

About Environmental Defense Fund

Environmental Defense Fund (EDF) is one of the world's largest environmental nonprofit organizations, with more than two million members and a global staff of over 700 scientists, economists, policy experts and other professionals. EDF finds practical and lasting solutions to the most serious environmental problems. Working with businesses, scientists and academics, EDF takes a leading role in minimizing the environmental and health risks associated with the development of oil and natural gas globally.

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Table of Contents

Introduction	04
Executive Summary	06
Methane Landscape Update	08
Data and Analysis	10
Methodology	10
A Story of Divergence	11
THE GAP IN DISCLOSURE	11
LEADERS IN METHANE REPORTING EMERGE	12
LEADERSHIP SPOTLIGHT: SOUTHWESTERN ENERGY	12
WHILE SOME COMPANIES MOVE FORWARD, OTHERS STEP BACK	13
EUROPEAN DOMICILES, LARGE CAP COMPANIES AND UPSTREAM COMPANIES MOST LIKELY TO DISCLOSE	14
VOLUNTARY INITIATIVES ILLUSTRATE THE DIVIDE	15
Investor Engagement Drives Better Reporting	16
METHANE RESOLUTIONS SPARKS NEW AND IMPROVED REPORTERS	17
LEADERSHIP SPOTLIGHT: CIMAREX ENERGY	17
LESS ENGAGEMENT AND LESS DISCLOSURE FOR MIDSTREAM COMPANIES	18
Quality of Methane Disclosure Improving	18
REPORTING OF METHANE METRICS UP	19
COMPANIES STEP UP ON SETTING TARGETS	20
LDAR BASICS AND BEYOND	21
LEADERSHIP SPOTLIGHT: NOBLE ENERGY	22
MAJOR ROOM FOR IMPROVEMENT IN MEASUREMENT	23
What's Next for Methane Disclosure	23
Recommendations	23
Conclusion	24
Individual Company Data	25
Resources	29
Using the Performance Assessment Tool	30
Endnotes	31
About the Authors	32

Introduction

We live in a very different world from when Environmental Defense Fund (EDF) published [*Rising Risk: Improving Methane Disclosure in the Oil and Gas Industry*](#) two years ago. Progress on climate in the nation's capital has stalled with a new administration in the White House. However, new and often unlikely parties moved to fill that void. States have developed their own policies to advance climate goals. China has stepped forward as a new international leader. Businesses have increasingly recognized climate change as a factor in their decision-making process. And all the while, investor engagement on climate generally, and on oil and gas methane emissions specifically, has only grown.

[*Rising Risk*](#) was a first-of-its-kind report that showed how oil and gas methane emissions represented significant financial, reputational and regulatory risks to the industry. It also demonstrated that the U.S. oil and gas industry was failing to provide adequate disclosure on this issue. [*Rising Risk*](#) helped educate investors on why methane matters and outlined metrics that could help im-

CONTINUED ON PAGE 5



INTRODUCTION (CONT'D)

prove methane reporting. Methane emissions have now progressed from a little-understood risk to a focus of international investor engagement. Some companies have responded constructively to this new pressure, but others have yet to seize the opportunities methane management presents.

Meanwhile, calls for better reporting on climate change are becoming increasingly mainstream. For instance, the Financial Stability Board created and charged the Task Force on Climate-related Disclosure (TCFD) to create consistent, comparable and quantitative frameworks that address climate risk.² The TCFD initiative, supported by investors, companies and governments alike, builds on top of the work organizations like the Sustainability Accounting Standards Board (SASB) and CDP have been doing to bring climate and methane disclosure into the mainstream.

Both investors and companies have a long-term stake in the future of the oil and gas industry, and therefore need to assess all types of factors when considering the industry's future. With this vantage point, stakeholders recognize the serious risk methane emissions pose to oil and gas companies. The assumption that natural gas will have a role to play in a low carbon future has been a driver of company investment in the resource, but methane emissions threaten that often-touted “clean” reputation of natural gas – potentially harming the bottom line of investors and companies.

Additionally, methane accelerates the larger risk climate change poses to portfolios. Tackling climate in the oil and gas industry cannot be done via carbon alone. Investors should engage on methane not only because it is necessary to tackle climate risk comprehensively,

but also because solutions exist that can be implemented today. A constructive dialogue on methane can lend itself to near-term progress, building mutual trust and creating shareholder value, especially as investors and companies tackle what can be more complex issues like scenario analysis and stranded assets.

With the emergence of these new dynamics, we decided it was appropriate to reassess the landscape of methane management and disclosure today. EDF's *Rising Risk* analyzed the 2015 methane reporting from 65 top upstream and midstream oil and gas companies operating in the United States, and here we revisit those same companies to evaluate progress, identify gaps, and highlight opportunities for continued improvement. This report is designed to inform and support the continued and critically necessary engagement on a pressing business and climate risk.



Executive Summary

Reporting on methane emissions in the U.S. oil and gas industry is slowly improving, though unevenly. While many companies have improved reporting, some have not or gotten worse despite significant investor and U.S. regulator attention to the issue. The overall quality of methane data has improved, making information more actionable. This is a good start, but the industry needs to improve transparency further to ensure all investors and other stakeholders have the information they need to assess methane performance and manage risk.

EDF analyzed the publicly available information from 64 top upstream and midstream companies operating in the U.S. Below are high-level takeaways from our research. Please see page 25 for company-by-company results.

KEY RESEARCH FINDINGS:

A Story of Divergence in Industry Disclosure:

- 27% of companies report on at least three of the five analyzed methane metrics, and 58% of companies report at least some information on methane emissions. However, 42% of companies still do not disclose any information on methane emissions or management.
- Seven new companies have begun reporting on methane, but eight companies that once reported have stopped.
- 82% of companies that participate in voluntary initiatives provide some methane reporting, while only 32% of non-participants disclose methane information, showing some correlation.

