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WORKING PAPER

A Roadmap to Catalyze Methane Abatement in the Oil and Gas Sector Using Debt Financing

Background Research to Support the ***Guidance for Including Methane Abatement in Oil and Gas Debt Structuring***, Proposed by the Methane Finance Working Group

By **Dr. Luisa Palacios, Dr. Gautam Jain, and Preetha Jenarthan**
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Her responsibilities included overseeing programs with cross-functional teams across the region, which involved developing sustainable finance sector policies, driving sustainability-linked corporate finance and debt capital market transactions, and advising clients on their transition action plans. She also designed an ESG risk framework to incorporate climate-related risks into credit assessments and the organization's risk appetite statement. Additionally, she supported regulatory initiatives for the Joint Committee for Climate Change, co-chaired by the Central Bank and Securities Commission of Malaysia, including the Climate Change and Principle-based Taxonomy, the Value-Based Intermediation and Investment Impact Assessment Framework sectoral guides for renewable energy and energy efficiency, and organizing their inaugural climate finance conference. She also played a key role in incubating the CEO Action Network, driving policy

advocacy with the public sector, capacity-building efforts, and collective commitments on climate action and social stewardship for over 50 private sector organizations across energy, finance, and other industries. She was also a member of several working groups on climate finance, including the UN Principles of Responsible Banking Impact Reporting and Disclosure task force.

Earlier in her career, Preetha was a Business and Strategy Associate at American International Group (AIG) Malaysia, where her responsibilities included conducting business analytics to optimize profitability and ensure capital adequacy, managing digital partnerships, and leading a new market entry strategy proposal for the Asia Pacific region. She holds a master's degree in Economic Policy Management with a concentration on Energy and Environment from Columbia University and a bachelor's degree in Actuarial Science and Finance with a minor in Economics from Drake University.

1. The Methane Finance Working Group's Remit

Human-caused methane emissions have contributed to at least one quarter of global warming since the preindustrial era.[1] Since methane is 80 times more potent than carbon dioxide (CO_2) in trapping heat over the first two decades after its release, abating methane is considered a critical near-term strategy for reducing emissions.[2]

Even with the urgent need for action, methane emissions from the energy sector reached a near-record high in 2023, largely driven by the oil and gas industry.[3] To limit global temperature rise to 1.5 degrees Celsius, methane emissions from the oil and gas sector must fall by at least 75 percent by 2030. This is a pivotal condition for the global energy sector to reach net zero by 2050, as outlined in the International Energy Agency (IEA) Net Zero Emissions by 2050 Scenario (NZE Scenario).[4]

The United Nations Framework Convention on Climate Change has identified methane abatement from the oil and gas sector as one of the most cost-effective strategies to rapidly reduce the rate of warming and contribute substantially to global efforts to limit the temperature rise to 1.5 degrees Celsius.[5] However, capital deployment for methane abatement is falling short of the pace needed to meet the 2030 reduction conditions despite favorable economics and recent policy support.

In response to the growing urgency to address methane emissions, a strong consensus emerged at the 2023 United Nations Climate Change Conference (COP28) in Dubai regarding the critical need to increase investments in methane abatement efforts within the oil and gas sector.

Why was the Methane Finance Working Group convened? Three key initiatives came out of COP28 to encourage the prioritization of methane abatement, focusing on commitments, technical expertise, and capital deployment. First, the Oil & Gas Decarbonization Charter (OGDC), a global industry charter outlining commitments, including methane abatement targets, was launched to transition the sector to low-carbon operations and accelerate climate action.[6] Second, the World Bank's Global Flaring and Methane Reduction Partnership (GFMR) launched a multi-donor trust fund composed of governments, oil companies, and multilateral organizations committed to ending routine gas flaring at oil production sites across the world and reducing methane emissions from the oil and gas sector to near zero by 2030.[7] Lastly, the Methane Finance Working Group (MFWG) was launched to create a blueprint for scaling financing and driving investments in methane abatement projects across the oil and gas industry that should also simultaneously support the fulfillment of OGDC commitments and amplify GFMR capital.

While inclusive of the entire value chain, the **Guidance for Including Methane Abatement in Oil and Gas Debt Structuring (the Guidance)** has been designed to include national oil companies (NOCs), which are responsible for over half of global oil production.[8]

What was the goal of the Methane Financing Working Group? The Methane Financing Working Group aimed to leverage global financial markets to drive capital toward methane emissions reduction projects in the oil and gas sector that align with the methane and flaring reductions outlined in the IEA's NZE Scenario. The objective was to develop voluntary guidance that is viewed as credible from a climate perspective, utilizing broadly established market mechanisms already familiar to capital seekers and capital providers alike. To achieve this, the Working Group served as a forum for various stakeholders in the oil and gas sector—including oil and gas operators, solution providers, financial institutions, civil society, academics, and climate science experts—to discuss the opportunities and challenges of scaling investments for methane emissions abatement globally.

What is the Methane Finance Working Group's first deliverable? The Working Group has developed voluntary guidance for debt-financing structures commonly used in global capital markets to facilitate large-scale capital deployment for methane reduction. The Guidance is a consolidation of the Working Group's initial findings and recommendations.

The Guidance targets short- to mid-term real economy emissions reductions and is designed for use by capital seekers, providers, and other stakeholders. While the Guidance primarily supports the bond and loan markets, it could also apply to private credit and project finance. Drawing on the proven ability of broadly defined sustainable finance structures—specifically thematic or labeled instruments—to scale financing, the Working Group considered three financing structures for methane abatement initiatives: key performance indicator (KPI)-linked, use-of-proceeds (UoP), and conventional (unlabeled) instruments with covenants. The Guidance provides details for structuring the first two types of instruments specifically for targeting methane abatement, and this document covers the Working Group discussions on all three types of instruments.

