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Case Study: Wyoming-Based Natural Gas Operator

Abstract

The subject of this case study is a privately held natural gas producer in the U.S. with 172 employees. The company acquires and develops natural gas producing assets, and currently operates over 2,400 wells in a natural gas field in Wyoming, producing about 0.6 billion cubic feet per day. The operator has implemented a number of climate and environmental sustainability programs, and its methane emissions management in particular appears to be well beyond the typical practices of other small, private oil and gas (O&G) producers in the U.S. This paper will study management practices which enabled sustainability programs to be put in place, and the role of sustainability in the company's overall business strategy. Recommendations focus on how the company can leverage better sustainability performance to mitigate regulatory risks and access new markets. Connecting these sustainability initiatives to commercial benefits will help solidify these programs as part of a successful business strategy.

1. Sustainability Outputs to Date

The company has implemented a variety of sustainability initiatives, primarily focused on methane emissions reduction, habitat protection and land reclamation, water management, and the use of solar power in field operations.

Methane emissions management

The O&G industry emits methane primarily through fugitive emissions (i.e. intentional methane venting practices, unintentional methane leaks, incomplete combustion of methane during flaring). Given the high methane content of natural gas, this problem is particularly pervasive in the natural gas industry and has received a lot of scrutiny from investors, regulators, NGOs and international organizations. This Wyoming-based operator's Responsibly Produced Gas (RPG) initiative aims to minimize environmental impacts and reduce methane emissions from natural gas production operations. To achieve this, the company has implemented a variety of practical measures, including enhanced methane leak detection and repair (LDAR) using handheld and drone-based optical gas imaging (OGI) cameras, as well as aerial leak detection and quantification. The company has also undertaken a significant consolidation of production equipment to reduce emission sources.¹ Before natural gas from the well is sent to sales for further processing and transportation to end-users, the raw natural gas fluid stream needs to be separated to natural gas, condensate or oil, and water. This preliminary separation process requires a variety of onsite equipment, such as gas separators, pneumatic controllers, storage tanks, vapor recovery units, and flares. While it is logical that every producer should strive to

¹ Corporate ESG report. Accessed November 30, 2021.

minimize the loss of the product (i.e. natural gas), the current design and operation of this equipment result in loss of methane (as natural gas) unintentionally through valves, flanges, and other devices (also known as fugitive emission sources), loss of methane intentionally through “vents” due to normal operations or malfunctions, or both CO₂ and methane emissions from flaring (i.e. intentional combustion of gas for maintenance/safety or other reasons). Since 2017, this operator has consolidated production equipment from 277 well pads² to fewer than 150, by connecting additional wells together, and processing greater volumes of natural gas at a single well pad. This has resulted in a smaller absolute number of emissions. Additional measures to control methane emissions have included fixed emissions monitoring and measurement, a green completion program,³ and new technology applications to control permitted emissions from pneumatic devices.⁴

The company has also joined several voluntary industry partnerships which aim to improve quantification, disclosure and mitigation of methane emissions in the O&G sector. The operator is a member of ONE Future, an initiative to reduce emissions across the natural gas value chain of its members to 1% or less by 2025.⁵ This company was also the first U.S. corporation to join the Oil & Gas Methane Partnership 2.0 (OGMP 2.0), a United Nations (UN)-led and EU-funded initiative to develop a robust methane reporting framework for *measured* methane emissions intensity performance and reduction. Under the OGMP 2.0 framework, the operator has committed to direct measurement of methane emissions within three years. This is significant because current methane calculation methods often underestimate actual emissions observed from measurements. Standard practice (and regulatory requirements) of companies in the O&G industry today is to report inventories of *potentially* emitting sources (e.g. equipment, practices) and multiply these by an estimated average emission rate calculated by the U.S. EPA (“emissions factor”).⁶ However, studies have shown that methane emissions at well sites vary in time, almost on an hourly basis, making existing emissions estimation methods inaccurate and often not aligned with measurements undertaken at these sites.⁷ Indeed, the Environmental Defense Fund (EDF) conducted a study from 2012-2018, which found that U.S. O&G reporting underestimated methane emissions by as much as 60%.⁸ Shifting to methane measurements via technologies like satellites, drones, or sensor monitoring could significantly improve the accuracy of methane emissions data.⁹ As of November 2021, the subject of this case

² Well pads are a collection of individual wells at a single location.