Quality of Methane Data Is Better, but Not Enough:

- Reporting on methane metrics like absolute emissions figures, emissions intensity rates, targets, and leak detection and repair (LDAR) have all increased.
- Four companies now report quantitative methane reduction targets, up from zero in 2015. However, 60 companies still lack a methane reduction target.
- Only nine of the 32 companies that report a LDAR program detail the scope, frequency and methodology for how they conduct leak inspections.
- Only 14 companies report any information on the process of building an emissions inventory, either through direct measurement or estimates. Furthermore, only ten of those companies report using some level of direct measurement of emissions.

Investor Engagement Improves Reporting:

- Five of the seven new companies newly reporting on methane were targets of methane-disclosure shareholder resolutions during the past two years.
- More shareholder engagement leads to more frequent disclosure on methane, as evidenced by the greater disclosure among upstream vs. midstream companies.

RECOMMENDATIONS:

The report concludes with actionable recommendations to advance methane disclosure across the oil and gas industry, and address methane risk for the benefit for all parties involved.



Companies — Nail the Basics

Companies across the industry need to report on the basic methane metrics examined in *Rising Risk* as a bare minimum. Most notably, more companies need methane-specific reduction targets to show internal and external stakeholders their commitment to methane management. Well reported management programs are key to that accountability, including both quantitative metrics like targets, emission rates, and coverage of direct measurement, but also meaningful qualitative information like frequency, scope, and methodology for leak detection and repair. Non-reporting and reporting companies alike need to achieve this baseline level of reporting to begin addressing methane risk across the industry.



Industry Leaders — Raising the Bar

Robust reporting on methane management goes well beyond basic metrics. Comprehensive reporting going forward will need to include information to allow a company, its shareholders, regulators and peers to fully understand company commitment to the issue, and to assess performance over time. This next level of disclosure can include insights and actions from LDAR data, progress on technology pilots, company efforts to support methane regulations, and beyond. Continuous improvement in reporting is necessary for industry leaders to manage methane risk and remain competitive in the long-term.



Investors — Expand Engagement

To most effectively manage methane risk in their own portfolios, investors need to broaden their engagement, incentivizing companies to Nail the Basics and Raise the Bar. Furthermore, investors should find targeted ways to expand engagement to more midstream and smaller cap companies to close the gap between reporters and non-reporters. Leveraging this report and other materials like the PRI/EDF *Investor's Guide to Methane* for constructive conversation, investors can play a key role in closing the disclosure divide.



Methane Landscape Update

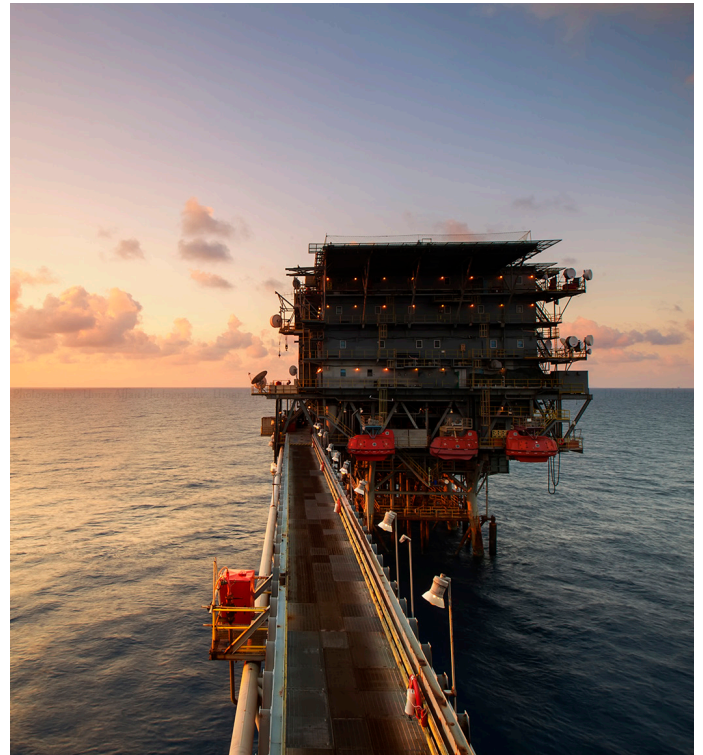
Methane, the primary component of natural gas, is a climate pollutant estimated to be at least 84 times more powerful than carbon dioxide (CO₂) over a 20-year period.³ In fact, methane emissions are responsible for 25% of the global warming we are experiencing today.⁴ Also, methane emissions from the oil and gas industry represent the largest industrial source of these emissions globally.⁵

Methane emissions pose reputational and financial risks to both investors and industry. In a capital and carbon-constrained world, the long-term viability of natural gas in part depends on its ability to play the role of the cleaner fossil fuel of the future. The oil and gas players investing in natural gas are betting on that potential. But methane emissions can squander much of the climate advantage of this fuel source, tarnishing the reputation of gas as a “clean” fossil fuel. Methane emissions are a problem for oil assets as well. Unless these emissions from all sources are managed, they will call into question the credibility of the oil and gas industry in offering climate solutions in a low-carbon world.

Additionally, lost methane is lost product. There is a quantifiable financial value to product that is leaked into the atmosphere, directly affecting a company’s bottom line. Worldwide, oil and gas companies leak and vent an estimated \$30 billion of methane each year into the atmosphere during their operations.⁶

However, cost-effective solutions to mitigate methane emissions exist today. A new study by the International Energy Agency (IEA) found that the global oil and gas industry can feasibly reduce up to 75% of methane emissions using existing technologies.⁷ Between 40-50% of those emissions could be reduced with a net zero cost. This action is estimated to have the equivalent climate impact in 2100 as shutting down all existing coal-fired power plants in China today – a significant climate impact with little relative cost.