Which stakeholders does the Guidance target? The Guidance is designed to accommodate the governance, technical capacity, and capital structure of capital seekers and counterparties, including emerging and frontier market NOCs, well-capitalized NOCs based mostly in developed countries, international oil companies (IOCs), independent exploration and production companies (E&Ps), oilfield services providers, multilateral development institutions, incorporated joint ventures, special purpose vehicles, midstream operators, oil and gas investors, asset managers, asset owners, and financial intermediaries. The Guidance also targets financial intermediaries who consider themselves to be climate-aligned, recognizing the importance of maintaining asset integrity and improving production efficiency for both fiduciary and climate risk management considerations.

What were the Working Group's structure and guardrails? The Working Group's structure and guardrails were designed to ensure effective collaboration and outcomes across its Technical, Financial, and Industry working groups. The Environmental Defense Fund (EDF) and Climate Bonds Initiative (CBI) co-chaired the Technical Working Group, and the Financial Working Group was chaired by the Center on Global Energy Policy (CGEP) at Columbia University's School of International and Public Affairs, with RMI as the facilitator. The Industry Working Group was chaired by the Atlantic Council, with McKinsey as a knowledge partner. Regarding the three working groups:

- The **Technical Working Group (TWG)** focused on establishing qualifying criteria and technology for methane abatement investments, including project finance, capital expenditure, and operating expense allocations, while defining measurement, reporting, and assurance specifications.
- The **Financial Working Group (FWG)** paired market incentives with technical recommendations, assessed the market viability of sustainable and conventional debt structures and investment vehicles across asset classes and counterparties, considered de-risking and deleveraging strategies, and ensured that disclosure and execution align with current instruments.
- The **Industry Working Group (IWG)** evaluated the feasibility of recommended financial structures and conducted stakeholder consultations to gather input and insights.

Ultimately, the Working Group sought to facilitate faster deployment of capital at scale to significantly reduce methane emissions across the oil and gas value chain, creating an ecosystem where capital seekers, providers, and structuring agents can confidently engage in transactions that fulfill fiduciary responsibilities, align with scientific consensus, and produce robust and verifiable emission reductions.

1.1 Important Disclaimers about the Methane Finance Working Group Guidance

The Guidance takes a focused approach to capital deployment considerations to meet the urgent need to drastically reduce methane emissions in the oil and gas sector by 2030. While guardrails have been incorporated into the Guidance, it is important to understand its scope.

1. The Working Group's goal was to provide a reference for capital allocation decisions in the oil and gas sector to move the needle toward achieving methane emission reduction by 75 percent in the industry as a whole by 2030.
    a. The Guidance does not exclude any capital-seeking entity, as it targets specific projects,

capital expenditures, operational expenditures, and KPIs that reduce methane emissions rapidly within appropriate guardrails.

b. Guardrails have been constructed in line with the methane abatement recommendations of the IEA's NZE Scenario without meaningful detraction from other recommendations.

c. Given that the IEA's 75 percent reduction of methane emissions scenario assumes *all* oil and gas assets will achieve near-zero methane emissions intensity by 2030, the Guidance focuses on ambition and potential impact.

d. Achieving the methane reductions needed in the IEA's NZE requires investment across oil and gas assets globally. Therefore, the Guidance is potentially applicable to all oil and gas assets regardless of ownership structure, the parent entity's level of commitment to global goals, progress, or transparency. That being said, the project pipeline and methane abatement framework that a company puts forth will be judged by stakeholders for its ambition and authenticity relative to the Guidance.

e. The rationale behind the focused approach suggested in the Guidance on methane abatement related to scope 1 and 2 emissions is to delineate what a company can control and to pinpoint the most significant opportunities for driving down emissions. According to the IEA, reducing scope 1 and 2 emissions from oil and gas operations, which account for slightly under 15 percent of total energy-related greenhouse gas (GHG) emissions, is one of the most viable and cost-effective ways to lower total GHG emissions across all sectors by 2030.[9] While the Guidance concentrates on methane and flaring abatement, guardrails are suggested to minimize leakages to other parts of the supply chain. Additionally, methane abatement efforts should be integrated within a company's broader decarbonization and transition strategy to ensure consistency with long-term decarbonization goals.

