

NO.	BARRIER TYPE	BARRIER	BARRIER DESCRIPTION	BARRIER EXAMPLE	COUNTRY OR GEOGRAPHIC AREA	INFO SOURCE	DOCUMENT LINK
1	Economic/Financing/Legal	Taxation	Taxes can make or break investments in methane mitigation projects. Lower taxes on Associated Petroleum Gas (APG) production has led to higher utilization rates of APG from these sources.	In Colombia, contracts for various offshore blocks get a 25 percent discount on income taxes and are exempt from value-added tax and customs charges.	Colombia	Colombia O&G Subcommittee Delegate	Not Applicable
2	Technical, Informational, Legal/Political	Resistance to implementing change in operations due to lack of technical knowledge, perceived costs, potential fines, and stringent regulations	Operators may not be aware of the volume of methane released at their facilities. Some methane emission sources are located in hard-to-reach places or in locations that require additional safety requirements to access. Uncertainty in emissions source data may prevent a company from investing in the implementation of methane reduction measures that are cost-effective. If a company aggressively targets its methane emissions, it may find greater actual emissions than the calculated results. This may result in increased fines or more stringent regulation. Some companies may have a corporate culture that is resistant to implement operational changes, or they may be unaware of cost-effective methane mitigation technologies. Limited budgets and resources within an oil and gas company deter investment in methane reduction projects even though the projects may be cost-effective in the long run	In Russia, there is a pollution tax on emissions. If a gas company were to abate a significant methane emission source, this would provide evidence of "fugitive" emissions in excess of what the company may have been paying the pollution tax on. This could expose the company to an increase in taxes for past emissions. Prior to planning for and implementing a methane reduction project, the gas company would have to "trust" the government not to levy additional taxes for past emissions.	Global; Russia	Methane Emissions from the Oil and Gas Sector, Global Methane Initiative Presentation - World Bank Methane Finance Study Group: First Meeting (December 2012), Colombia O&G Subcommittee Delegate	Clean Air Task Force, http://siteresources.worldbank.org/EXTCARBONFINANCE/Resources/2_GMI_Methane_Introduction_12-19-12_Final.pdf
3	Legal/Political	Difficulty in establishing participation agreements with international methane-reduction entities	State oil companies may experience difficulty in reaching an agreement between the legal offices of the oil company and the international methane-reduction entity. This can result in a long wait time in accessing the international methane-reduction entity as a mechanism to obtain technical support.	State oil companies may experience difficulty in reaching an agreement between the legal offices of the oil company and the international methane-reduction entity. This can result in a long wait time in accessing the international methane-reduction entity as a mechanism to obtain technical support.	Colombia	Ecopetrol	Not Applicable
4	Technical	The split incentives when the facility operator does not own the gas or oil	Split incentives can be a major issue when gas markets open up. The owner of the gas has no ability to invest in the pipeline because of the market structure.	In Colombia, hydrocarbon reserves are owned by the state. Independent foreign oil and gas companies have been allowed to enter into joint ventures with Ecopetrol, a state-owned oil and gas company.	Colombia	Colombia O&G Subcommittee Delegate	Not Applicable
5	Economic/Financing	Hopes for outside investment through the Joint Implementation (JI) and Kyoto Clean Development Mechanism (CDM)	Some companies aggressively seek CDM carbon credit project approvals by packaging/combining projects where the implementation of methane reduction technologies is economical with applications that are not economical which makes the whole project uneconomical.	A company in the Middle East would naturally include gas recovery as a small fraction of a larger production project. But if the gas is vented, and then has to stand-alone in retrofitting the gas recovery equipment, it can be packaged to appear uneconomic.	India; Russia; Ukraine	Methane Emissions from the Oil and Gas Sector	Clean Air Task Force
6	Economic/Financing	Inconsistent investment climate	Some developing countries with oil and gas resources do not have a well-established framework for outside capital investment that is open, consistent, fiscally sound and legally defensible.	A developing country that does not have "proper, consistent, legal, fiscal and approved" framework for investment may be subject to bribery or corruption.	Global	Methane Emissions from the Oil and Gas Sector	Clean Air Task Force
7	Legal/Political	Government segregation of oil and gas enterprises	When a national company owns the oil industry and another national company owns the gas industry, problems/disputes can arise regarding jurisdiction of methane gas from mitigation projects.	In Russia, the national gas company Gazprom owns and operates the gas industry from extraction to distribution to the gas customer. Russian national oil company TNK-BP owns and operates the oil industry from extraction to refinery. In situations, where Gazprom and TNK-BP have to cooperate to plan and implement methane gas mitigation projects, the organizational structure of the companies makes it difficult to collaborate as problems and disputes can arise over which company has jurisdiction over the methane gas.	Mexico; Russia	Methane Emissions from the Oil and Gas Sector	Clean Air Task Force