Investors are paying increasing attention. In the U.S., investor networks like Ceres and the Interfaith Center on Corporate Responsibility (ICCR) have all



made methane risk an engagement priority the last few years. In 2017, methane engagement went global. Methane is now the singular focus of a United Nations-supported Principles for Responsible Investment (PRI) initiative involving 36 investors from 11 different countries, representing \$4.2 trillion assets under management.⁸ Investors filed over 35 methane disclosure resolutions since *Rising Risk* was published, with many earning significant shareholder support.⁹ In fact, ExxonMobil subsidiary XTO announced a new methane management program in the U.S. after mounting pressure for the company to increase its reporting on climate and specifically on methane.¹⁰

Leaders in industry are taking note of these opportunities, both as part of coalitions and as individual companies. The Oil & Gas Climate Initiative (OGCI), a group of ten international oil and gas companies, announced its intention to set a quantitative methane reduction target in 2018 and limit emissions to “near zero.”¹¹ This initiative includes BP, Shell and Total,

which are analyzed in this report. Relatedly, eight energy companies have signed a document of guiding principles to significantly reduce methane across the natural gas value chain, with the next step to develop an action plan.¹² These principles include calls for increased transparency, support for smart regulations, and global deployment of emission reduction measures in new and existing facilities.

These advances are occurring despite the deregulatory efforts from the White House. While there have been and continue to be numerous attempts at delaying, revising or repealing federal methane regulations, as of this writing federal standards for controlling methane from new and modified oil and gas equipment remain

in effect. Meanwhile, regulation of methane at the state level has increased, with states like California, Colorado, Ohio and Pennsylvania regulating methane emissions from the oil and gas industry to varying degrees. And internationally, Canada and Europe have taken steps forward on their own methane rules as well. In this environment, companies failing to address their methane emissions expose themselves to legal risks as well.

Two years have passed since *Rising Risk*, and while methane is still a relevant risk, momentum for better methane management, by investors, leading companies and forward-thinking regulators is growing.



Data and Analysis

Methodology

EDF surveyed 64 upstream and midstream companies operating in the U.S. These companies were the same companies that were examined in *Rising Risk*, with the exception of Spectra Energy. Enbridge and Spectra Energy merged in February 2017, so only Enbridge was analyzed in this new report.

EDF commissioned Greenpoint Innovations to analyze these companies' methane management and disclosure. The team looked at the publicly-available reporting on a number of investor-focused disclosure platforms to determine the level of methane information these companies provide. These included company websites, sustainability reports, annual reports, CDP disclosures and 10-

Ks. The results were compared to the findings in *Rising Risk* for analysis. The bulk of the data collection was conducted in September and October 2017. However, some companies did release 2017 disclosure information subsequent to our research.

EDF strives to ensure the highest levels of accuracy in our research. If you notice any mistakes or omissions, please let us know so we can correct our error.



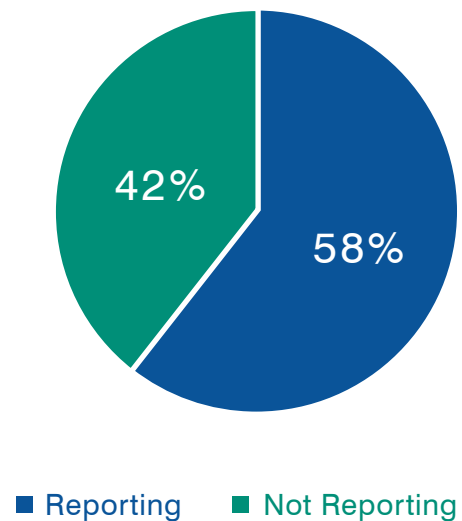
A Story of Divergence

THE GAP IN DISCLOSURE

The oil and gas industry has all but split in two; those reporting on methane management and those that do not. **58% of companies surveyed report some information, even if broad, on methane**, a figure that approximately matches the proportion of companies that reported in 2015 in *Rising Risk*. Still, over 40% fail to report any information at all on methane emissions or their management.

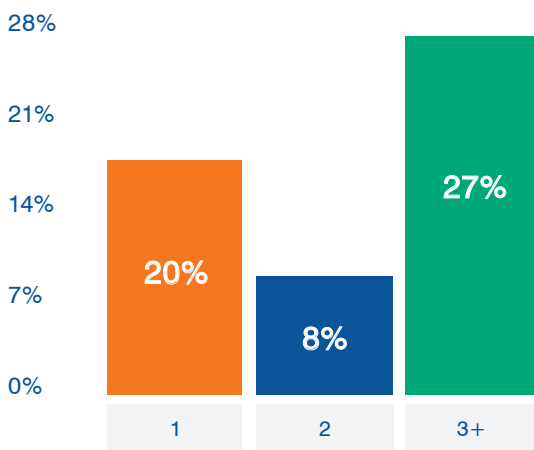
Company Reporting on Methane in 2017

% of companies



Company Reporting on Five Baseline Methane Metrics in 2017

% of companies reporting details on:



In *Rising Risk*, EDF examined five metrics necessary for baseline methane disclosure:

1. An absolute emissions figure
2. An emissions rate (methane emissions as a percentage of gas produced or throughput)
3. Discussion of leak detection and repair (LDAR)
4. Discussion of corporate positions on methane regulations
5. A quantitative methane reduction target

Of the 58% of companies that are reporting information on methane, almost half of those report three or more of these five metrics. Comparing this 27% against the over 40% who report nothing further highlights the divide in the distribution of companies and how much they report.

LEADERS IN METHANE REPORTING EMERGE

Some companies have emerged as leaders. They have committed to utilizing best methane management practices, and providing qualitative and quantitative transparency to their stakeholders, assuring them that the company is adequately addressing methane risk. Top level disclosure goes beyond the baseline methane metrics mentioned above and includes the qualitative narrative of how a company ensuring methane emissions are best managed. For instance, ExxonMobil writes about its personnel training program focusing on methane mitigation.¹³ Shell reports on its technology pilots of new continuous methane monitors.¹⁴ Noble Energy discusses its collaborative efforts with the Colorado state government to develop effective regulations.¹⁵



Leadership Spotlight: Southwestern Energy

Southwestern Energy (SWN) already was a leader in methane disclosure in 2015 but has exhibited a commitment to continuous improvement.¹⁶ SWN reports four of the five basic methane metrics. While SWN previously only disclosed an absolute methane emissions figure, the company now reports a rate as well. SWN is also one of only four companies with a quantitative target. Further improvement since 2015, SWN now includes details on the scope, frequency and methodology of its LDAR program on its website. The company writes that it keeps records of leaks to analyze trends that can increase the efficiency and efficacy of its program. Furthermore, SWN demonstrates its commitment to advancing methane science and innovation, discussing its use of direct measurement, new technology pilots and research study participation.

