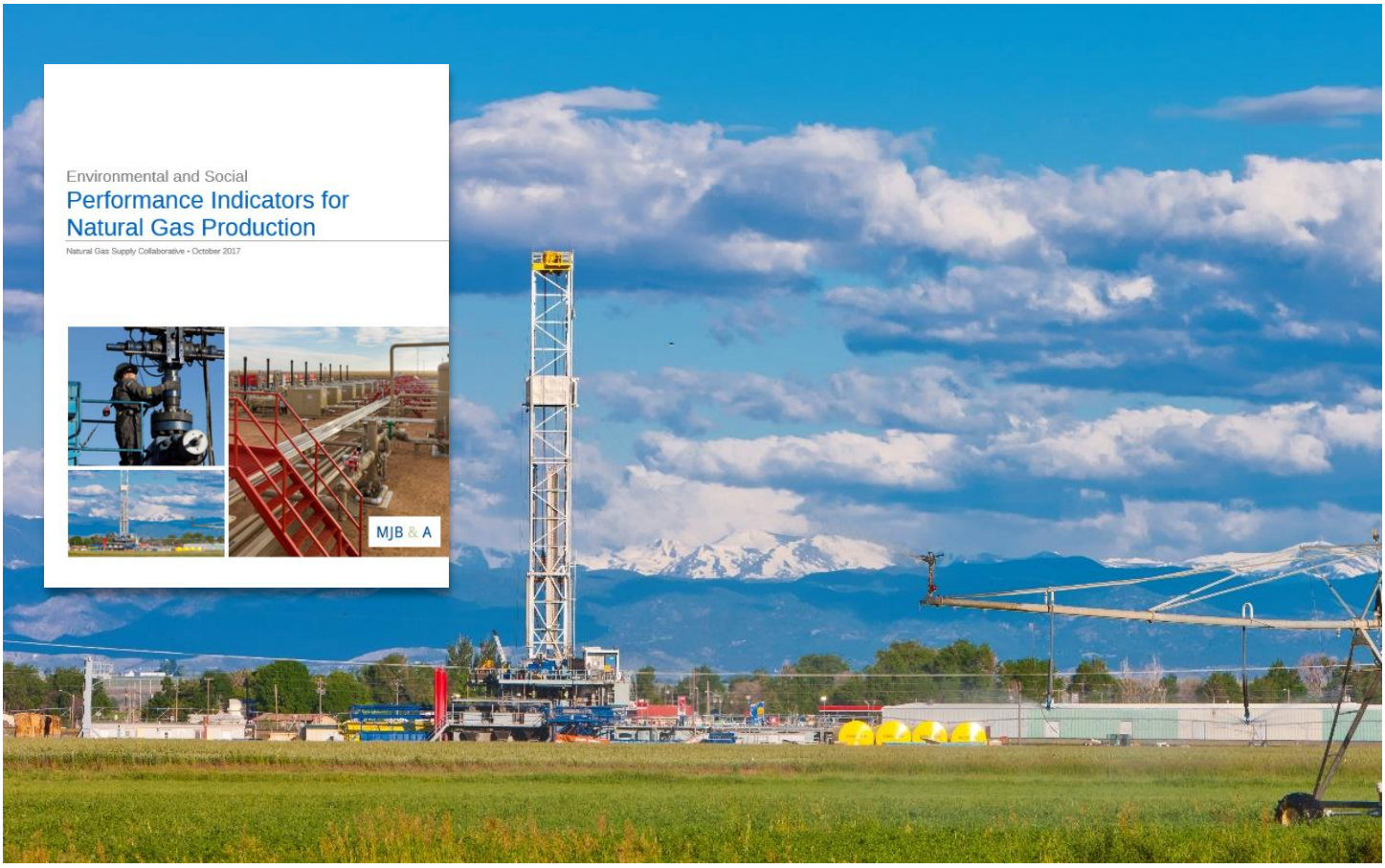
TECHNICAL SUPPLEMENT

Environmental and Social

Performance Indicators for Natural Gas Production

Natural Gas Supply Collaborative ▪ October 2017



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Acknowledgments

This report is the product of a collaborative effort among Austin Energy, Calpine Corporation, Consolidated Edison Company of New York, Los Angeles Department of Water and Power, National Grid, NRG Energy, NW Natural, Pacific Gas and Electric Company, and Xcel Energy. We would also like to acknowledge the valuable insights provided by outside reviewers who offered feedback on our public review draft, including natural gas producers, environmental organizations, and think tanks. Their input was immensely helpful to the development of the performance indicators.

M.J. Bradley & Associates LLC (MJB&A) convenes and manages the collaborative, overseeing development and release of all work products.

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MJB&A, founded in 1994, is a strategic consulting firm focused on energy and environmental issues. The firm includes a multi-disciplinary team of experts with backgrounds in economics, law, engineering, and policy. The company works with private companies, public agencies, and non-profit organizations to understand and evaluate environmental regulations and policy, facilitate multi-stakeholder initiatives, shape business strategies, and deploy clean energy technologies.