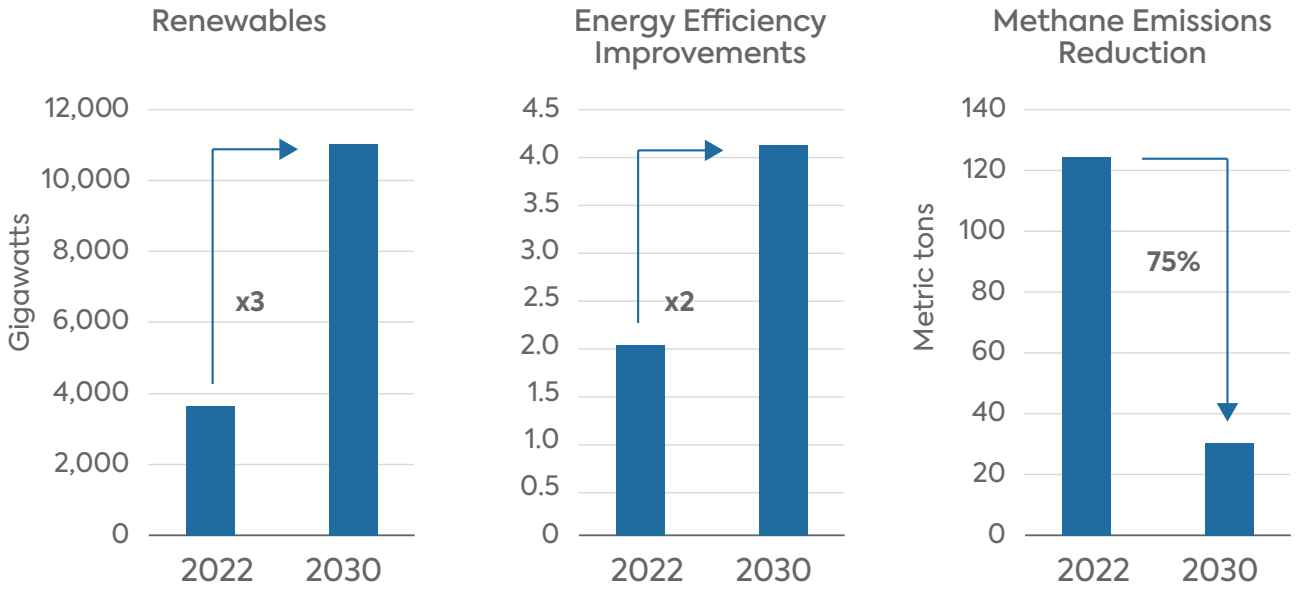
2. The Working Group acknowledges that in net-zero scenarios, such as the one presented by the IEA, part of the required methane emission reductions stems from a drop in oil and gas demand. As the IEA has stated, "Reductions in fossil fuel use alone ~~e~~even in the NZE scenario ~~d~~do not achieve deep enough cuts in methane emissions to reach levels consistent with limiting warming to 1.5 degrees Celsius with no or low overshoot."[10] The focus of the Working Group is on the bulk of the methane emission reduction efforts from current oil and gas operations. It is beyond the scope of the Working Group to determine which countries, basins, and companies should be producing the oil and gas the world will demand by 2030, 2035, 2040, or 2050 under NZE or any other energy transition scenario and, thus, where the financing and the investments for such activities will or should take place.

3. The Working Group acknowledges that strategies to capture methane currently being vented could mean new infrastructure for the use of recovered and associated gas. The Guidance offers considerations for analyzing the impact of new infrastructure.

2. Unlocking Capital for Methane Abatement in the Oil and Gas Sector

The IEA lists several actions that must be taken by 2030 to achieve net-zero emissions in the energy sector globally by 2050 and limit the temperature increase to 1.5 degrees Celsius. As outlined previously, one of the required key actions is reducing methane emissions from the oil and gas sector by approximately 75 percent.[11] Methane emission reduction is cited at the same level of importance as a threefold increase in the capacity of renewables-based electricity generation, doubling the rate of energy efficiency improvements, and considerable increases in electrification (see Figure 1).[12] Substantially reducing methane emissions from the oil and gas sector by 2030 was also a key commitment made at COP28.[13]

Figure 1: Global renewables power capacity, primary energy efficiency improvements, and energy sector methane emissions in the NZE Scenario



Source: "Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach," International Energy Agency, September 2023, p. 108, https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach.

Reducing emissions from the oil and gas industry holds the largest abatement potential relative to any other anthropogenic activity. Existing technologies are capable of abating most of the emissions in the sector,[14] with about 50 percent of such mitigating measures at a low cost, and some even at a negative cost.[15] Despite its high potential as a critical enabler of the IEA's NZE Scenario,

the world is not on track to meet the 75 percent methane emission reduction in the oil and gas sector by 2030. According to the IEA's methane tracker, methane emissions from fossil fuels are not yet declining, with the 2023 level of emissions about the same as in 2019.[16]

For the oil and gas sector to take effective action against this invisible challenge, a better understanding of the obstacles to mobilizing capital into methane abatement solutions is needed, particularly in emerging markets.[17] Some of the obstacles to deploying capital for methane abatement in the sector include lack of regulation and cost of capital but also lack of financial incentives to undertake these methane abatement projects. The lack of financial incentives might be associated with internal competition within a firm for investment resources vis-à-vis other projects with higher profitability, lack of understanding of the costs associated with such projects, and/or lack of appetite to finance the infrastructure needed to recover the vented and flared gas.[18]

What is the investment gap in this critical decarbonization vector? In 2023, the IEA estimated that about USD 100 billion in cumulative spending will be needed for a 75 percent reduction in methane emissions in the oil and gas sector by 2030.[19] In 2024, McKinsey & Company estimated that the spending required to eliminate methane emissions is even higher, at around USD 200 billion by 2030, including the cost of building the infrastructure to bring the recovered methane to existing pipelines.[20] These estimates translate into USD 14–33 billion in annual capital deployment for methane abatement in the sector through 2030. However, according to Climate Policy Initiative's (CPI) estimates, based on publicly available data, only USD 11 million of average annual investments were identified for methane abatement in the oil and gas industry for the 2021–2022 period.[21]

The low level of spending reported by CPI might, in large part, reflect a lack of up-to-date and transparent data, the absence of standardized reporting frameworks, and the difficulty in distinguishing methane abatement investments from routine operational expenditures across the industry. This underscores the urgency of better disclosures about methane abatement spending, which the Methane Finance Working Group seeks to address. Notwithstanding the probable underreporting of spending toward methane reduction, the gap in capital deployment is likely considerable in this critical decarbonization lever, with one of the highest global warming reduction benefits per dollar invested.[22]