³ When a natural gas well is developed, there is an excess of natural gas which has in the past been released into the air (vented) or burned off (flared). Green completions instead require companies to capture the gas at the wellhead immediately after well completion. Source: <https://www.energyindepth.org/natural-gas-and-green-completion-in-a-nut-shell/>.

⁴ Corporate ESG report. Accessed November 30, 2021.

⁵ Our Nation’s Energy (ONE) Future. Accessed December 1, 2021. <https://onefuture.us/>.

⁶ Agerton, Mark and Gilbert, Ben. *The Key to Reducing Methane Emissions? Actual Measurement*. Forbes. August 16, 2021. Accessed December 1, 2021.

<https://www.forbes.com/sites/thebakersonstitute/2021/08/16/the-key-to-reducing-methane-emissions-actual-measurement/?sh=439872233b88>.

⁷ Vaughn et. al. *Temporal variability largely explains top-down/bottom-up difference in methane emission estimates from a natural gas production region*. PNAS November 13, 2018 115 (46) 11712-11717; first published October 29, 2018; <https://doi.org/10.1073/pnas.1805687115>.

⁸ Environmental Defense Fund. *Major studies reveal 60% more emissions*. Accessed November 30, 2021. <https://www.edf.org/climate/methane-studies>.

⁹ McKinsey Sustainability. *Curbing Methane Emissions: How five industries can counter a major threat*. September 23, 2021. Accessed December 1, 2021.

study had already achieved OGMP 2.0’s “Gold Standard Emissions Rating” by reporting “85% of all emission sources from operated assets, utilizing measurement and detailed engineering calculations rather than generic emission factors” and setting a methane intensity target of 0.15%.¹⁰ While the company estimates their 2020 methane intensity to have been about 0.08%, this did not apply direct measurement of emissions. The OGMP 2.0 target was set at 0.15% because the company expects that their measured methane intensity will be slightly higher than the calculated figure of 0.08% after measurements are completed. The 0.15% target is also still well below other industry targets. ONE Future’s 2025 target for the production segment of the value chain is 0.28%,¹¹ the OGMP Framework generally references 0.25% or below as best practice,¹² and the U.S. budget reconciliation proposal for methane fees would not apply to operators with a methane intensity below 0.2%.¹³

Conservation efforts

Another focus of this operator’s sustainability function is on conservation, and includes a land reclamation program, habitat protection efforts, and detailed impact analyses for all new projects. Land reclamation refers to the process of restoring the land so that any effects of O&G development on natural resources are not permanent. The goal is to restore the ecosystem affected by surface disturbances from O&G operations “to a condition equal to or closely approximating that which existed before the land was disturbed”.¹⁴ 80% of the company’s disturbed acreage is in some stage of reclamation, and the organization spends an average \$1.5 million per year on reclamation projects.¹⁵ The land reclamation program focuses on controlling invasive plant species, reducing pesticide application, and increasing native pollinator plants.

Water management

Hydraulic fracturing operations to produce O&G can use significant volumes of water. The company has implemented a water recycle and reuse program, which has resulted in 100% recycling of water from well completions, 25% recycling of all produced water (i.e. water that comes back out of the well along with the hydrocarbons), and a 55% reduction in freshwater consumption in the past four years. In 2020, the company generated about 4.5 million barrels¹⁶ of produced water, and limited spill volume to 9.8 barrels (or 0.0002%) of that. The company sources zero water from surface withdrawals (e.g. rivers, lakes), and has protective well casing for aquifers at 2.5x the depth of all known aquifers.¹⁷

<https://www.mckinsey.com/business-functions/sustainability/our-insights/curbing-methane-emissions-how-five-industries-can-counter-a-major-climate-threat>.