For questions or comments about this report, please contact: NGSCFeedback@mjbradley.com

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Process and Existing Frameworks

The Natural Gas Supply Collaborative (NGSC) is a voluntary collaborative of natural gas purchasers that are interested in promoting safe and responsible practices for natural gas supply.[1] This document provides additional context and supporting information for NGSC's report, *Environmental and Social Performance Indicators for Natural Gas Production*. The following discussion summarizes the process NGSC used to identify the performance indicators, highlights some of the feedback NGSC received from reviewers, and shows how the performance indicators identified by NGSC are drawn from existing voluntary reporting frameworks.

Process for Identifying Performance Indicators

M.J. Bradley & Associates (MJB&A) worked with NGSC to identify four key topic areas for performance indicators: methane and air emissions, water, chemical use, and community impacts and workforce safety. After identifying the key topic areas, MJB&A reviewed five existing frameworks that provide guidance on environmental and sustainability disclosure:

- CDP's Climate and Water Questionnaires and Oil and Gas Sector Module (CDP);
- Disclosing the Facts (DTF);
- GRI Oil and Gas Sector Disclosures (GRI);
- IPIECA, American Petroleum Institute (API), International Association of Oil & Gas Producers (IOGP) Oil and Gas Industry Guidance on Voluntary Sustainability Reporting and IPIECA's Pilot Climate Change Reporting Framework (IPIECA); and
- Sustainability Accounting Standards Board Oil and Gas Exploration and Production Sustainability Accounting Standard (SASB).

These frameworks have broad coverage of environmental and sustainability disclosure topics. Each framework provides important information for natural gas producers as they develop sustainability and other voluntary disclosure reports. Drawing from these frameworks, NGSC worked to highlight a concise list of important non-financial indicators for the four key topic areas from the perspective of natural gas purchasers. Additional information on each framework is provided below.

NGSC used the following principles to identify the non-financial performance indicators:

1. **Respond to stakeholder questions.** The performance indicators should address stakeholder questions regarding how natural gas producers are working to manage key issues associated with natural gas production.
2. **Promote quantitative and comprehensive disclosure**. The performance indicators should promote transparent information that shows how natural gas producers are systematically managing operations.

[1] NGSC participants include: Austin Energy, Calpine Corporation, Consolidated Edison Company of New York, Los Angeles Department of Water and Power, National Grid, NRG Energy, NW Natural, Pacific Gas and Electric Company, and Xcel Energy.

3. **Emphasize leading practices.** The performance indicators should be based on leading practices and metrics demonstrated within the industry.

MJB&A reviewed current approaches to reporting and disclosure and identified examples of performance indicators within each of the existing reporting frameworks. With guidance from NGSC and through interviews with outside experts, MJB&A developed a draft set of non-financial performance indicators that were published in a white paper for public review.

Stakeholder Feedback

NGSC posted a public review draft white paper on MJB&A's website on August 23, 2017 and sent the white paper with a request for comment to a wide range of stakeholders including other natural gas purchasers, natural gas producers, environmental groups, experts, and investor groups. A number of stakeholders provided feedback. NGSC advised reviewers that feedback might be made publicly available in the process of finalizing the performance indicators.

NGSC is grateful for the thoughtful feedback provided by reviewers of the public draft, including natural gas producers, environmental organizations, and other stakeholders. Their input was helpful in refining and revising the performance indicators. This section summarizes key updates to the performance indicators and responds to additional issues raised by reviewers.

NGSC received feedback expressing concern that some natural gas producers may not have the resources to support voluntary reporting. The NGSC performance indicators are not meant to harm any natural gas producers. The performance indicators offer a flexible structure that encourages reporting by companies in the early stages of reporting as well as by companies with more advanced programs. This approach recognizes that all companies connected to the natural gas supply chain have a role to play in responding to stakeholder questions. NGSC participants came together to highlight the importance and value of rigorous voluntary reporting and transparency. Consumer-facing industries were the first to adopt rigorous voluntary reporting but customers and stakeholders increasingly expect transparency from all industries. For natural gas producers, voluntary disclosure is increasing as companies respond to requests from investors, communities, and other stakeholders. Producers at the earlier stages of reporting are encouraged to increase the amount of information reported over time.

Some reviewers noted that information related to a number of the performance indicators is already reported to regulators. While NGSC recognizes that companies report information to regulatory authorities, such information is not always accessible to stakeholders. Part of voluntary reporting is improving the accessibility and availability of information. The final report references existing reporting requirements and frameworks that include information consistent with the NGSC performance indicators. By identifying data that may already be collected and is consistent with the performance indicators, NGSC hopes to make it easier for producers to voluntarily report information through company websites or other public reporting mechanisms they may choose to use.

One reviewer asked why NGSC developed its own indicators if they are all already reflected in existing voluntary frameworks. While the NGSC performance indicators are based on existing reporting and disclosure frameworks, NGSC's goal is to highlight performance indicators that best address the questions NGSC participants receive from stakeholders about the practices applied within their supply chains. By

identifying the performance indicators that are most important to NGSC participants in a single location, NGSC hopes to help natural gas producers improve the efficiency of their reporting.

Some reviewers recommended expanding the scope of the report to address more topic areas and include more indicators, including additional emissions and land use indicators. NGSC recognizes that there are many important issues and potential indicators associated with natural gas production. However, NGSC did not attempt to develop a comprehensive list of performance indicators. Rather, this initiative is intended to provide input on key topics of interest to NGSC participants. NGSC acknowledges that there are additional indicators that producers and other stakeholders may find useful, but has decided to focus on the indicators included in the report.