8	Legal/Political, Informational, Economic	Methane reduction is a recent or unexplored concept to country	There may be a limited number of in-country success stories on implementation of methane reduction technologies. Companies may be more receptive to consider methane reduction technologies that have been tried in-country and proven successful. Some countries with interest in methane reduction may have limited numbers of trained inspectors capable of verifying and enforcing emissions reductions.	Some oil producing regions in Africa and other developing regions do not have methane mitigation emission programs in place. Developing methane mitigation programs requires technical expertise and trained inspectors capable of verifying and enforcing emissions reductions as well as training personnel about methane reduction technologies.	Global	Methane Emissions from the Oil and Gas Sector, Global Methane Initiative Presentation - World Bank Methane Finance Study Group: First Meeting (December 2012), Lessons Learned in Reducing Methane Emissions from the Oil and Gas Sector	Clean Air Task Force, http://siteresources.worldbank.org/EXTCARBONFINANCE/Resources/2_GMI_Methane_Introduction_12-19-12_Final.pdf , https://www.catf.us/2018/05/lessons-learned-reducing-methane-emissions/
9	Economic/Financing	Low cost of gas and natural gas	The price of natural gas has a substantial influence on the cost-effectiveness of methane mitigation, which in turn affects the scale of implementation. Lower gas prices (sometimes government regulated) deter investment and implementation of methane emission abatement projects.	In some countries like Venezuela and Argentina, gas prices are set low by the government to benefit the local population. These low gas prices may limit investment in methane emissions abatement by making the abatement projects uneconomical.	Global; Venezuela; Argentina, Colombia	Methane Emissions from the Oil and Gas Sector, Colombia O&G Subcommittee Delegate	Clean Air Task Force
10	Economic/Financing	Investment priorities	There is an economic choice on whether to invest in existing distribution sector infrastructure improvement versus investment in expansion to new customers. Investing in improvements to existing infrastructure increases rates which can economically deter consumption resulting in potentially lost revenue. Investment in new customers moves more gas, lowers rates, and earns more revenue. Additionally, oil prices dominate the energy markets. Capital is typically utilized for infrastructure to produce oil with little investment to bring associated gas to market.	In the United States, flaring of associated petroleum gas (APG) within the Alaska North Slope is prohibited. However, instead of investing in infrastructure to bring the APG to market, the gas is injected back into the reservoir.	United States; Global	Natural Gas STAR Presentation: Barriers to Implementation of Methane Emissions Reduction Projects in Gas Transmission and Distribution; Methane Emissions from the Oil and Gas Sector	Clean Air Task Force; https://primis.phmsa.dot.gov/rd/mtgs/062409/JeromeBlackman.pdf

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11	Economic/Financing	Capital investments and cost to consumer	<p>Capital investments for emission reduction projects and methane abatement technologies may require substantial up-front investment. Often, they are largely financed through borrowed money. Without clear cost recovery, this could result in downward evaluation of the company's credit rating, which in and of itself can increase the overall cost of capital.</p> <p>Costs/benefits from emissions reductions/gas savings are passed on to the consumer. Consumers are generally unwilling to accept higher rates for infrastructure improvements that lead to more efficient operation and lower rates in later years.</p> <p>Benefits from emissions reductions/gas savings are passed on to the shipper (pipeline customer). There is little incentive for gas transmission and distribution companies to implement methane mitigation measures.</p>	In the United States, the cost of improvements to gas infrastructure is typically passed on to the consumer via rate increases. Consumers are generally unwilling to pay the increased cost.	Global, United States	<p>Natural Gas STAR Presentation: Barriers to Implementation of Methane Emissions Reduction Projects in Gas Transmission and Distribution;</p> <p>Methane Emissions from the Oil and Gas Sector</p>	<p>Clean Air Task Force</p> <p>https://primis.phmsa.dot.gov/rd/mtgs/062409/JeromeBlackman.pdf</p>
12	Legal/Political	Competition with other government emissions programs	Some countries may have voluntary emissions reduction programs that encourage industry to implement methane abatement technologies as well as related air regulations. Participating in a voluntary methane reduction program while at the same time complying with air regulations may concern companies and deter implementation of abatement projects.	In the United States, the U.S. EPA's Natural Gas STAR program is a voluntary program that encourages oil and gas companies to join and commit to reducing methane emissions from their operations. Some companies while interested in methane abatement, may be not be inclined to share information with a program associated with the regulating body on emissions.	Russia; United States; Canada	Methane Emissions from the Oil and Gas Sector	Clean Air Task Force
13	Economic/Financing	Lack of market access for the methane or gas captured, or energy produced with it	Market access and the cost of transporting the gas are critical to the success in utilizing associated Petroleum Gas (APG) in many cases. Sometimes the means to transport associated natural gas to market exists; however, the transmission pipeline does not have additional capacity for the associated gas. In some cases, there may not be a nearby gas market and, utilizing stranded gas may not be economical.	Many areas of Africa do not have access to a natural gas market. For example, in Angola, associated petroleum gas (APG) had little market value until Chevron invested heavily in a venture to bring liquefied natural gas (LNG) to markets.	Colombia, Angola	Colombia O&G Subcommittee Delegate, Methane Emissions from the Oil and Gas Sector	Clean Air Task Force