¹⁰ Corporate press release. November 2021. Accessed December 1, 2021.

¹¹ ONE Future. Accessed December 1, 2021. <https://onefuture.us/#production-scorecard>.

¹² Oil and Gas Methane Partnership (OGMP) 2.0. *An Investor’s Guide to the Oil and Gas Methane Partnership 2.0*. September 2021. Accessed December 1, 2021.

https://www.ogmpartnership.com/sites/default/files/files/Investors-Guide-to-the-OGMP_FINAL.pdf.

¹³ *Text – H.R.5376 – 117th Congress (2021-2022): Build Back Better Act*. November 19, 2021.

<https://www.congress.gov/bill/117th-congress/house-bill/5376/text>.

¹⁴ U.S. Department of the Interior – Bureau of Land Management. *Reclamation*. Accessed December 1, 2021.

<https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/reclamation>.

¹⁵ Information obtained during an October 2021 interview with the company’s Vice President of Environment, Health and Safety.

¹⁶ One barrel contains 42 gallons.

¹⁷ Corporate ESG report.

Solar power development

The operator has built 4,000 solar power producing field units, which generate 1.73 MW per day. This electricity is used for communications and remote monitoring of operations. Scaling up the solar array is a project under consideration, but current regulatory conditions are impeding feasibility.¹⁸ Wyoming adopted a net metering regulation in 2001, which allows an electricity consumer-generator to be compensated by the utility for excess electricity supplied to the grid from their distributed generation system. However, the state has restricted eligibility for net metering to solar, wind, biomass or hydropower systems with “a generating capacity limit of not more than 25 kW.”¹⁹ Without an obligation for utilities to take excess power back into the grid, the economics of scaling up solar power production appear challenging.

Sustainability metrics & reporting

The Wyoming-based operator releases an annual ESG report, which includes much of the information reported in traditional Corporate Responsibility Reports, but does not align with a sustainability reporting standard (e.g. TCFD, GRI). Since the company is privately-held, there are no external forces pressuring the company to produce this format of report. Report content and disclosed metrics stem from regulatory requirements. For example, regulations limit the number of acres of disturbance that the company is permitted at any one time, so they developed an extensive land reclamation process, which is described in the report. The company also benchmarks report content against ESG disclosures of comparable public companies. The Wyoming-based operator has thus identified a set of key performance indicators (KPIs) to measure annual sustainability performance, which include the number and volume of environmental releases, total recordable incident rate for injuries (TRIR), freshwater usage, waste management, land reclamation, and metric tons of methane emissions reduced.

2. Sustainability Strategy

At first glance, it may appear surprising that this Wyoming-based operator has invested resources into developing a robust ESG program. First, the company may not face the same shareholder pressures as publicly traded energy companies on sustainability issues. In 2021, 21 shareholder resolutions were filed with energy companies related to climate and sustainability, with requests ranging from reviewing stranded carbon asset risks, to reporting on climate change financial risks and adopting GHG reduction targets.²⁰ Since the company’s investors are not public, their stance on ESG issues is unknown. Moreover, the majority of ESG initiatives do not make the company any money.²¹ While there historically have been several premium deals in the natural gas industry where utilities paid a premium for certified lower-emission gas, there is not currently a true market for this.²² Utilities are regulated by public utilities commissions (PUCs),

¹⁸ Information obtained during an October 2021 interview with the company’s Vice President of Environment, Health and Safety.

¹⁹ Boudewyns, Abigail. *Research Memorandum: Net Metering*. Wyoming Legislature Service Office. April 25, 2019. Accessed December 10, 2021. <https://wyoleg.gov/LSOResearch/2019/19RM024.pdf>.

²⁰ CERES. *Engagement Tracker*. Accessed December 10, 2021.

https://engagements.ceres.org/?_ga=2.29128117.889124443.1639168053-48012131.1639168053.