One natural gas producer noted that there are potential synergies associated with implementing leading practices across the report's four topic areas (methane and air emissions, water, chemical use, and community and safety) and recommended that the report address these synergies. This is an important insight, and identifying and gathering information about these potential interconnections is a potential benefit of voluntary reporting. While exploration of the synergies goes beyond the current scope of the report, it is a topic area NGSC could consider in the future.

NGSC received comments identifying challenges associated with reporting on fines, penalties, and enforcement actions, which was included as a quantitative performance indicator related to communities in the draft white paper. The challenges identified by reviewers included the use of different criteria by companies to report this information and a concern that the information would lack context. Reviewers encouraged the use of indicators that promote active community engagement. The final report includes a revised quantitative performance indicator for community engagement. To emphasize the importance of proactive community dialogue, the new performance indicator seeks information to understand how a natural gas producer measures progress on improving engagement with local communities. Recognizing that information on fines, penalties, and enforcement actions is useful to stakeholders but requires context, reporting on these actions is still included as an example under the community management strategy indicator.

Some reviewers asked for more information about why participants are engaged in NGSC. The final report includes a discussion of why the participants came together for this voluntary collaborative and clarifies how robust voluntary reporting on natural gas production practices can benefit both natural gas producers and purchasers. NGSC is encouraging natural gas producers to voluntarily report information related to the performance indicators through company websites or other established reporting mechanisms. By having more information publicly available, NGSC participants will have a better understanding of natural gas supply and will be better positioned to respond to stakeholder questions.

Reviewers asked how information released by natural gas producers could be used in the future. NGSC efforts have focused on the identification of the performance indicators and the development of the final report. The final report is intended to serve as a resource for natural gas producers and provide a framework for work on environmental performance goals. NGSC participants are committing to ongoing engagement with natural gas producers and other stakeholders to build on this report and promote safe and responsible practices for natural gas supply.

Background on Existing Frameworks

MJB&A reviewed five existing frameworks that provide guidance on environmental and sustainability disclosure:

- **CDP, formerly the Carbon Disclosure Project**, has developed annual reporting questionnaires related to climate change, water, forests, and supply chains in an effort to inform business, investment, and policy-making decisions. CDP has also released a set of questions specifically for oil and gas companies.
    - CDP's 2017 Oil and Gas Module is available at: https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/000/429/original/CDP-Oil-Gas-Module-Information-Request.pdf?1478710460
    - CDP's 2017 Water Questionnaire is available at: https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/000/228/original/CDP-Water-Information-Request.pdf

- **GRI, the Global Reporting Initiative**, is a non-profit which has developed an international framework for sustainability reporting with the aim of increasing accountability and transparency among organizations. GRI's oil and gas disclosure document is intended to provide companies with guidance on what to include in their annual sustainability reporting. GRI's Oil and Gas Sector Disclosures are available at: https://www.globalreporting.org/resourcelibrary/GRI-G4-Oil-and-Gas-Sector-Disclosures.pdf

- **Disclosing the Facts (DTF**) is a report developed by the Investor Environmental Health Network, As You Sow, and Boston Common Asset Management. The report accesses how well oil and gas companies disclose their use of current best practices to minimize the risks and impacts associated with hydraulic fracturing. DTF scores companies not on their actual performance, but on what information related to key areas of concern companies disclose. DTF's 2016 report and indicators are available at: http://disclosingthefacts.org/2016/DisclosingTheFacts_2016.pdf

- **IPIECA, the International Petroleum Industry Environmental Conservation Association**, worked with API and the IOGP to develop guidance on voluntary sustainability reporting. The guidance aims to help companies understand why it is important to produce a sustainability report, how to engage in the process, and what relevant content to include in a report.
    - The IPIECA, API, and IOGP Oil and Gas Industry Guidance on Voluntary Sustainability Reporting is available at: http://www.api.org/~/media/Files/EHS/Environmental_Performance/voluntary-sustainability-reporting-guidance-2015.pdf
    - IPIECA's Pilot Climate Change Reporting Framework is available at: http://www.ipieca.org/media/2706/ipieca-climate-change-reporting-framework_aug_2016.pdf

- **SASB, the Sustainability Accounting Standards Board**, is an independent non-profit that develops voluntary sustainability standards for public corporations. SASB developed their own oil and gas guidance document identifying information that companies can report. SASB's Oil & Gas Exploration and Production Sustainability Accounting Standard is available at: https://www.sasb.org/wp-content/uploads/2014/06/NR0101_ProvisionalStandard_OGExplorationProduction.pdf

Tables 1 and 2 provide additional information on the indicators in existing frameworks that are similar to the NGSC performance indicators.

Table 1: Quantitative Performance Indicator Mapping

The table below provides additional information on similar indicators in existing frameworks referenced for each quantitative performance indicator.