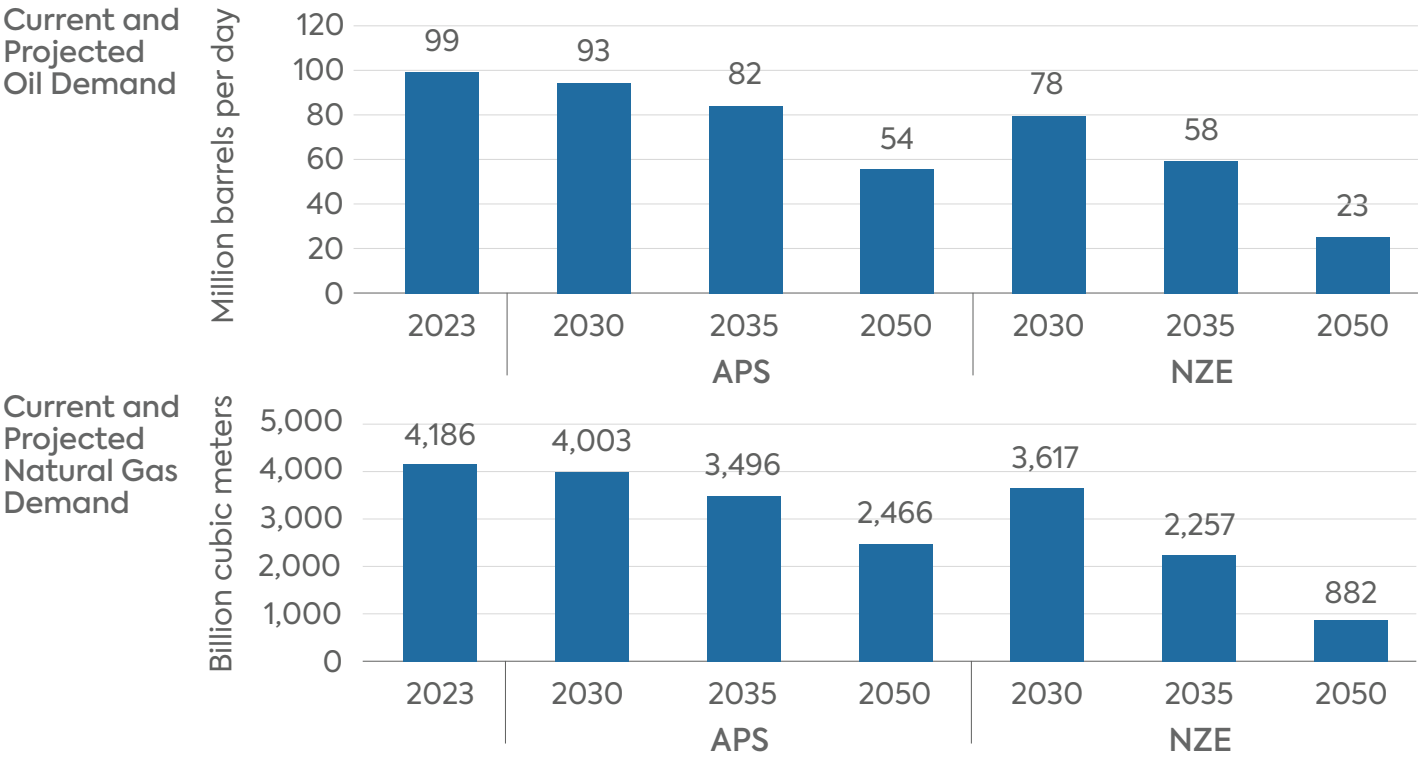
This gap in capital deployment stands in stark contrast to the growing pledges and commitments around methane abatement by the industry (see Figure 4 in section 2.3 about methane pledges). A more focused approach is thus needed to ensure transparency around oil and gas companies' methane abatement spending and the investments they are prepared to undertake to reduce methane emissions.

2.1 Deploying Capital for Methane Abatement in the Oil and Gas Industry Is Critical

Even under the NZE Scenario, a substantial amount of oil and gas will still be consumed globally in the next decade. To have a chance of staying within reach of the target of limiting temperature increase to 1.5 degrees or even two degrees Celsius by 2050, oil and gas should be produced with near-zero methane emissions.[23] According to the IEA's World Energy Outlook 2024 (WEO), oil demand aligned with the NZE Scenario is expected to be around 78 million barrels per day (b/d) by 2030 and almost 58 million b/d by 2035 versus 99 million b/d in 2023 (see Figure 2). Regarding natural gas, the IEA's latest WEO foresees demand at 3,617 billion cubic meters (bcm) by 2030 and 2,257 bcm by 2035, consistent with the NZE Scenario versus 4186 bcm in 2023.[24]

The oil and gas consumption expected under the various 2030 energy transition scenarios makes methane abatement a critical and urgent action for limiting temperature rises.

Figure 2: Oil and gas demand under NZE and APS scenarios



Note: APS refers to IEA's Announced Pledges Scenario, which is based on countries implementing their national climate commitments in full and on time.

Source: "World Energy Outlook 2024," International Energy Agency, October 2024, https://www.iea.org/reports/world-energy-outlook-2024.

In line with the IEA, the Working Group concluded that targeted actions to tackle methane emissions from fossil fuel production are essential "to limit the risk of crossing irreversible climate tipping points" even in the NZE Scenario.[25] However, methane abatement in the oil and gas sector is even more critical in the context of much higher fossil fuel use, which is the current trajectory that the world is on, avoiding roughly 0.1 degrees Celsius warming in 2050, comparable to eliminating all CO_2 emissions from all heavy industry globally.[26]