WHILE SOME COMPANIES MOVE FORWARD, OTHERS STEP BACK

New companies have responded to calls for methane disclosure and begun reporting on methane management practices for the first time. **Seven companies that did not disclose in 2015 now do.**

Despite progress on behalf of these new reporters, a divide remains. Eight companies that had previously reported on methane have now stopped. It is understood that business circumstances unrelated to a company's commitment to methane management can influence this type of reporting behavior. However, while a financially difficult operating environment over the past years may be partially to blame for some instances of backsliding, the goal is that investors and companies can work together to ensure that reporting on methane remains a priority going forward.



New Companies Reporting

Antero Resources

Cimarex Energy

Kinder Morgan

QEP Resources

Targa Resources Partners

Unit Corporation

WPX Energy

Companies No Longer Reporting

Buckeye Partners

Cabot Oil & Gas

Dominion Midstream Partners

Encana

Enlink Midstream Partners

Linn Energy

Magellan Midstream Partners

Plains All American Pipeline

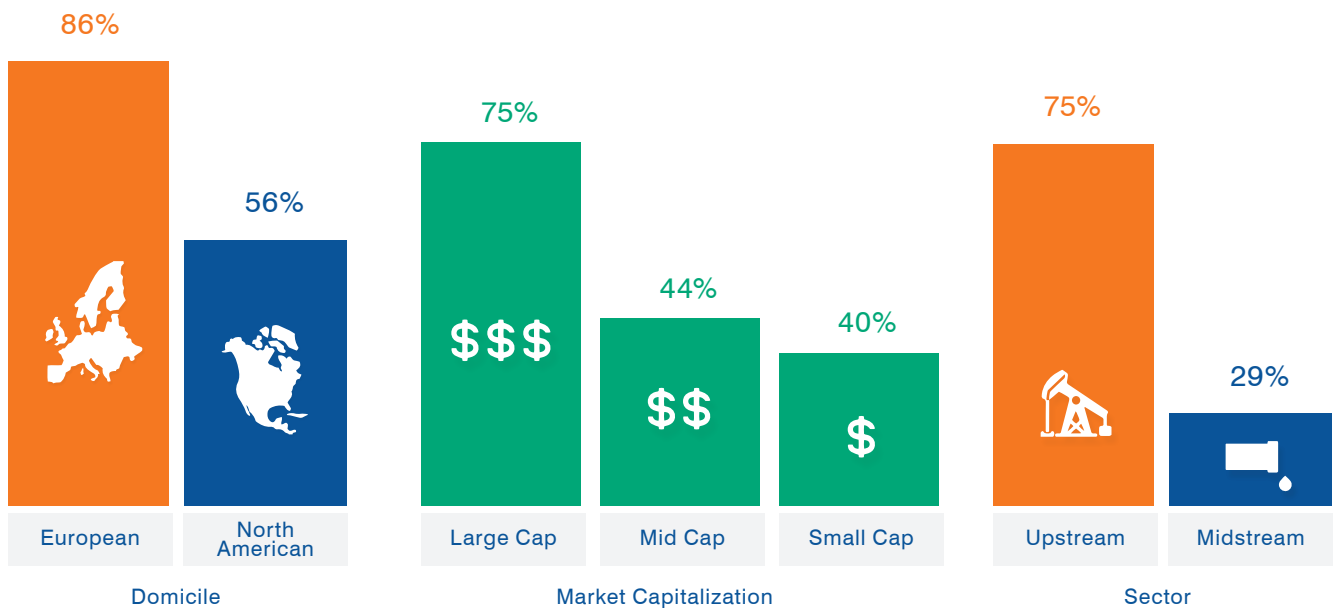
EUROPEAN DOMICILES, LARGE CAP COMPANIES AND UPSTREAM COMPANIES MOST LIKELY TO DISCLOSE

The divide in disclosure appears even more clearly when separating these companies by identifiers, like domicile, market cap and sector. These divides have persisted after being first identified in *Rising Risk*. The analysis of 2017 disclosure echoes those 2015 findings, showing European-based companies more frequently disclose on methane compared to their North American counterparts. There is also a proportional relationship between market cap and level of disclosure. Similarly, the percentage of upstream companies disclosing is much higher than that of the midstream companies.



Companies Reporting on Methane by Characteristics in 2017

% of companies reporting on methane



VOLUNTARY INITIATIVES ILLUSTRATE THE DIVIDE

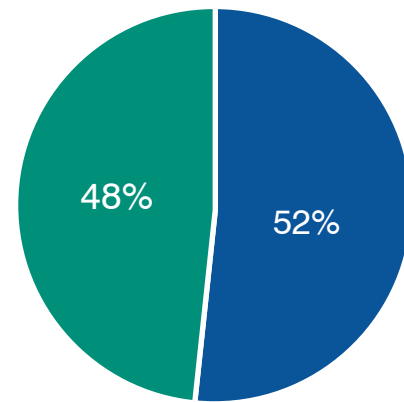
Another division in the oil and gas industry separates the 52% of companies involved in voluntary initiatives, and the remaining who are not. There are a number of voluntary methane initiatives today, such as EPA Natural Gas Star, Oil and Gas Climate Initiative and Oil, Oil and Gas Methane Partnership and ONE Future.

This divide is particularly glaring given the clear correlation between those companies who participate in voluntary initiatives and those who disclose information on methane. **82% of companies in voluntary initiatives provide some disclosure, while only 32% of non-participants disclose methane information.** This correlation shows a possible link between better reporting and better actual emissions management for those participating in credible voluntary initiatives.