NGSC Indicator	Existing Framework with Similar Indicator	Similar Indicator
What are the total methane emissions of your operations, and what is the methane emissions intensity of your operations?	CDP Oil and Gas Module (2017)	**O&G Module 3.3**: Please provide masses of gross Scope 1 carbon dioxide and methane emissions released into the atmosphere in units of metric tonnes CO_2 and CH_4, respectively, for the whole organization broken down by emissions category. **O&G Module 7.5**: Estimate total methane emitted expressed as % of natural gas production or throughput at given segment.
	DTF (2016)	**Air Emissions Indicator 5**: Does the company report the percentage emissions rate for methane from its drilling, completion, and production operations, measured as methane emissions per methane production on an annual basis?
	GRI (2013)	**G4-EN15**: Report direct (scope 1) emissions within the reporting boundary of operational control, broken down by the 6 major-species if significant: Carbon Dioxide (CO_2) Methane (CH_4), Nitrous Oxide (N_2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur Hexafluoride (SF_6). **G4-EN18**: Report emissions intensity in tonnes CO_2e/mboe or other appropriate normalization factor to the respective business sector (e.g., oil and gas production, refining) for emissions within the reporting boundary of operational control.
	IPIECA (2015)	**E1 GHG Emissions C1**: Direct GHG emissions (Scope 1), reported using the company's preferred approach (operational, equity share or other) to include: direct CO_2, direct CH_4, and direct other direct gases (if significant). **E1 GHG Emissions C3**: GHG emissions and/or intensity, reported by business activity (e.g. oil and gas production, refining).

NGSC Indicator	Existing Framework with Similar Indicator	Similar Indicator
What are the sources of water for completions (hydraulic fracturing) at your operations by volume and percentage of total volume? For freshwater, what is the intensity of use?	DTF (2016)	**Water Management Indicator 6**: For each play does the company disclose the percentage of produced and/or flowback water from wells that is reused for subsequent well completions? **Water Management Indicator 8**: For each play does the company report the aggregate quantity of water used for operations? **Water Management Indicator 9**: For each play, for the quantity of water reported in response to the question immediately above, does the company report the share of water sourced from various types (e.g., x% potable, x% non-potable, x% groundwater, x% surface water, x% municipal, x% water recycled from operations or other forms of recycled water, or other such categories.)?
	GRI (2013)	**G4-EN8**: Report normalized freshwater withdrawal separately for each type of water intensive operations, by million barrels oil equivalent (mboe) produced.
	IPIECA (2015)	**E6 Freshwater S2**: Report freshwater withdrawal per unit of production, the freshwater withdrawal intensity, by business activity (e.g. oil and gas production, refining). **E6 Freshwater O6**: Provide quantitative and qualitative information on operations located in water-stressed or water-scarce areas or other locations where potential water management risks have been identified, including volumes of water withdrawn and/or consumed from sources such as municipal water supplies or other water utilities, and surface water, including water from lakes, ponds, streams, rivers and aquifers.
Do you conduct pre- and post-drill groundwater testing? What is the frequency and location?	DTF (2015)	**Water Management Indicator 5**: For each play, does the company disclose whether it assesses groundwater quality before it drills?
	SASB (2014)	**NR0101-08**: Percentage of hydraulic fracturing sites where ground or surface water quality deteriorated compared to a baseline.

NGSC Indicator	Existing Framework with Similar Indicator	Similar Indicator
What were the number and volume of hydrocarbon and non-hydrocarbon spills to soil and water from your operations?	GRI (2013)	**G4-EN24**: Report spills within the company's operational boundary, reporting separately the total number and volume of both hydrocarbon and non-hydrocarbon spills (to soil and to water) greater than one barrel of oil equivalent (boe) that reach the environment. The volume reported should not be reduced by the amount subsequently recovered.
	IPIECA (2015)	**E9 Spills to the Environment S3**: Separately report hydrocarbon spills to soil and to water (number and volume spilled). **E9 Spills to the Environment O1**: Report number and volume of spills of non-hydrocarbon materials (including chemicals, produced water or other materials) to soil and to water.
	SASB (2014)	**NR0101-11**: Number and aggregate volume of hydrocarbon spills, volume in Arctic, volume near shorelines with ESI rankings 8-10, and volume recovered.
How do you measure progress on stewardship activities for hydraulic fracturing chemicals? Provide quantitative data.	DTF (2016)	**Toxic Chemicals Indicator 1**: Does the company provide quantitative reporting on progress in reducing the toxicity of hydraulic fracturing fluids, including information indicating a baseline year for calculations?
	GRI (2013)	**G4-EN1**: Materials used by weight or volume. Include chemicals used in hydraulic fracturing such as acids, biocides, breakers, clay stabilizers, corrosion inhibitors, crosslinkers, friction reducers, gelling agents, iron controllers, scale inhibitors, surfactants.
	IPIECA (2015)	**HS4 Product Stewardship O1**: Quantitative data to provide scale to the narrative on product stewardship activities, such as the number of product assessments of potential impacts undertaken or the number of new and updated Safety Data Sheets (SDSs) issued in the year compared to the total number of applicable SDSs in place at the end of the year.