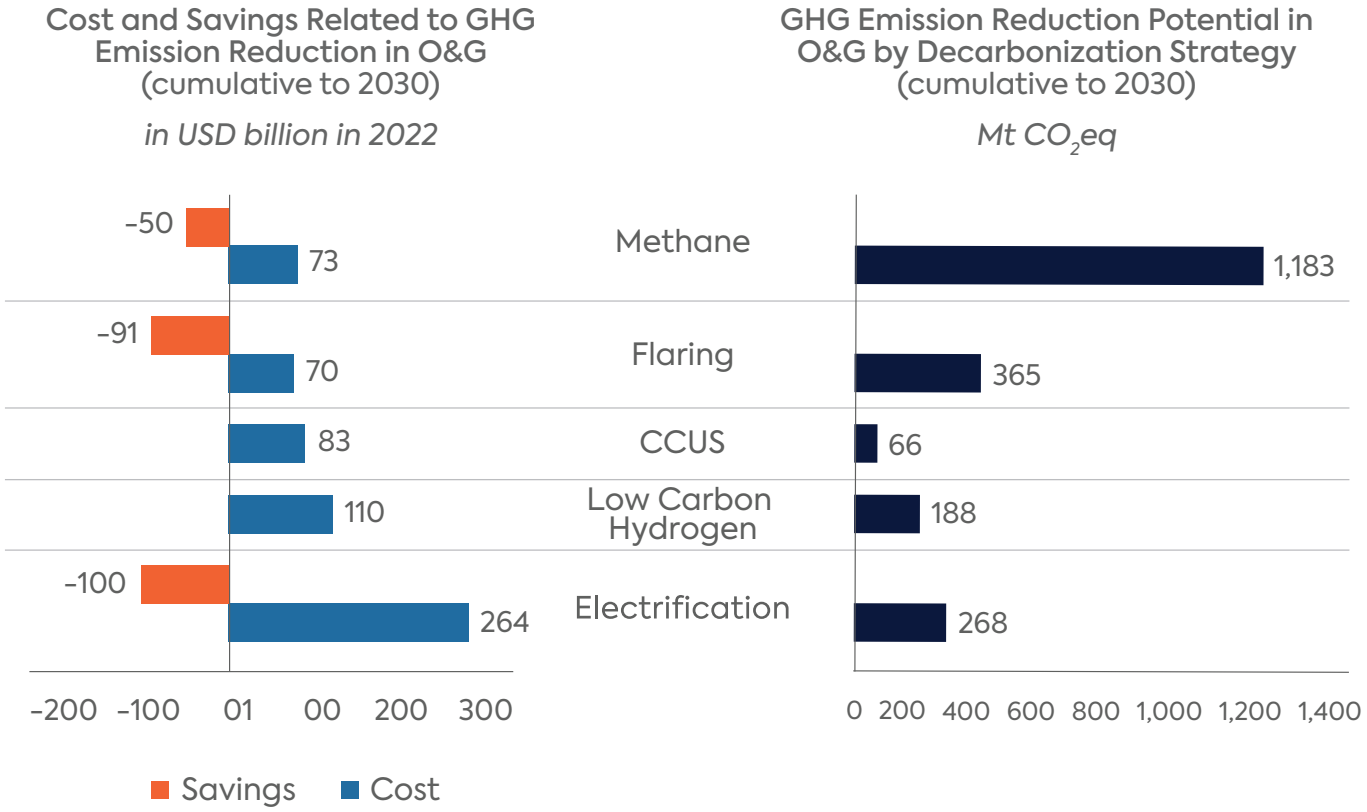
It is beyond the scope of this guidance to determine which countries, basins, and companies should be producing the oil and gas that the world will need by 2030, 2035, 2040, or 2050 under NZE or any other energy transition scenario and, thus, where the financing and the investments for such activities will or should take place. Rather, the Methane Finance Working Group's goal is to encourage capital deployment to decarbonize supply by providing best practices and guardrails for methane-abating activities.

2.2 Investing in Methane Abatement as Part of the Industry's Decarbonization Metrics

Of all the decarbonization levers the oil and gas industry has to reduce its GHG emissions, including CCUS, low-carbon hydrogen, electrification, and reducing methane emissions, the last is the most effective, as shown in Figure 3.[27]

The Guidance includes a series of abatement measures for methane specifically, as part of the proposed financial structures, that are in line with the IEA's recommendations. These solutions include boosting operational excellence at extraction sites by increasing the energy efficiency of processes; monitoring and capturing methane venting, including leaks; capturing and storing combustion gases or directly vented CO2; and reducing flaring. The World Bank has highlighted the critical relationship between flaring and methane emissions, given the risk of the potentially more adverse impact of inefficient flares (i.e., unlit) on methane emissions than currently estimated.[28]

Figure 3: Abatement costs and GHG emission reduction in oil and gas by decarbonization lever, cumulative to 2030



Source: "Cost and Savings in the Net Zero Scenario, 2030," International Energy Agency, May 2023, https://www.iea.org/data-and-statistics/charts/cost-and-savings-in-the-net-zero-scenario-2030; "Emissions Reductions in the Net Zero Scenario, 2030," International Energy Agency, May 2023, https://www.iea.org/data-and-statistics/charts/emissions-reductions-in-the-net-zero-scenario-2030.

The needed reduction in methane emissions by 2030 assumes that the available methane abatement technologies are deployed across all oil and gas production, processing, and transport facilities by 2030 so that the industry-wide emission intensity converges with that of the world's best operators today.[29] It is important to note that the IEA assumes that around 30 percent of the methane emissions reduction in the NZE stems from the fall in oil and gas demand over this period, which means methane abatement projects and activities need to be deployed to achieve the remaining 70 percent reduction. As explained earlier, in the current oil demand trajectory, which is not aligned with a 30 percent decline in demand, abating methane in the supply of oil and gas globally is even more critical.

2.3 Methane Pledges: The Industry Has Stepped Up Commitments

Oil and gas companies with a net-zero target by 2050 encompassing scopes 1, 2, and 3 emissions—account for less than 6 percent of the global oil production.[30] However, achieving a 75 percent reduction in methane emissions would require increasing capital deployment for methane emissions reduction projects globally. As explained earlier, the IEA has stated that reductions in fossil fuel use alone even in the NZE Scenario do not achieve deep enough cuts in methane emissions to reach levels consistent with limiting warming to 1.5 degrees Celsius and that additional, targeted actions to tackle methane emissions from fossil fuel production and use are essential.