14	Legal/Political	A fully contracted pipeline realizes full revenue irrespective of loading of pipeline	Transmission company gas transportation rates are based on capacity (reservation or demand charge) of pipelines rather than actual loads of gas moved (volumetric charge). Hence, there is little, or no incentive to invest capital to save off-peak leakage.	In the United States, transmission company gas transportation rates are typically based on pipeline capacity (reservation or demand charge) rather than on the actual amount of gas moved (volumetric charge). Therefore, there is little incentive from the transmission company's perspective to invest in projects that mitigate off-peak leakage.	United States	<p>Natural Gas STAR Presentation:</p> <p>Barriers to Implementation of Methane Emissions Reduction Projects in Gas Transmission and Distribution</p>	https://primis.phmsa.dot.gov/rd/mtgs/062409/JeromeBlackman.pdf
15	Legal/Political	Capital recovery is linked to volumetric rates	Recovery of capital investment is often linked to volumetric rates despite efforts to "decouple" rates.	In the United States, energy companies generally produce more revenue if they sell more of their product, which is at odds with environmental objectives that promote energy efficiency or conservation. Several states including California, Massachusetts, Virginia, North Carolina and New York have instituted decoupled gas rates as a rate design measure to improve a utility's economic incentive to implement efficiency and conservation projects.	United States	<p>Natural Gas STAR Presentation:</p> <p>Barriers to Implementation of Methane Emissions Reduction Projects in Gas Transmission and Distribution</p>	https://primis.phmsa.dot.gov/rd/mtgs/062409/JeromeBlackman.pdf
16	Economic/Financing	Carbon prices	<p>Carbon markets are a source of revenue for methane mitigation projects. This has a particularly strong effect in the gas and oil sector.</p> <p>Many governments in developing and developed countries continue to collaborate on broad emissions reductions through Nationally Appropriate Mitigation Actions (NAMAs) with bilateral or multilateral funding.</p> <p>Also, some countries have developed voluntary carbon markets that allow the commercialization of carbon credits, as long as the prices are competitive against the value of the resource (oil and gas).</p>	The United States has commercialized carbon credits, as long as the prices are competitive against the value of the resource (oil and gas).	Colombia	Colombia O&G Subcommittee Delegate	Not Applicable

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17	Legal/Political	Cost and risks associated with a rate case	<p>In the United States, the Natural Gas Act (NGA) requires that rates charged for services provided by interstate pipelines be "just and reasonable." According to the Federal Energy Regulatory Commission (FERC), rates are designed based on a pipeline's cost of providing service including an opportunity for the pipeline to earn a reasonable return on its investment. FERC sets rates for interstate pipeline services via proceedings.</p> <p>The cost of pipeline investments in emission reductions can only be recovered via a rate case which requires regulatory proceedings with FERC. When a pipeline files a rate case, there is the potential that the pipeline's achieved earnings will be reduced.</p>	<p>In the United States, the Natural Gas Act (NGA) requires that rates charged for services provided by interstate pipelines be "just and reasonable." According to the Federal Energy Regulatory Commission (FERC), rates are designed based on a pipeline's cost of providing service including an opportunity for the pipeline to earn a reasonable return on its investment. FERC sets rates for interstate pipeline services via proceedings.</p> <p>The cost of pipeline investments in emission reductions can only be recovered via a rate case which requires regulatory proceedings with FERC. When a pipeline files a rate case, there is the potential that the pipeline's achieved earnings will be reduced.</p>	United States	<p>Natural Gas STAR Presentation:</p> <p>Barriers to Implementation of Methane Emissions Reduction Projects in Gas Transmission and Distribution</p>	<p>https://primis.phmsa.dot.gov/rd/mtgs/062409/JeromeBlackman.pdf</p>
18	Economic/Financing	Receiving carbon credit for the mitigation project	<p>Establishing baseline and verifying reductions to receive carbon credit is a labor and resource intensive process which deters companies from implementing mitigation projects.</p>	<p>In the United States, some carbon credit programs require verification measuring and reporting methods such as continuous emissions monitoring systems which can be expensive and difficult to implement.</p>	General	<p>Global Methane Initiative Presentation - World Bank Methane Finance Study Group: First Meeting (December 2012)</p>	<p>http://siteresources.worldbank.org/EXTCARBONFINANCE/Resources/2_GMI_Methane_Introduction_12-19-12_Final.pdf</p>
19	Economic/Financing	Monopoly enterprises and vested interests	<p>Companies transitioning from a state-run society to a market-based society cannot cut off gas supply to citizens who do not pay for their services which reduces the company's revenue and its ability to implement methane abatement projects.</p> <p>Oil companies are reluctant to make major investment without a firm commitment that the monopoly enterprise will accept their gas at a fair price.</p>	<p>Gazprom controls all aspects of natural gas production, gas transmission and gas distribution in Russia. Some major oil producers in Russia are flaring their associated petroleum gas instead of sending it to Gazprom in part because of a reluctance to make a major investment without a firm commitment from Gazprom that their gas will be accepted at a fair market price. However, Gazprom has made a legitimate point that the oil companies have not installed gas processing plants such that their associated gas meets pipeline specifications.</p>	Russia	<p>Methane Emissions from the Oil and Gas Sector</p>	<p>Clean Air Task Force</p>