NGSC Indicator	Existing Framework with Similar Indicator	Similar Indicator
How do you measure progress on improving engagement with the communities that you operate in? Provide quantitative data.	DTF (2016)	**Community Impact Indicator 1**: For each play does the company describe major identified community concerns and the company's response or actions to resolve such concerns? **Community Impact Indicator 2**: Does the company disclose its internal processes, including data systems, for capturing and addressing local concerns before, and after, the drilling process begins? **Community Impact Indicator 3**: Does the company disclose its internal processes for reporting local concerns and response data upward within the company?
	GRI (2013)	**G4-DMA (Local Communities)**: Report on engagement with affected stakeholders, as well as procedures for local community impact assessment and mitigation. **OG10**: Identify significant disputes associated with current, planned or proposed future operations. Examples of disputes include land use, use of marine areas, and impacts on cultural heritage. Report the number of these disputes and describe their nature. Report actions taken in response to disputes, and the outcomes of actions.
	IPIECA (2015)	**SE1 Local Community Impacts and Engagement C1**: Describe policies, programmes and/or procedures for: assessing and addressing local community impacts; engaging with affected stakeholders and responding to their grievances and concerns; and public disclosure of information on company activities and management of impacts. **SE1 Local Community Impacts and Engagement O2**: Quantitative data may include: • the number and/or percentage of sites with grievance processes or similar conflict resolution procedures in place; and • data on the types of concerns raised via engagement or grievance mechanisms, supported by qualitative information on how concerns have been addressed, including elevation of concerns to corporate management, as appropriate.

NGSC Indicator	Existing Framework with Similar Indicator	Similar Indicator
What were your recordable injury rate, fatality rate, and near miss frequency rate for employees and contractors?	GRI (2013)	**G4-LA6**: Type of injury and rates of injury, occupational diseases, lost days, and absenteeism, and total number of work related fatalities, by region and gender.
	IPIECA (2015)	**HS3 Occupational Injury and Illness Incidents C1**: Report occupational injuries separately for employees and contractors: Total Recordable Injury Rate; Lost Time Injury Rate; Number of fatalities (excluding illness fatalities); Fatal Accident Rate (excluding illness fatalities); and Fatal Incident Rate.
	SASB (2014)	**NR0101-17**: (1) Total Recordable Injury Rate (TRIR), (2) Fatality Rate, and (3) Near Miss Frequency Rate for (a) full-time employees, (b) contract employees, and (c) short-service employees.

Table 2: Management Strategy Performance Indicator Mapping

The table below provides additional information on the similar indicators from existing frameworks referenced for each example management strategy performance indicator.

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
What is your strategy for limiting methane emissions?	Developing a LDAR protocol that includes information on the frequency, methodology, and scope of LDAR programs for all potential sources, including pneumatics, tanks, and compressors.	CDP Oil and Gas Module (2017)	O**&G Module 7.3**: Does your organization conduct leak detection and repair (LDAR), or use other methods to find and fix fugitive methane emissions? O**&G Module 7.3a**: Please describe the protocol through which methane leak detection and repair, or other leak detection methods, are conducted, including predominant frequency of inspections, estimates of assets covered, and methodologies employed.
		DTF (2016)	**Air Emissions Indicator 7**: Does the company describe the practices through which methane leak detection and repair, or other leak detection methods, are conducted, including descriptions and proportions of facilities assessed, and methodologies employed? **Air Emissions Indicator 8**: Does the company report, for each of the facility categories described above, the frequency of leak detection and repair efforts?

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
	Developing methane reduction goals and tracking progress toward meeting goals. If appropriate, different goals are set for different production regions.	CDP Oil and Gas Module (2017)	**O&G Module 7.7**: Did you have a methane-specific emissions reduction target that was active (ongoing or reached completion) in the reporting year and/or were methane emissions incorporated into targets reported in CC3 [CDP's climate change questionnaire]? **O&G Module 7.7a**: If you have a methane-specific emissions reduction target that is not detailed as a separate target in CC3, please provide those details here, addressing all of the metrics requested in table CC3.1a or CC3.1b (for an absolute or intensity target, respectively)
		DTF (2016)	**Air Emissions Indicator 9**: Does the company disclose an active methane emissions reduction target and progress toward achieving this target?
		IPIECA Climate (2016)	**Topic 6 Element 3**: The company's position on the use of greenhouse gas emissions or energy-related goals, both published and internal. If the company uses goals, provide commentary on the type of goal(s); (absolute or intensity); goal(s) that the company has established; key performance indicators used to measure this (these) goal(s); and progress towards meeting this (these) goal(s).
		SASB (2014)	**NR0101-03**: Description of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets.
	Conserving gas rather than flaring or venting, with exceptions for safety. Explaining strategies to conserve gas from activities such as liquids unloading.	CDP Oil and Gas Module (2017)	**O&G Module 3.4**: Please describe your organization's efforts to reduce flaring, including any flaring reduction targets set and/or its involvement in voluntary flaring reduction programs, if flaring is relevant to your operations.