Currently, oil and gas companies with pledges to reduce methane emissions in their oil and gas operations represent a growing universe and present an opportunity to transition from pledges into action (see Figure 4). Recent commitments include the Global Methane Pledge, which has participation from 159 countries, and the OGDC, which has over 50 signatories—30 of whom had not previously engaged in other international initiatives aimed at mitigating methane emissions and flaring, including many NOCs—illustrating a growing collective effort to combat methane emissions. Despite the progress made, capital being deployed for methane abatement in the oil and gas sector is falling short of the pace required to meet the 2030 target.

Figure 4: Methane pledges and initiatives by organization

Name of the organization	Pledge	Scope	Launch date
OGMP Oil And Gas Methane Partnership 2.0	• The Oil & Gas Methane Partnership 2.0 (OGMP 2.0) is a voluntary initiative to help companies reduce methane emissions in the oil and gas sector • It is the flagship oil and gas reporting and mitigation program of the United Nations Environment Programme (UNEP)	• Over 140 companies with assets in more than 70 countries Members represent the following: • About 40% of the world's oil and gas production • Over 80% of LNG flows • Nearly 25% of global natural gas transmission and distribution pipelines • Over 10% of global gas storage capacity	2015
Global Methane Pledge	• To cut methane emissions by 30% below 2020 levels by 2030	• The Global Methane Pledge unites 159 participating countries and the European Commission, representing about 50% of global anthropogenic methane emissions • Many oil-producing countries are signatories to this pledge	COP26 2021
OGDC THE OIL & GAS DECARBONIZATION CHARTER	• Net zero (scopes 1 and 2) by 2050 • Near-zero upstream Methane Emissions by 2030 • Zero Routine Flaring	• More than 50 signatories from 30 countries • 32 NOCs • 22 IOCs and independents • Members represent more than 43% of global oil production	COP28 2023
METHANE GUIDING PRINCIPLES	• Reduce methane emissions across the natural gas supply chain	• 50+ members	2017

Name of the organization	Pledge	Scope	Launch date
OIL AND GAS CLIMATE INITIATIVE	• Reduce upstream methane emissions intensity to well below 0.20% by 2025 • Bring carbon intensity from our upstream operations down to 17.0 kg CO_2e per barrel of oil equivalent by 2025 • Bring routine flaring to zero by 2030	• 12 of the largest oil and gas companies, producing around a third of the global oil and gas	2017
WORLD BANK GROUP Global Flaring and Methane Reduction Partnership (GFMR)	• GFMR is a multi-donor trust fund committed to ending routine gas flaring at oil production sites across the world and reducing methane emissions from the oil and gas sector to near zero by 2030 • Committed to helping developing countries cut flaring and methane emissions generated by the oil and gas industry by providing critical catalytic grants and technical assistance to governments and state-owned operators that commit to addressing flaring and methane emissions through long-term programs	• Composed of governments, oil companies, and multilateral organizations active in over a dozen countries, which account for about a quarter of the oil and gas sector's methane emissions	COP28 2023
Zero Gas Flaring Initiative (ZRF)	• Committed to end routine gas flaring no later than 2030	• 36 governments and 58 oil companies representing 60% of global gas flaring	2015

Source: Organizations' websites.

3. Labeled Financing Structures to Scale Capital for Methane Abatement

To implement methane commitments, companies must deploy capital for methane-abating projects and activities, including measurement. Capital markets should encourage the prioritization of spending on abatement, as companies seek external financing through the regular course of business. Unfortunately, the capital deployment for methane abatement is alarmingly low, not well understood, and not prioritized, partly because of a lack of incentives for companies and countries to pursue methane emission reductions.[31] UNEP, in its methane report, states that "achieving global climate goals hinges on a decisive shift from ambition to action."[32] This guidance seeks to help with the critical piece of this puzzle: ensuring that capital from the private sector is deployed to translate ambition into actionable methane abatement activities in the oil and gas sector.

The IEA has identified a range of potential sources of financing to support methane abatement, including governments, development finance institutions, commercial banks, and the private sector.[33] Specifically, the IEA sees opportunities to link funding currently provided to the oil and gas industry—directly or indirectly—to methane abatement through the issuance of securities, which can be tied to sustainability.

Similarly, the World Bank's GFMR has identified a variety of sources that include oil and gas companies, oil service operators, governments, development finance institutions, commercial banks, private capital funds, and strategic investment funds.[34] Among the potential instruments for flaring and methane reduction by investors, the World Bank cites green bonds and loans, transition bonds and loans, and sustainability-linked debt as instruments that could be deployed for such purposes. The bank does acknowledge, though, that their application for flaring reduction and methane abatement may be difficult because of the prevailing green bond and loan standards.