²¹ Information obtained during an October 2021 interview with the company’s Vice President of Environment, Health and Safety.

²² Hampton, Liz and Disavino, Scott. *U.S. natural gas producers hope customers will pay more for ‘green gas’*. Reuters. June 30, 2021. Accessed December 10, 2021.

and the role of the PUC is to protect the ratepayer. Creating a market that monetizes the environmental attributes of the natural gas produced by different operators would require a common, consistent way of assessing those attributes, and for a regulator to allow for the inclusion of their costs into customer rates. Moreover, a low-price environment for O&G commodities places additional pressure on companies to exercise capital discipline and operate more cost-efficiently, especially for leaner independent producers. 2020 saw a historic drop in O&G prices and major bankruptcies.²³

Despite being a privately-held company, and the fact that ESG initiatives generally did not make the company any money during an “oil bust” year, this operator reportedly continues to view sustainability as an important part of their business.²⁴ The company’s CEO has been quoted several times touting their commitment to be a low-emissions producer,²⁵ and the General Counsel (GC) supports sustainability as a means of retaining investors. The Board of Directors is also supportive of sustainability efforts. All quarterly management updates to the Board include an ESG update, which looks at how year-to-date metrics compare to past average performance.²⁶ 10% of employee compensation is tied directly to company performance on reducing injuries, environmental releases, and methane emissions. The company also shares the sustainability metrics attached to employee compensation with contractors and suppliers. While the company does not collect sustainability data from, or impose any ESG requirements, on contractors and suppliers, these information-sharing engagements aim to ensure partners are operating responsibly, and to encourage communication of any issues or potential improvements.

Several factors justify sustainability management as being a key part of running this business. One reason is that the company operates almost entirely on federal lands. In January 2021, President Biden issued an Executive Order pausing new leases on federal lands for O&G development, until “a comprehensive review and reconsideration of Federal oil and gas permitting and leasing practices” could be completed, especially “in light of the Secretary of the Interior’s broad stewardship responsibilities over the public lands [...] including potential climate and other impacts associated with oil and gas activities”.²⁷ In November 2021, the Department of the Interior released their review, recommending that the Administration raise royalty rates for O&G leases on public lands and limit land available for O&G development to “areas that have moderate or high potential for oil and gas resources and which are in proximity to existing oil and gas infrastructure”.²⁸ While this falls short of President Biden’s campaign trail promise to ban all new O&G leasing on public lands and waters,²⁹ it is certainly indicative of the regulatory environment that the company is operating under, and helps to justify investments into improving their ESG performance, especially to mitigate climate impact.

²³ OGV Energy. *Over 100 oil and gas companies went bankrupt in 2020*. January 21, 2021. Accessed December 10, 2021. <https://www.ogv.energy/news-item/over-100-oil-and-gas-companies-went-bankrupt-in-2020>.

²⁴ Information obtained during an October 2021 interview with the company’s Vice President of Environment, Health and Safety.

²⁵ Corporate press release from March 2020. Accessed December 3, 2021.

²⁶ Information obtained during an October 2021 interview with the company’s Vice President of Environment, Health and Safety.

²⁷ The White House. *Executive Order on Tackling the Climate Crisis at Home and Abroad*. January 27, 2021.

<https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/>.

²⁸ U.S. Department of the Interior. *Report on the Federal Oil and Gas Leasing Program: Prepared in Response to Executive Order 14008*. November 2021. Accessed December 10, 2021.

<https://www.doi.gov/sites/doi.gov/files/report-on-the-federal-oil-and-gas-leasing-program-doi-eo-14008.pdf>.

²⁹ Biden Harris Campaign. *The Biden Plan for a Clean Energy Revolution and Environmental Justice*. Accessed December 10, 2021. <https://joebiden.com/climate-plan/>.