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
		DTF (2016)	**Air Emissions Indicator 3**: For each play, does the company report the voluntary practices it takes, in addition to those practices required by law, other than reduced truck use and fuel substitutions for engines, to reduce air pollution emissions to the atmosphere from its drilling, completions, and production operations?
		IPIECA Climate (2016)	**Topic 6 Element 1**: The strategies, programmes, initiatives and activities that the company employs to mitigate greenhouse gas emissions within its own operations, including the company's approaches to energy efficiency, flaring reduction, venting and fugitive emissions reduction, carbon capture and storage, and renewable energy sources.
	Replacing high-bleed pneumatic devices with no-bleed devices wherever possible and low-bleed devices at other locations, and reporting on annual progress of replacement efforts.	DTF (2016)	**Air Emissions Indicator 6**: Does the company report the percentage or number of high-bleed controllers replaced with low-emission alternatives, or a program for their replacement?
	Undertaking efforts to characterize and address emissions from episodic, high-emitting sources, including field testing of new technologies designed to rapidly detect significant leaks.	IPIECA Climate (2016)	**Topic 8 Element 1**: The company's R&D activities directed towards technologies that have the potential to reduce greenhouse gas emissions in oil and gas sector operations or from hydrocarbon-derived product use.
	Participating in voluntary methane reduction programs.	CDP Oil and Gas Module (2017)	**O&G Module 3.4**: Please describe your organization's efforts to reduce flaring, including any flaring reduction targets set and/or its involvement in voluntary flaring reduction programs, if flaring is relevant to your operations. **O&G 7.6**: Please describe your organization's participation in voluntary methane emissions reduction programs

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
		IPIECA Climate (2016)	**Topic 8 Element 2**: The third-party institutions and programmes that the company is engaged with to promote R&D in low-carbon technologies.
What is your strategy for managing freshwater use?	Establishing production-based freshwater use intensity targets.	CDP Water Information Request (2017)	**W8.1**: Do you have any company-wide targets (quantitative) or goals (qualitative) related to water?
	Reducing freshwater use through efforts such as wastewater recycling, use of brackish water, and operational improvements.	DTF (2016)	**Water Management Indicator 10**: Does the company state its practices for how and when it uses non-potable water in its operations?
		IPIECA (2015)	**E6 Freshwater O6**: Provide quantitative and qualitative information on operations located in water-stressed or water-scarce areas or other locations where potential water management risks have been identified.
	Not using local freshwater resources that directly compete with and negatively impact other local uses, such as agriculture and drinking supplies.	DTF (2016)	**Water Management Indicator 11**: Does the company report whether it operates in water-scarce areas (and how this is determined) and its program or practices for limiting or reducing water in water-scarce areas it identifies?
		IPIECA (2015)	**E6 Freshwater O6**: Provide quantitative and qualitative information on operations located in water-stressed or water-scarce areas or other locations where potential water management risks have been identified.
	Reporting on efforts to limit or reduce freshwater use in water-stressed areas.	DTF (2016)	**Water Management Indicator 11**: Does the company report whether it operates in water-scarce areas (and how this is determined) and its program or practices for limiting or reducing water in water-scarce areas it identifies?

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
		IPIECA (2015)	**E6 Freshwater O6**: Provide quantitative and qualitative information on operations located in water-stressed or water-scarce areas or other locations where potential water management risks have been identified
What is your approach to well planning and strategy for maintaining well integrity?	Actively assessing potential underground contamination pathways before drilling by evaluating local geology, including natural fractures and existing oil and gas infrastructure.	CDP Water Information Request (2017)	**Water 2.1**: Does your organization undertake a water-related risk assessment? **Water 2.3**: Please state how frequently you undertake water risk assessments, what geographical scale and how far into the future you consider risks for each assessment. **Water 2.5**: Please select the methods used to assess water risks.
		DTF (2016)	**Water Management Indicator 3**: Does the company report steps it takes, when planning to drill and complete new wells, to minimize the risk that nearby offset oil and gas wells (both active and inactive) and faults and fractures will provide pathways for fracturing fluids, hydrocarbons, and other contaminants to enter the environment, including the atmosphere or surface or ground water?
	Employing practices, such as cement bond log testing and mechanical integrity tests, to ensure well integrity. For each practice, explain risk assessment process for determining which to use.	CDP Water Information Request (2017)	**Water 2.1**: Does your organization undertake a water-related risk assessment? **Water 2.3**: Please state how frequently you undertake water risk assessments, what geographical scale and how far into the future you consider risks for each assessment. **Water 2.5**: Please select the methods used to assess water risks.

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
		DTF (2016)	**Water Management Indicator 1**: Does the company describe under what circumstances it uses cement evaluation logs, or temperature, acoustic, or ultrasonic measures to assess well integrity e.g., for some or every new or refractured well, when entering new plays, and/or addressing well integrity anomalies?
	Employing practices for ensuring well integrity and fracture containment.	API (2015)[2]	**API Recommended Practice 100-1**: Hydraulic Fracturing – Well Integrity and Fracture Containment.
	Providing a detailed plan for lifetime well integrity management, including but not limited to annular pressure monitoring, with remediation and reporting protocols.	API (2016)[3]	**API Recommended Practice 90-2**: Annular Casing Pressure Management for Onshore Wells.
	Employing practices for isolating potential flow zones.	API (2010)[4]	**API Standard 65-2**: Isolating Flow Zones During Well Construction.
What is your strategy for managing water onsite and wastewater?	Employing practices to avoid seismic activity when operating deep disposal wells or require such practices of wastewater disposal well companies.	DTF (2016)	**Water Management Indicator 4**: For each play, does the company state the practices it uses, or requires of its third-party contractors, when planning completion of new production wells, drilling and operating its own deep disposal wells, or disposing of wastewater, to avoid seismic activity that can be felt at the surface?
	Employing risk assessment processes when determining what type of treatment and storage systems to deploy.	DTF (2016)	**Water Management Indicator 13**: For each play, does the company state whether it uses tanks and/or open impoundments to store produced water; its criteria for such selection(s); and steps it takes to reduce spills, leaks, volatile emissions, and hazards to wildlife?