The Guidance seeks to put these recommendations into practice and support capital deployment by expanding the current scope of thematic or labeled debt to include specific features targeting flaring and methane emission reductions in sustainable debt instruments issued by the oil and gas sector. The Methane Finance Working Group developed guidance aligned with International Capital Market Association (ICMA) guidelines for green, sustainability, and sustainability-linked instruments and seeks alignment with relevant components of the Climate Transition Finance Handbook.[35]

This chapter aims to provide a brief introduction to the asset class, along with the different incentives and challenges that capital providers and seekers in the oil and gas industry face

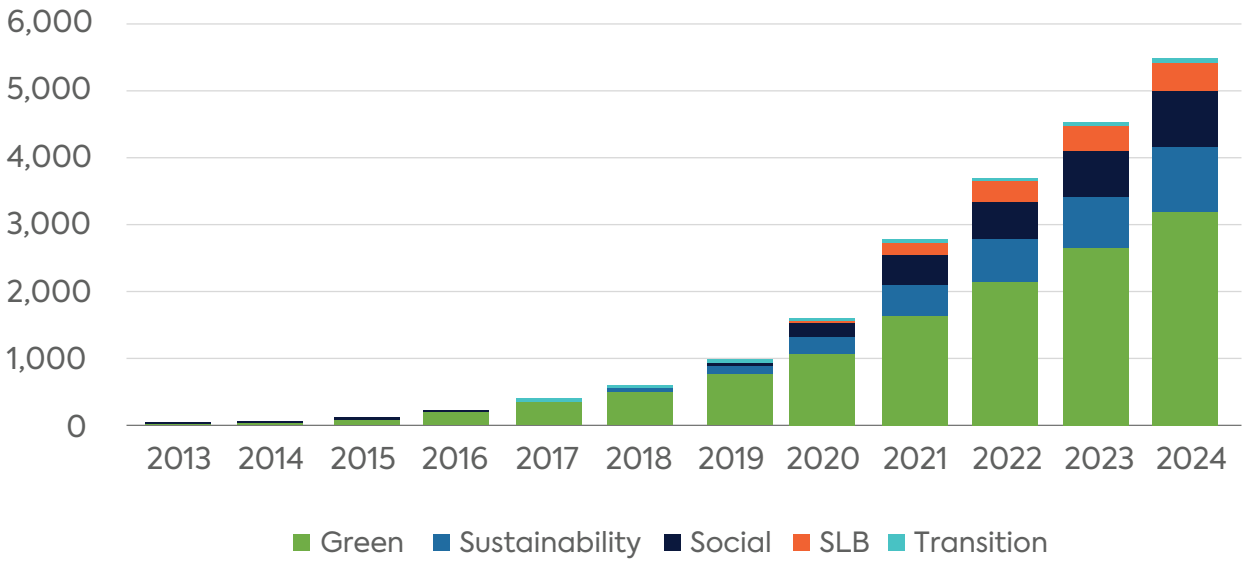
when using these instruments, as a precursor to the taxonomy of methane abatement features applicable to thematic instruments, which are detailed in the Guidance.

3.1 The Case for Using the Sustainable Debt Market to Fund Methane Abatement

Although the first thematic bond ~~kn~~known as a Climate Awareness Bond ~~w~~as issued in 2007,[36] the asset class did not gain broad acceptance among the investor and issuer community until the ICMA released the "Green Bond Principles" in 2015. One of the most important purposes these principles served was to provide assurance to investors by lowering "greenwashing risk," which occurs when an entity uses sustainability as a pretext to gain market access and raise funds it might otherwise not have, but does not follow through on its promises. As the asset class gained credibility among investors, it expanded substantially in the ensuing period: both in terms of the amounts of thematic bonds issued and the types of bonds. Based on Bloomberg data, around $5.5 trillion of such bonds have been issued through Q4 2024 (Figure 5), with expectations that the asset class will continue to grow in the coming years[37]; despite the rapid expansion, the asset class comprises only about 4 percent of the global fixed income market, indicating room for growth.[38]

There are two broad categories of thematic bonds (or loans): use-of-proceeds (UoP) bonds and key performance indicator (KPI) bonds.[39] The funds raised by UoP bonds are tied to specific types of projects, unlike KPI bonds, whose proceeds are not earmarked for any specific projects or activities, but the bond issuer is expected to meet prespecified sustainability performance targets. The UoP bonds are further classified based on the type of projects covered: Green bond proceeds are directed toward environmental sustainability projects, social bonds fund projects targeting social issues, and sustainability bonds cover both environmental and social projects. Similarly, the most common type of KPI bonds are sustainability-linked bonds (SLBs), which typically have a penalty attached in the form of an increase in interest payments if the prespecified targets are not met. In addition, there are transition bonds, which target funding for the greening of brown sectors and can be either UoP or KPI type. Among these different types of labeled bonds, green bonds, sustainability bonds, and SLBs are the most relevant from the point of view of methane abatement in the oil and gas sector.

Figure 5: Cumulative thematic bond issuance by type (USD billion)



Source: Bloomberg; data as of December 2024.

The most important reason for considering thematic instruments for methane abatement is their broad acceptance by investors as a means of meeting sustainability goals with low greenwashing risk while providing financial returns, as can be demonstrated by the strong growth of the asset class (Figure 5). ICMA's green bond and SLB principles have played a significant role in lowering the greenwashing risk and providing assurance to investors, supported by the annual reporting requirement, along with the recommended pre-issuance and post-issuance external verifications.[40]

Figure 6 briefly describes how methane reduction features could be incorporated into thematic bonds and compares these instruments with conventional bonds, which can also be used by incorporating covenants targeting methane abatement. However, as the table shows, each instrument offers both advantages and disadvantages from the point of view of investors and issuers. It's important to point out that the pros and cons highlighted in the table are not necessarily specific to methane reduction but apply more broadly to these instruments.