Another strategic reason to undertake these sustainability initiatives is to secure a competitive advantage relative to other suppliers. Natural gas flows eastward from the Rockies production region have been squeezed in the wake of the shale boom as large, competing volumes of low-cost O&G production have come online in the east coast's Marcellus shale deposit and the Permian basin in Texas. To the west, California's rapid development of renewable power capacity, increasingly displacing gas- and coal-fired generation, has taken further market share from Rockies gas.³⁰ The company's operations are located in Wyoming, one of the "Rocky Mountain states" facing a shrinking domestic market for its gas.³¹ If the company can use ESG performance as a means of differentiating their volumes, this could have a net positive impact for the company on both sustainability and financial performance.

3. Sustainability organization structure, capacity & resources

With just 172 employees, this Wyoming-based operator runs a relatively lean business. 72 employees work in Denver, and 100 employees work on the field team in Wyoming. There is a field office with about 20 employees, and the remaining 80 employees rotate in two shifts so there are always 40 employees in the field. A wide range of employees work on sustainability initiatives, including the field operations team, field EHS team, engineers, communications/PR, IT, land department, and finance.³² The Vice President of Environment, Health and Safety leads the sustainability function in conjunction with the VP of Government and Regulatory Affairs. Both report directly to the GC, who in turn reports to the CEO. There is not an explicitly designated sustainability leader or separate department. The company did this to avoid ESG issues being siloed to a subset of individuals.³³ That being said, the VP of EHS has established an informal team which meets weekly to evaluate opportunities to reduce emissions. The emissions team does not formally report to anyone beyond the VP of EHS, and capital comes from the existing EHS budget. A wide range of job titles were recruited for the team, including the employee responsible for air permitting and reporting, three engineers in the Denver office responsible for operations and facility design, and three engineers from the field operations team. The team was assembled about a year ago and has implemented several projects of varying ambition. A recent project routed methane previously vented from pneumatic controllers³⁴ to a combustor, resulting in about 1.5 tCH₄ emissions reduced per production unit. The team is also in early stages of evaluating potential hydrogen production.³⁵ There is not a specific "bucket" of capital funding allocated for sustainability efforts, since ESG initiatives are informally integrated into various existing budgets, so total spending on this is not precisely tracked. However, capital funding for sustainability efforts has been sufficient in prior years to achieve the company's goals, and overall funds allocated to this are increasing.³⁶ Specific capital spending data was unavailable.

4. Key Sustainability Management Practices

³⁰ Carr, Housley. *Rocky Mountain Breakdown - Western Natural Gas Markets Whack Rockies Producers*. RBN Energy LLC. April 3, 2018. Accessed December 10, 2021.

<https://rbnenergy.com/rocky-mountain-breakdown-western-natural-gas-markets-whack-rockies-producers>.

³¹ Carr, Housley. *Rocky Mountain Breakdown*.

³² Information obtained during an October 2021 interview with the company's Vice President of Environment, Health and Safety.

³³ Ibid.

³⁴ Equipment that uses natural gas to power facilities where electricity is not available in the field.

³⁵ Information obtained during an October 2021 interview with the company's Vice President of Environment, Health and Safety.

³⁶ Ibid.

The key management practices used to implement the sustainability initiatives outlined above were (1) focusing on methane emissions quantification and performance, (2) directly tying employee compensation to key ESG metrics, (3) securing leadership support for ESG, and (4) embedding the ESG function within existing business units.

A strategic focus on methane emissions is a critical part of being a natural gas operator today. GHG emissions are currently still largely calculated, rather than directly measured. While these methods are accurate for estimating CO₂ levels, intermittent methane emissions are subject to a much higher level of uncertainty, as discussed previously. Methane is a relatively short-lived, but very potent greenhouse gas, and the energy sector is a significant source of that methane.³⁷ It has about 28 times the warming impact that carbon dioxide has over a 100-year time period in the atmosphere, or over 80 times the impact over a 20-year time period.³⁸ For these reasons, methane emissions have drawn increased scrutiny from governments, regulators, NGOs, investors, and the general public:

- In late 2020, the EU rolled out a methane reduction strategy, including plans to eventually introduce methane disclosure and performance standards on methane emissions.³⁹
- The EU and the U.S. announced a Global Methane Pledge at COP26 to reduce methane emissions by 30% by 2030, which has been joined by over 100 countries.⁴⁰
- A group of 147 O&G investors, with over \$5 trillion in assets under management, released a statement called for stronger U.S. methane regulations.⁴¹
- The International Energy Agency (IEA) releases an annual Methane Tracker report aggregating global methane data and providing detailed analysis.⁴²
- The UN Environment Programme's 2021 Methane Assessment estimates that reducing methane emissions by 45% by 2030 would avoid close to 0.3°C of warming.⁴³

This Wyoming-based operator's focus on methane emissions is an appropriate response to these pressures, and a sound business strategy which mitigates regulatory, financial, and reputational risks.

Tying employee compensation to ESG metrics has also been the subject of a slew of recent literature. The company's practice in this area appears to be ahead of market trends. The UN Principles for Responsible Investment (PRI)⁴⁴ "strongly believes that ESG-linked pay can be an important tool to drive value and better sustainability performance" and cites several academic studies defending this thesis.⁴⁵ Companies are increasingly tying ESG metrics to

³⁷ IEA. *Methane Tracker 2021*. IEA. 2021. Accessed December 4, 2021. <https://www.iea.org/reports/methane-tracker-2021>

³⁸ Ibid.

³⁹ European Commission. *Reducing greenhouse gas emissions: Commission adopts EU Methane Strategy as part of European Green Deal*. 14 October 2020. Accessed November 30, 2021. https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1833.

⁴⁰ BBC News. *COP26: US and EU announce global pledge to slash methane emissions*. November 2, 2021. Accessed December 4, 2021. <https://www.bbc.com/news/world-59137828>.

⁴¹ Ceres. *Major Investors Demand Ambitious Methane Regulations in the U.S.* May 13, 2021. Accessed December 3, 2021. <https://www.ceres.org/news-center/press-releases/major-investors-demand-ambitious-methane-regulations-us>.

⁴² IEA. *Methane Tracker 2021*.

⁴³ Ravishankara A. R. et. al. *Global Methane Assessment: Summary for Decision-Makers*. Climate & Clean Air Coalition/UN Environment Programme. 2021. Accessed December 3, 2021. 5. https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA_ES.pdf.

⁴⁴ The PRI is a UN-supported, international network of investors seeking to promote the consideration of ESG factors in investment and ownership decisions. Signatories represent over \$121 trillion of assets under management, as of 2021. Source: Principles for Responsible Investment. *About the PRI*. Accessed December 3, 2021. <https://www.unpri.org/pri/about-the-pri>.

⁴⁵ Principles for Responsible Investment. *ESG-Linked Pay: What Does the Research Say?* June 17, 2021. Accessed December 3, 2021. <https://www.unpri.org/executive-pay/esg-linked-pay-what-does-the-research-say/7863.article>

compensation,⁴⁶ but the practice is not yet universal. Recent Deloitte research found that “less than 40% of Fortune 100 companies have incorporated ESG measures in their annual incentive plan.”⁴⁷ However, “companies typically evaluate ESG measures in incentive plans on a qualitative basis.”⁴⁸ This poses the danger of executives receiving large bonuses for meeting ESG goals that are significantly less rigorous and transparent than financial goals and “greenwashing” the firm’s true ESG performance. Indeed, BlackRock, the world’s largest asset manager, has noted that “companies using sustainability performance metrics [should] explain carefully the connection between what is being measured and rewarded alongside business goals and long-term performance”.⁴⁹ In sum, this Wyoming-based operator’s practice of linking specific, quantitative ESG metrics to pay is ahead of many public companies.