However, not all voluntary initiatives are created equal, and stakeholders need to be informed of goals and methods before assessing the value in participation. Companies can work to make initiatives ambitious and transparent, ensuring that they lead to verifiable reductions with sufficient reporting so that investors and regulators can evaluate their efficacy. Unfortunately, this is not always the case. Some voluntary initiatives fail to achieve these goals, the most notable of which is the recently announced Environmental Partnership spearheaded by the American Petroleum Institute.¹⁷ The Environmental Partnership not only advocates for operational practices much less stringent than common industry practices, but its approach to data aggregation and anonymized reporting lacks transparency at the company level.

Company Participation in Voluntary Initiatives in 2017

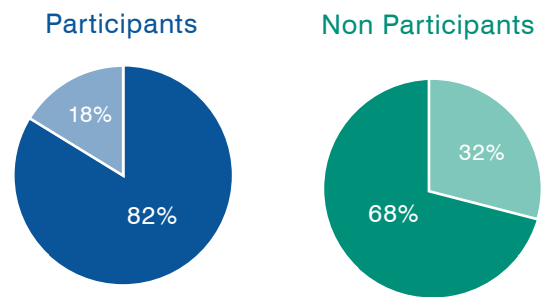
% of companies



■ Participants ■ Non Participants

Disclosure on Methane by Participation in Voluntary Initiatives in 2017

% of companies



■ Reports relevant methane ■ Reports relevant methane
 ■ Does not report on methane ■ Does not report on methane

Investor Engagement Drives Better Reporting

METHANE RESOLUTIONS HELP SPARK NEW AND IMPROVED REPORTERS

Seven new companies reported methane information in 2017 compared to 2015. **Five of those seven new reporters received shareholder resolutions calling for greater methane disclosure between 2015 and 2017.**

Shareholder resolutions can also lead reporting companies to improve. ExxonMobil was subject to two highly publicized resolutions calling for better disclosure on environmental risks. A first resolution by shareholders asked ExxonMobil to provide information on “energy demand sensitivities, implications of two degree Celsius scenarios, and positioning for a lower-carbon future.”¹⁸ This resolution received a historic 62% vote. A second resolution calling for greater methane-specific information received a nearly 40% vote. A few months later Exxon responded, providing details on a new and improved methane management program.¹⁹

New Companies Reporting After Resolutions

Antero Resources

Cimarex Energy

Kinder Morgan

Targa Resources Partners

WPX Energy





Leadership Spotlight: Cimarex Energy

Cimarex Energy received methane shareholder resolutions in 2016 and 2017, both of which were withdrawn after conversations between Cimarex and filers.²⁰ In response, Cimarex began providing greater transparency into its methane management practices. Cimarex provides an absolute methane emissions figure and a rate, as well as discussing its investment in LDAR.²¹ Beyond these basic metrics, Cimarex now also details its mitigation efforts, including installing instrument air and pneumatics powered by solar and wind. Cimarex also acknowledges the needs for methane disclosure beyond regulatory GHG reporting, writing on their corporate website, “It’s important to make a distinction between the general reporting required for GHG emissions reporting and the specific methane emissions often discussed in the public space.”²²



LESS ENGAGEMENT AND LESS DISCLOSURE FOR MIDSTREAM COMPANIES

Splitting the oil and gas industry sector into upstream and midstream companies illustrates the relationship shareholder engagement can have on the disclosure divide. 75% of upstream companies report on methane, while only 29% of midstream companies do. Accordingly, the upstream sector has been a greater target for methane disclosure than the midstream sector. **For instance, over 35 methane-specific resolutions have been filed since 2015, only four have targeted midstream companies.**²³

Quality of Methane Disclosure Improving

REPORTING OF METHANE METRICS UP

Those companies that are leading the way in disclosure not only continue to report on methane but continue to improve the level of detail in that disclosure as well. There are slight improvements in the percentage of companies disclosing on all five of the baseline methane metrics examined.

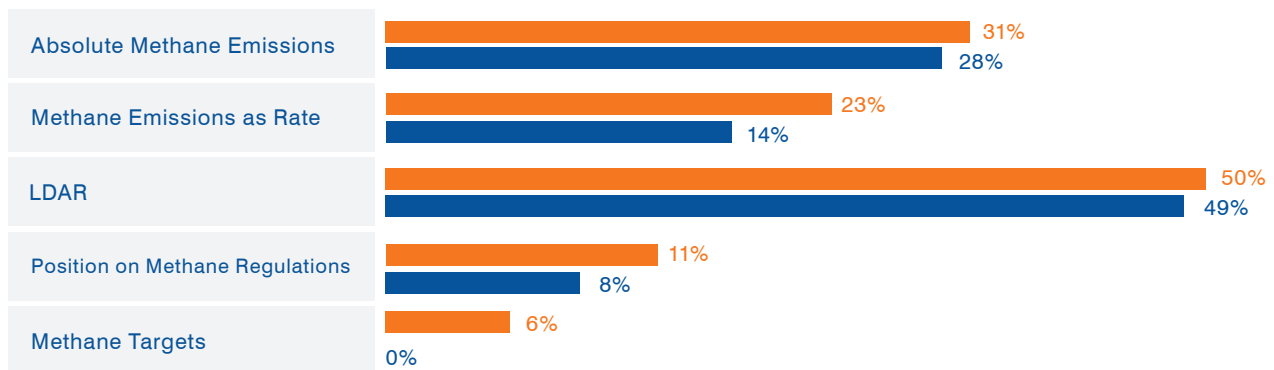
Almost one-third of the companies analyzed report an absolute methane emissions rate. 50% of the companies have some public discussion of their LDAR program. Four companies, up from zero in 2015, now have quantitative methane targets.