[2] Information on API Recommended Practice 100-1 is available at: http://www.api.org/~/media/files/publications/whats%20new/100-1_e1%20pa.pdf
[3] API Recommended Practice 90-2 is available for purchase from API and Authorized API Resellers: http://www.api.org/products-and-services/standards/purchase
[4] API Standard 65-2 is available at: http://www.api.org/~/media/Files/Policy/Exploration/Stnd_65_2_e2.pdf

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
	Reducing wastewater volumes by managing wastewater via in-field recycling.	IPIECA (2015)	**E6 Freshwater O7**: Describe how other types of water, if significant, are managed. Other types of water may include produced water, process waste water, storm water or desalinated water. **E10 Waste O5**: Describe efforts to minimize the generation of waste and improve on company waste management practices.
	Describing how wastewater is handled and the ultimate disposition of wastewater.	GRI (2013)	**OG5 2.3**: Report strategies and criteria for disposal and treatment, and standards used for quality of produced water discharged, including hydrocarbon and salinity.
		IPIECA (2015)	**E6 Freshwater O7**: Describe how other types of water, if significant, are managed. Other types of water may include produced water, process waste water, storm water or desalinated water.
	Prior to reuse of produced water offsite, participating in research to better understand opportunities for reuse outside the field and the health and environmental risks associated with reuse, especially for agriculture.	CDP Water Information Request (2017)	**Water 4.1**: Does water present strategic, operational or market opportunities that substantively benefit/have the potential to benefit your organization? **Water 4.1a**: Please describe the opportunities water presents to your organization and your strategies to realize them.
		IPIECA (2015)	**E10 Waste O5**: Describe efforts to minimize the generation of waste and improve on company waste management practices.
What is your strategy for managing chemicals?	Working to reduce the toxicity of the chemicals used, establish quantitative goals to reduce chemical toxicity, and report on progress towards achieving those goals.	DTF (2016)	**Toxic Chemicals Indicator 1**: Does the company provide quantitative reporting on progress in reducing the toxicity of hydraulic fracturing fluids, including information indicating a baseline year for calculations?

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
		GRI (2013)	**G4-EN27**: Extent of impact mitigation of environmental impacts of products and services. Report on partnerships (e.g., with Original Equipment Manufacturers) to develop new technologies that result in improved environmental performance.
		IPIECA (2015)	**HS4 Product Stewardship C1**: Discuss the company's approach to product assessments and how identified findings are addressed.
	Providing data sheets on proper response to the release of specific chemicals, and engagement and preparedness training with local emergency responders.	IPIECA (2015)	**HS4 Product Stewardship C2**: Describe the processes to provide Safety Data Sheets and other risk management information to customers and to the public, as appropriate.
	Including exclusions in contracts for specifically identified chemicals (e.g., BTEX and diesel fuel).	DTF (2016)	**Toxic Chemicals Indicator 3**: Does the company state a practice to not use diesel fuels, as defined by EPA, in hydraulic fracturing fluids? **Toxic Chemicals Indicator 4**: Does the company state a practice to not use BTEX in hydraulic fracturing fluids?
	Providing workers and managers with regular company health and safety training.	IPIECA (2015)	**HS1 Workforce Participation C1**: Describe the company's approach to managing workforce participation in health and safety dialogues.
	Reporting whether or not hydraulic fracturing chemical disclosure includes exemptions for confidential business information.	DTF (2016)	**Toxic Chemicals Indicator 5**: Does the company clearly state on its website that FracFocus and/(or its own reporting) may exclude chemicals protected by claims of confidential business information (CBI)?
		SASB (2014)	**NR0101-07**: Percentage of hydraulically fractured wells for which there is public disclosure of all fracturing fluid chemicals used

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
What is your strategy for protecting and engaging with communities?	Minimizing impacts in potentially vulnerable areas, such as when operating in proximity to communities, in areas with local air quality problems, or regions facing water scarcity.	DTF (2016)	**Community Impacts Indicator 1**: For each play does the company describe major identified community concerns and the company's response or actions to resolve such concerns? **Community Impacts Indicator 4**: Does the company disclose a practice to adjust activity schedules to prevent or reduce traffic congestion from operations? **Community Impacts Indicator 5**: To reduce risks of accidents, and to ensure compliance with designated routes, does the company describe driver training and/or tracking methods for its own employees and third-party contractors? **Water Management Indicator 11**: Does the company report whether it operates in water-scarce areas (and how this is determined) and its program or practices for limiting or reducing water in water-scarce areas it identifies?
		IPIECA (2015)	**E6 Freshwater O6**: Provide quantitative and qualitative information on operations located in water-stressed or water-scarce areas or other locations where potential water management risks have been identified.
		SASB (2014)	**NR0101-15**: Discussion of process to manage risks and opportunities associated with community rights and interests