The subject of this case study has also secured senior leadership support for ESG initiatives. This is crucial for getting buy-in throughout the company and aligning all levels of management around the same goals. Failure to do so would likely have resulted in inconsistent top-down messaging across teams on ESG goals, as well as the lack of a formal incentive structure for achieving these, ultimately creating setbacks for improving ESG performance.

Finally, the company’s decision not to set up a separate sustainability department likely mitigated perceptions of sustainability as a foreign, idealistic pursuit, irrelevant to the core business of selling natural gas. This also likely lessened the learning curve around implementing new standard operating procedures and technologies, since O&G producers benefit from a lot of technically savvy talent (e.g. engineers, emissions reporting experts). Exclusively sustainability-focused hires may lack specific technical expertise on O&G production operations, which can impede practical implementation of measures and limit strategic thinking on potential solutions.

5. Applicability to Other Businesses

The climate challenge cannot be solved without tackling global energy-related emissions, so it is worth studying whether this company’s best practices in sustainability management can be replicated by other natural gas producers to accelerate the global energy transition. The operator’s focus on the quantification and reduction of methane emissions should be implemented by others in the industry. Better emissions data and performance could have significant reputational benefits for companies, and operating as a responsible producer is likely to help conserve long-term access to capital. In addition, recent IEA analysis notes that, “methane [...] has commercial value: the additional methane captured can often be monetised directly [...] emissions reductions could result in economic savings or be carried out at low cost.”⁵⁰ This Wyoming-based operator’s practice of tying employee compensation to key ESG metrics, and the strong leadership support for ESG goals, are also both management approaches

⁴⁶ BlackRock. *Incentives Aligned with Value Creation*. Investment Stewardship Commentary. March 2021. Accessed December 3, 2021. 2. <https://www.blackrock.com/corporate/literature/publication/blk-commentary-engagement-on-incentives-aligned-with-value-creation.pdf>.

⁴⁷ Bujno, Maureen and Sullivan, Kristen. *Incorporating ESG Measures into Executive Compensation Plans*. Harvard Law School Forum on Corporate Governance. May 24, 2021. Accessed December 3, 2021. <https://corpgov.law.harvard.edu/2021/05/24/incorporating-esg-measures-into-executive-compensation-plans/>.

⁴⁸ Bujno, Maureen and Sullivan, Kristen. *Incorporating ESG Measures into Executive Compensation Plans*. Harvard Law School Forum on Corporate Governance.

⁴⁹ BlackRock. *Incentives Aligned with Value Creation*. 2.

⁵⁰ IEA. *Methane Tracker 2021*.

that can and should be implemented at other companies. This is already underway, as more executives and Boards recognize the importance of ESG and set compensation metrics accordingly, as demonstrated above. Other aspects of this operator's sustainability management appear less easy to replicate at other companies. For example, the company's decision to embed the ESG function within existing business units likely worked in favor of sustainability initiatives by eliminating bureaucratic hurdles and reducing ideological resistance to these projects. However, this may be difficult to implement in larger organizations.

6. Sustainability Management Recommendations

Engage with federal regulators on new requirements for federal O&G leases, to model any new standards on this company's Responsibly Produced Gas initiative and mitigate regulatory risk: To mitigate regulatory risk, the company should seek to set the performance standard under any new requirements of the Biden Administration for O&G operators on federal lands. As outlined above, this operator has implemented a robust methane management program. The company should outline the key successes and lessons learned of this program in engagements with federal regulators, and advocate for any new requirements of O&G operators (e.g. methane emissions intensity threshold) to be modeled on their own RPG initiative and performance.