Company Reporting of Key Methane Metrics by Year

■ 2017 ■ 2015

% of companies reporting on:



COMPANIES STEP UP ON SETTING TARGETS

In 2015, not a single company analyzed had a quantitative methane target. **Now, four companies provide targets: Hess, Kinder Morgan, NiSource and SWN.** Three of the four companies that disclose quantitative targets do so in the context of the greater ONE Future value-chain targets. Notably, there are companies that are also members of ONE Future, but they do not explicitly report a reduction target in their public information.²⁴

While this increase shows marked improvement, progress is too slow. There are companies who report quantitative greenhouse gas (GHG) reduction targets that include methane. However, since methane is a short-lived climate pollutant, it needs to be assessed separately from other GHGs. In order to be completely transparent, companies need to break out the methane component. Clear targets are powerful signals of management commitment to methane emission reductions and can focus attention on this issue across an organization. Targets also allow investors to hold companies accountable for their commitments.

Companies Reporting Targets

Hess

Kinder Morgan

NiSource

Southwestern Energy

NiSource reports:



Over the past ten years, NiSource companies have reduced methane emissions from service and mainlines by 25%. By 2025, we're targeting a 50% reduction in methane emissions over a 20-year period.²⁵



LDAR BASICS AND BEYOND

Leak detection and repair is a necessary component of any comprehensive methane management program, but the disclosure divide appears here again, with only half of the surveyed companies disclosing any use of LDAR in their operations.

Baseline LDAR reporting requires not just discussion of a program’s existence. Companies need to at minimum provide three key details about its program:

1. Scope of the program
2. Frequency of inspection
3. Methodology used for detection

Out of the 32 companies that disclose LDAR programs, only nine report on all three LDAR components: ConocoPhillips, Consol Energy, EOG Resources, ExxonMobil, Hess, Noble Energy, SWN, TransCanada and WPX Energy.



Companies Reporting 3 LDAR Components

ConocoPhillips

Consol Energy

EOG Resources

ExxonMobil

Hess

Noble Energy

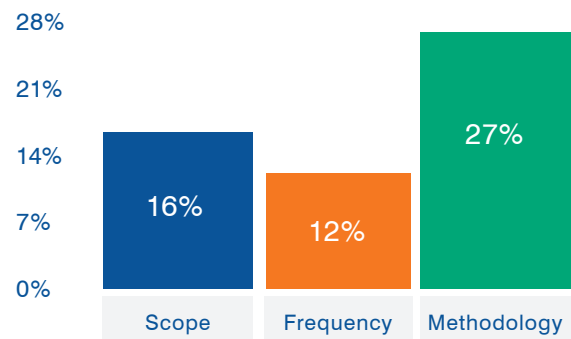
Southwestern Energy

TransCanada

WPX Energy

Company Reporting of LDAR Program Components in 2017

% of companies reporting details on:





Leadership Spotlight: Noble Energy

Noble Energy not just reports the existence of its LDAR program, but it also discloses all three of the relevant LDAR components.²⁶ Noble communicates the scope of their program in its sustainability report and to CDP by disclosing it operates LDAR for a percentage of its DJ Basin, Appalachian Basin and Texas onshore assets. The frequency of its LDAR inspections (monthly, quarterly, annually) varies by site. And Noble's methodology for inspections are conducted with infrared cameras. These efforts are reported as contributing factors to Noble Energy's 1.62 billion cubic feet (bcf) reduction in methane emissions in 2016. With this information, stakeholders — whether investors, peer companies or regulators — can begin to properly assess Noble's program.

ExxonMobil reports:



All leaks and repairs are tracked and will be analyzed for frequency, trends and patterns. We can prioritize which facilities and types of equipment are more prone to leaking and can establish an orderly framework for addressing these.²⁷



Some companies are moving beyond the three basic metrics and looking at LDAR programs as a space ripe for innovation. LDAR is evolving rapidly with emerging technologies like continuous monitors (piloted by Shell and Statoil), drone-based monitors and predictive analytics. By thinking critically about an LDAR program, companies can learn and optimize their operations. By reporting these more qualitative initiatives, companies can show their stakeholders the cutting-edge thinking going into not just having a LDAR program but its current performance and continuous improvement. Investors and companies want to know the answers to questions beyond the three basic details: What is the incidence rate of leaks? What are the main causes of leaks? How quickly are the leaks fixed? The three LDAR component should be considered basic requirements, not limiting prescriptions for the qualitative data comprehensive LDAR reporting can provide.

MAJOR ROOM FOR IMPROVEMENT IN MEASUREMENT

In regard to the accuracy of methane data, there is vast room for improvement across the industry. **Only 14 companies report any information on the process of building an emissions inventory, either through direct measurement or estimates. Furthermore, only ten of those companies report using some level of direct measurement of emissions.**

Companies Reporting Direct Measurements

ConocoPhillips

Devon Energy

ExxonMobil

Marathon Oil

NiSource

Noble Energy

Occidental

Pioneer Natural Resources

Southwestern Energy

TransCanada

TransCanada reports implementing direct measurement in order to inform

“

Extensive in-house set of emission factors for calculating fugitive emissions.²⁸

”

Companies that do not use direct measurement frequently rely on generic emissions factors for estimates. These emissions factors have two major disadvantages to direct measurement. Firstly, direct measurement allows a company to know both location and volume more precisely—exactly where leaks are happening, and how much product is wasted. This information is necessary for a precise and effective methane management program.

Secondly, science studies find that generic emissions factors often underestimate, sometimes drastically, actual amounts of methane released into the atmosphere.²⁹ Therefore, for stakeholders to assess the rigor and accuracy of any methane emissions figures a company reports, these stakeholders must know how a company arrived at those figures.

What's Next for Methane Disclosure

RECOMMENDATIONS:

Based on the results of our analysis, EDF recommends the following to further improve methane reporting:

Companies — Nail the Basics

Companies across the industry need to report on the basic methane metrics examined in *Rising Risk* as a bare minimum. Most notably, more companies need methane-specific reduction targets to show internal and external stakeholders their commitment to methane management. Well reported management programs are key to that accountability, including both quantitative metrics like targets, emission rates, and coverage of direct measurement, but also meaningful qualitative information like frequency, scope, and methodology for leak detection and repair. Non-reporting and reporting companies alike need to achieve this baseline level of reporting to begin addressing methane risk across the industry.