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
	Transporting water whenever possible using pipelines (with appropriate protections against leaks) and other strategies to reduce truck traffic.	DTF (2016)	**Community Impacts Indicator 4**: Does the company disclose a practice to adjust activity schedules to prevent or reduce traffic congestion from operations? **Air Emissions Indicator 4**: For each play, does the company report whether it substitutes pipelines for trucks to transport water or wastewater, including, e.g., criteria for making this choice, percentages of water/wastewater transported by pipeline, or individual examples of operating or under construction pipeline systems?
	Engaging with communities and addressing local concerns.	DTF (2016)	**Community Impacts Indicator 2**: Does the company disclose its internal processes, including data systems, for capturing and addressing local concerns before, and after, the drilling process begins? **Community Impacts Indicator 3**: Does the company disclose its internal processes for reporting local concerns and response data upward within the company?
		GRI (2013)	**G4-DMA (Local Communities)**: Report on engagement with affected stakeholders, as well as procedures for local community impact assessment and mitigation. **G4-DMA (Local Communities)**: Report efforts to assess and understand community perceptions of company impacts and activities, such as self-appraisal, use of reliable and unbiased third party or independent research, and/or surveys developed in collaboration with the affected stakeholders and local community.

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
		IPIECA (2015)	**SE1 Local Community Impacts and Engagement C1**: Describe policies, programmes and/or procedures for: assessing and addressing local community impacts; engaging with affected stakeholders and responding to their grievances and concerns; and public disclosure of information on company activities and management of impacts.
	Reducing light, noise, and odor pollution from operations.	DTF (2016)	**Community Impacts Indicator 6**: Does the company describe routine measures to minimize light, noise, and odor pollution from its drilling completion, and production operations?
		GRI (2013)	**G4-DMA (Local Communities)**: Report on engagement with affected stakeholders, as well as procedures for local community impact assessment and mitigation.
		IPIECA (2015)	**SE1 Local Community Impacts and Engagement C1**: Describe policies, programmes and/or procedures for: assessing and addressing local community impacts; engaging with affected stakeholders and responding to their grievances and concerns; and public disclosure of information on company activities and management of impacts.
	Disclosing all fines and violations, with details on how communities are compensated, where appropriate, and lessons learned are used to prevent future occurrences.	CDP Water Information Request (2017)	**Water 7.1**: Was your organization subject to any penalties, fines and/or enforcement orders for breaches of abstraction licenses, discharge consents or other water and wastewater related regulations in the reporting year? **Water 7.1a**: Please describe the penalties, fines and/or enforcement orders for breaches of abstraction licenses, discharge consents or other water and wastewater related regulations and your plans for resolving them.

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
		GRI (2013)	**G4-DMA (Asset Integrity and Process Safety)**: Report processes for identifying, reporting, management review and follow-up on investigation results of near-accidents; these are also referred to as near misses or potential accidents.
	Maintaining, testing, and communicating an Emergency Response Plan.	GRI (2013)	**G4-DMA (Emergency Preparedness)**: Report on mechanisms used to involve local communities in the development of emergency plans for existing and new operations including risk communication, preparation, rehearsal, regular review and modification, arrangements for the management of crises and approaches to ensure disclosure of these plans in a timely and transparent manner.
		IPIECA (2015)	**E9 Spills to the Environment C4**: Describe emergency preparedness and response programmes, plans, organizational structures and affiliations for an effective response to spills and other emergencies.
		SASB (2014)	**NR0101-19**: Discussion of management systems used to integrate a culture of safety and emergency preparedness throughout the value chain and throughout the exploration and production lifecycle.
What is your strategy for ensuring contractor health, safety, and environmental performance?	Using third-party databases to screen contractors on environmental and safety metrics before hiring.	DTF (2016)	**Management and Accountability Indicator 4**: Does the company use third party databases, such as ISNetworld, or others providing equivalent information, to obtain information to evaluate potential contractors before hire?
	Establishing contractor performance standards on metrics related to safety and community impacts (e.g., spills, traffic accidents).	DTF (2016)	**Community Impacts Indicator 5**: To reduce risks of accidents, and to ensure compliance with designated routes, does the company describe driver training and/or tracking methods for its own employees and third-party contractors?

NGSC Indicator	NGSC Example	Existing Framework with Similar Indicator	Similar Indicator
		GRI (2013)	**G4-DMA (Employment)**: Report policies, standards and practices for all workers on site (including contractors, subcontractors and migrant labor).
	Establishing a code of conduct for contractors to communicate expected business conduct.	GRI (2013)	**G4-DMA (Employment)**: Report policies, standards and practices for all workers on site (including contractors, subcontractors and migrant labor).
	Requiring contractors to meet the same training and safety levels required for employees.	GRI (2013)	**G4-DMA (Employment)**: Report policies, standards and practices for all workers on site (including contractors, subcontractors and migrant labor).
		IPIECA (2015)	**HS1 Workforce Participation O1**: Discuss coverage of [health and safety] programmes and the extent to which contractors are included.
		SASB (2014)	**NR0101-19**: Discussion of management systems used to integrate a culture of safety and emergency preparedness throughout the value chain and throughout the exploration and production lifecycle.