Connect ESG investments with commercial benefits: The company should look to monetize its ESG initiatives. One way to do this could be to leverage their lower-emissions, more transparent methane emissions performance as a competitive advantage with international customers interested in buying "greener" volumes of natural gas. This would also open a new outlet for the company's natural gas volumes, given the difficulties that producers in the Rockies may face in retaining domestic market share. One way to access international markets could be to negotiate an IPM-type deal with a liquefied natural gas (LNG) exporter. Cheniere Energy, the largest U.S. LNG exporter, introduced these Integrated Production Management (IPM) agreements to the market, through which natural gas producers can sell gas to the global LNG markets "less a fixed liquefaction fee, shipping, and other costs".⁵¹ Customers in the international markets have signaled interest in buying lower-emissions natural gas. In 2020, the French gas and power company Engie backed out of a deal for U.S. LNG volumes due to concerns around methane emissions,⁵² and Singapore's Pavilion Energy has signed several deals for LNG volumes that require suppliers to quantify and report lifecycle GHG emissions.⁵³

Examine profitable options for expanding solar power capacity, and developing hydrogen production and CCUS capacity: The company should consider whether expansion into low-carbon businesses would allow the company to capture new markets and profits. The company has already identified additional solar power capacity and hydrogen production as potential opportunities, although feasibility analysis of these is still in early days.⁵⁴ CCUS

⁵¹ Cheniere Energy. Corporate Presentation. November 2021. Accessed December 10, 2021. <https://lngir.cheniere.com/presentations>.

⁵² White, Sarah and DiSavino, Scott. France halts Engie's U.S. LNG deal amid trade, environment disputes. Reuters. October 22, 2020. Accessed December 10, 2021. <https://www.reuters.com/article/engie-lng-france-unitedstates/france-halts-engies-u-s-lng-deal-amid-trade-environment-disputes-idUSKBN27808G>.

⁵³ Energy Intelligence. Pavilion Signs Third LNG Deal with Carbon Quantification. June 9, 2021. Accessed December 10, 2021. <https://www.energyintel.com/0000017b-a7dd-de4c-a17b-e7df709a0000>.

⁵⁴ Information obtained during an October 2021 interview with the company's Vice President of Environment, Health and Safety.

technologies could also potentially be an attractive investment considering the 45Q tax credit provided in the U.S., which confers a credit value of up to \$50 per ton of CO₂ for CCUS projects that begin construction before January 1st, 2026.⁵⁵ Hydrogen, renewable power and CCUS technologies all represent markets with significant growth potential. The IEA's Net Zero Emissions (NZE) scenario includes these among the key pillars for achieving decarbonization goals. Under the NZE scenario, annual capacity additions of solar PV would reach 630 GW by 2030 (from 134 GW in 2020), and the overall share of renewables in power generation would roughly double.⁵⁶ Global hydrogen production would also more than double from ~90 Mt in 2020 to over 200 Mt in 2030. Annual volumes of captured carbon would grow from 40 Mt CO₂ in 2020 to 1.6 Gt CO₂ by 2030, and further to 7.6 Gt CO₂ in 2050.⁵⁷ The NZE is not a forecast, but a scenario built on the assumption that the world limits warming to 1.5°C and achieves net zero emissions by 2050. Nevertheless, it demonstrates the scale of the growth opportunity in technologies such as these if the world moves seriously towards emissions targets. This Wyoming-based operator stands to gain significant new market share if it can profitably build expertise and capacity in these key technologies.

7. Conclusion

The subject of this case study has strategically designed its sustainability initiatives and management approach around its regulatory obligations and the most material ESG topics in the O&G industry. Moving forward, the company should look to mitigate regulatory risks of operating natural gas production on federal lands, by advocating for any new regulations to be modeled on their Responsibly Produced Gas initiative. Management should also seek out opportunities to monetize the GHG profile of its natural gas volumes on international markets through an IPM agreement with an LNG exporter. Finally, the company should consider investing in markets with high growth potential under a carbon-constrained future (e.g. solar, hydrogen and CCUS).

⁵⁵ KPMG. *Drilling Down: Examining the Section 45Q Tax Credit*. March 5, 2020. Accessed December 4, 2021. <https://home.kpmg/xx/en/home/insights/2020/10/examining-section-45q-tax-credit.html>.

⁵⁶ IEA (2021), *Net Zero by 2050*, IEA, Paris <https://www.iea.org/reports/net-zero-by-2050>.

⁵⁷ Ibid.