Industry Leaders — Raising the Bar

Robust reporting on methane management goes well beyond basic metrics. Comprehensive reporting going forward will need to include information to allow a company, its shareholders, regulators and peers to fully understand company commitment to the issue, and to assess performance over time. This next level of disclosure can include insights and actions from LDAR data, progress on technology pilots, company efforts to support methane regulations, and beyond. Continuous improvement in reporting is necessary for industry leaders to manage methane risk and remain competitive in the long-term.

Investors — Expand Engagement

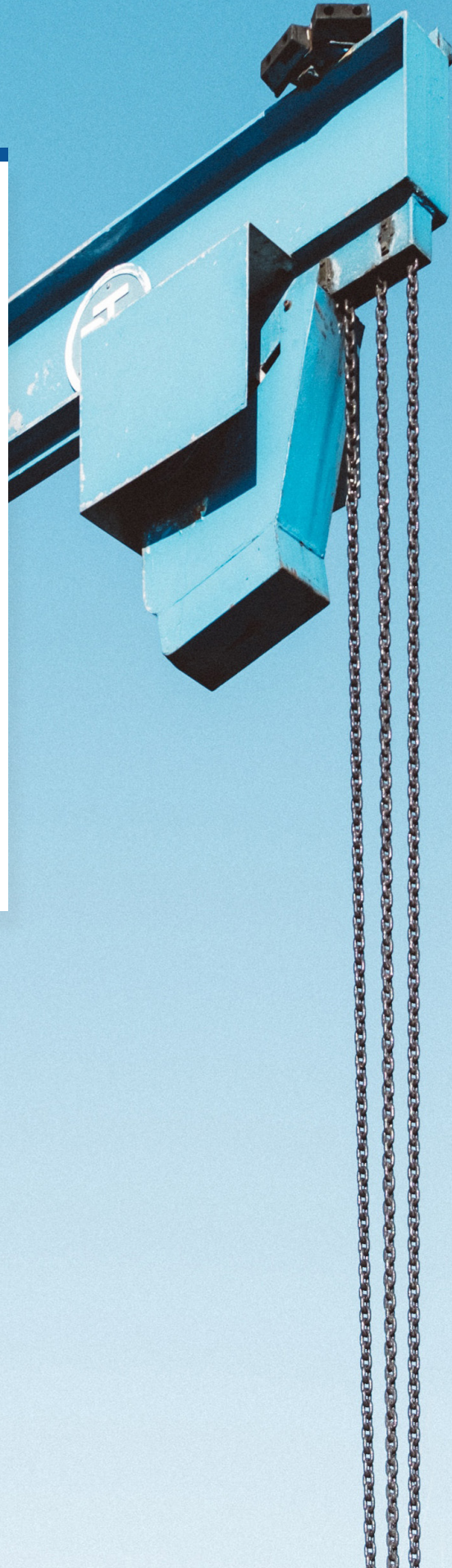
To most effectively manage methane risk in their own portfolios, investors need to broaden their engagement, incentivizing companies to Nail the Basics and Raise the Bar. Furthermore, investors should find targeted ways to expand engagement to more midstream and smaller cap companies to close the gap between reporters and non-reporters. Leveraging this report and other materials like the PRI/EDF *Investor's Guide to Methane* for constructive conversation, investors can play a key role in closing the disclosure divide.



Conclusion

Two years ago, *Rising Risk* identified the stark but addressable disconnect between the risk methane posed the oil and gas industry versus the limited reporting it was receiving. Methane disclosure is improving, but not fast enough given this risk and the rising investor pressure to address it.

Considering the role that natural gas could play in a cleaner-energy economy, as scrutiny of the oil and gas industry increases it's in the industry's best long-term interest to pro-actively, comprehensively and transparently address concerns around methane. The industry must develop targets and plans to limit emissions, and then improve reporting so stakeholders can verify progress and give credit where due. So long as the disclosure divide continues, investors and other stakeholders will question if this industry can be part of the climate solution or not.



Individual Company Data

COMPANY	Reports Methane Emissions as a Standalone Figure	Reports Methane Emissions as a Rate	Reports Using Some Direct Measurement	Reports a Quantitative Methane Goal	Discusses Methane Reducing Activities	Participates Publicly In Voluntary Methane Initiatives	Reports Position On Methane-Related Regulations	Discusses General LDAR Use	Reports LDAR Program Scope	Reports LDAR Program Frequency	Reports LDAR Program Methodology
Anadarko	✗	✗	✗	✗	✓	✓	✓	✓	✓	✗	✓
Apache	✗	✗	✗	✗	✓	✓	✗	✓	✗	✗	✓
BHP Billiton	✓	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗
BP	✓	✓	✗	✗	✓	✓	✗	✓	✗	✓	✓
Cabot Oil & Gas	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
Chevron	✓	✗	✗	✗	✓	✓	✓	✓	✗	✗	✓
Cimarex Energy	✓	✓	✗	✗	✓	✗	✗	✓	✗	✗	✗
Conoco Phillips	✓	✓	✓	✗	✓	✓	✗	✓	✓	✓	✓
Continental Resources	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Devon Energy	✓	✓	✓	✗	✓	✓	✗	✓	✓	✗	✓
Encana	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
EOG Resources	✓	✗	✗	✗	✓	✗	✗	✓	✓	✓	✓
EP Energy LLC	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
EQT Resources	✓	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗
Exxon Mobil	✓	✓	✓	✗	✓	✓	✗	✓	✓	✓	✓
Freeport-Mcmoran Inc.	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Hess Corp	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓
Marathon Oil	✓	✓	✓	✗	✓	✓	✗	✓	✗	✗	✓
Noble Energy, Inc	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓
Occidental	✓	✗	✓	✗	✓	✓	✗	✓	✗	✗	✓
Pioneer Natural Resources	✗	✗	✓	✗	✓	✓	✗	✓	✗	✗	✓
Royal Dutch Shell plc	✓	✗	✗	✗	✓	✓	✓	✓	✗	✗	✓
Total S.A.	✓	✓	✗	✗	✓	✓	✗	✓	✗	✗	✗

UPSTREAM: LARGE CAP

	COMPANY	Reports Methane Emissions as a Standalone Figure	Reports Methane Emissions as a Rate	Reports Using Some Direct Measurement	Reports a Quantitative Methane Goal	Discusses Methane Reducing Activities	Participates Publicly in Voluntary Methane Initiatives	Reports Position on Methane-Related Regulations	Discusses General LDAR Use	Reports LDAR Program Scope	Reports LDAR Program Frequency	Reports LDAR Program Methodology
UPSTREAM: MID CAP	Antero Resources	✗	✗	✗	✗	✓	✓	✗	✓	✓	✗	✓
	Chesapeake Energy	✗	✓	✗	✗	✓	✓	✗	✓	✗	✓	✓
	Consol Energy	✓	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
	Energen resources Corp	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
	Linn Energy	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
	Newfield Exploration	✓	✓	✗	✗	✓	✗	✗	✓	✗	✓	✓
	QEP Resources	✗	✗	✗	✗	✓	✗	✗	✓	✗	✓	✓
	Range Resources	✗	✗	✗	✗	✓	✗	✗	✓	✗	✓	✓
	Rice Energy	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
	Seneca Resources (National Fuel)	✗	✗	✗	✗	✓	✓	✗	✓	✗	✗	✓
	SM Energy Company	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
	Southwestern Energy Co	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓
WPX Energy Inc	✗	✗	✗	✗	✓	✗	✓	✓	✓	✓	✓	
UPSTREAM: SMALL CAP	Exco resources	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
	SandRidge Energy	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
	Ultra Petroleum	✗	✗	✗	✗	✓	✗	✗	✓	✗	✗	✓
	Unit Corporation	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗



Resources

How To: Using the Performance Assessment Tool

In October 2016, EDF released *An Investor's Guide to Methane*, a guide that provided practical advice on how investors can engage on methane, and what they should expect from companies regarding operations practices and disclosure.³⁰ The framework of this engagement guide is founded on three focus areas: measure, report and reduce. The below Performance Assessment Tool, created in partnership with UNPRI, summarizes the key takeaways from that report so stakeholders can quickly evaluate a company's methane management program. With that in mind, this report should provide the reader with the necessary data to successfully use the Performance Assessment Tool.

SUMMARY PERFORMANCE ASSESSMENT TOOL

	BEGINNER	INTERMEDIATE	EXPERT
MEASURE	<ul style="list-style-type: none"> Estimates emissions using generic emissions factors Developing plans to take measurements within one year 	<ul style="list-style-type: none"> Strategic plan for how and where measurements need to be taken Uses direct measurement to develop company-specific emissions factors Share data with international science efforts 	<ul style="list-style-type: none"> Measures all facility emissions 1x or more every three years Robust use of company-specific emissions factors Active participant in and funding of international science efforts
REPORT	<ul style="list-style-type: none"> Reports one of the recommended methane metrics Methane emissions reported separately from other GHGs Methane reduction target 	<ul style="list-style-type: none"> Reports against 2-3 methane metrics Uses best management practice quantitative targets (e.g. conducting LDAR on a % of assets, achieve % reduction from certain emissions sources) 	<ul style="list-style-type: none"> Reports action taken and progress made against all recommended metrics, incl. quantitative reduction target; reports comprehensive methane management approach Information audited by a third-party
REDUCE	<ul style="list-style-type: none"> Methane emissions rates trending downward to flat Only partially controls emissions Less than 1x/yr leak inspection No public opposition of regulation 	<ul style="list-style-type: none"> Methane emissions rate decreasing Adopts BMPs for new emissions sources 1 – 2x/yr leak inspection Neutral on regulations 50% of assets covered under voluntary initiatives 	<ul style="list-style-type: none"> Methane emissions rate and absolute emissions significantly decreasing Substantial retrofits of existing assets 4 – 12x/yr leak inspection Publicly supports regulation More than 75% of assets covered under voluntary initiatives

Notes

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- ⁴ Ibid.
- ⁵ *World Energy Outlook 2017*. International Energy Agency, 2017, *World Energy Outlook 2017*, www.iea.org/Textbase/npsum/weo2017SUM.pdf.
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- ⁸ "PRI Tackles Threat of Methane Emissions with Collaborative Engagement." News, Principles for Responsible Investment, 2017, www.unpri.org/page/pri-tackles-threat-of-methane-emissions-with-collaborative-engagement.
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- ¹¹ "Oil and Gas Climate Initiative." OGCI, www.oilandgasclimateinitiative.com/.
- ¹² "Reducing Methane Emissions across the Natural Gas Value Chain - Guiding Principles." *Reducing Methane Emissions across the Natural Gas Value Chain - Guiding Principles*, Climate & Clean Air Coalition, Dec. 2017, ccacoalition.org/en/resources/reducing-methane-emissions-across-natural-gas-value-chain-guiding-principles.
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- ¹⁴ "Methane Detectors Challenge." *Environmental Defense Fund*, Environmental Defense Fund, www.edf.org/methane-detectors-challenge.
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- ¹⁸ Op. cit. Ceres 2017
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- ²⁴ "Our Nation's Energy Future Coalition." *One Future*, One Future Coalition, www.onefuture.us/.
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- ³⁰ Wright, Sean. *An Investor's Guide to Methane: Engaging with Oil and Gas Companies to Manage a Rising Risk*. Environmental Defense Fund | Principles for Responsible Investment, 2016, *An Investor's Guide to Methane: Engaging with Oil and Gas Companies to Manage a Rising Risk*, www.edf.org/sites/default/files/content/investor_guide_final.pdf.

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