Figure 6: Comparison of proposed financial instruments for methane abatement

	KPI-linked structures	Use-of-proceeds structures	Plain vanilla or unlabeled structures
How can they be used for methane abatement	Capital is raised with unrestricted usage but issuers must commit to a set of Key Performance Indicators targeting methane and/or flaring reduction (e.g.methane emission redution targets, LDAR, etc.)	Capital is raised with restricted usage for specific projects, including methane abatemen projects	A methane covenant or provision is included in a typical bond, loan, or other transaction
Issuer pros	• Allow for large capital raises • Signals energy transition leadership • Fungibility of capital allows flexibility	• Historically, the most investor demand among sustainable debt as it can attract a broad pool of investors due to low peceived greenwashing risk • Potential for paying a lower interest rate if there is a greenium	• Less restrictive, could be incorporated with relative ease • Access to large amounts of capital with no restrictions
Issuer cons	• Setting up a sustainable debt framework requires time and effort • Interest rate steps up if targets associated with KPIs are not met • Reporting and verification requirements can be burdensome	• Setting up a sustainable debt framework requires time and effort • Reporting and verification requirements can be burdensome • Raising sufficient capital to reach benchmark size can be difficult if targeting only methane abatement	• Penalties for missing covenents can be high (e.g., principal acceleration) • Climate-focused investors are increasingly unwilling to finance via this channel, especially without company-level climate commitments
Investor pros	• Large capital raise would mean more liquid instrument • Reporting and verification requirements provide assurance	• Use-of-proceeds requirement lowers greenwashing risk considerably • Reporting and verification requirements provide assurance	• For investors with no specific climate mandate, rolling over existing debt into new debt with methane covenents would be straightforward and give them some green credentials • Large captial raise would mean liquid instrument
Investor cons	• Fungibility of captial increases the risk of greenwashing	• Potentially small size of instrument and therefore less liquid if targeting only methane abatement	• Limitations on the complexity of the convenets vis-a-vis KPIs • For cliamte-focused investors, convenents without climate commitments by the company are only a partial solution that may not be sufficient

Source: Authors.

The Guidance proposed by the Methane Finance Working Group builds on the general description of the different instruments covered in Figure 6 to provide enhanced credibility for oil and gas capital seekers looking to issue thematic instruments. While ICMA has overseen the creation of a helpful framework that makes thematic bonds much more acceptable to investors, the eligible sectors in the guidance are intentionally described very broadly. To provide further assurance to investors, greater specificity may be valuable by complementing ICMA's principles with sector-level guidance from relevant capital market authorities or international organizations. For example, the EU taxonomy for sustainable activities[41] and the Climate Bonds Initiative's Climate Bonds Standard and Certification Scheme[42] include more detailed taxonomies of eligible investments. In a similar vein, the Guidance includes recommendations for issuers and investors to assess the scope of instruments that include methane abatement activities and targets.

Historically, there have been low levels of capital deployment in methane abatement in the oil and gas sector. There is a general lack of interest among capital seekers (oil and gas companies) and capital providers (investors) because of structural constraints such as a lack of financial incentives for countries and companies to mitigate methane, the effort needed leading to lack of interest to develop a pipeline of quality projects for methane reduction, prioritization given the opportunity cost of developing a methane project pipeline especially with projects competing internally for capital, and a lack of proper methane measurements, reporting, and verification.[43]

To encourage the faster deployment of capital at scale, the Guidance proposes UoP and KPI taxonomies that lead to real economy emission reductions via methane abatement activities and projects. Further, many of the recommendations in the Guidance improve production efficiency a benefit for both capital seekers and their debt holders. While not covered in the Guidance, this working paper also includes a broad set of guidelines for using conventional instruments by incorporating appropriate covenants or provisions in the bond or loan indentures. Among capital providers, those without any specific sustainability mandates, conventional bonds with covenants targeting methane would likely be acceptable, as their focus tends to be more on the credit quality of the issuer.

3.2 Capital Seekers' Incentives and Constraints in Tapping the Sustainable Debt Market

The financing and capital allocation strategies of entities within the oil and gas industry are significantly influenced by their structural and operational characteristics. There is an underinvestment in methane abatement despite its significance in meeting net-zero goals. This underinvestment is driven by specific constraints that will require targeted incentives to overcome,

depending on the type of capital seekers broadly categorized as NOCs, IOCs, independent operators, midstream operators, refinery and marketing companies, and oilfield services companies (OFSCs).

The motivations of each type of capital seeker in accessing the sustainable debt markets for methane abatement are discussed below.

1. ***NOCs:*** NOCs are state-owned enterprises that dominate the oil and gas landscape, collectively accounting for more than half of the world's oil and gas production and holding nearly 60 percent of global reserves.[44] NOCs often align their capital allocation strategies with national priorities, such as enhancing energy security, creating jobs, and generating government revenue, which drives economic development, specifically in emerging and frontier economies. The focus on broader economic development for low- and middle-income petrostates is a key differentiator from public companies, which tend to focus solely on profit maximization and shareholder value creation.[45] NOCs as a group are quite heterogeneous, as they possess diverse financial structures and varying levels of creditworthiness, which influence their ability to access capital, including funding initiatives such as methane abatement or other low-carbon investments.[46] Since many NOCs are major revenue generators for their governments, their financial health directly affects the sovereign's ability to access capital and service debt.[47] Given their large share of global oil and gas production and relatively slower progress on climate commitments than IOCs, NOCs need to play a pivotal role in reducing methane emissions. While NOCs have around $1 trillion in outstanding debt—double that of seven Western majors—and $3 trillion in public equity,[48] they have issued a limited amount of sustainable debt, making methane abatement financing via thematic bonds a new option to consider for many.

2. ***IOCs:*** IOCs, which are nonstate entities and often publicly traded enterprises—including the "majors," the largest fully integrated firms operating globally—collectively contribute less than 13 percent of global oil and gas production and reserves.[49] In contrast to NOCs, IOCs operate across the value chain, primarily focusing on maximizing profits and generating shareholder returns. After years of poor equity returns, oil and gas companies have faced pressure to maintain profitability and capital discipline. Consequently, much of the recent cash windfall has been directed toward reducing debt, paying dividends, and repurchasing stocks.[50] US majors, in particular, are lagging behind their European counterparts when it comes to low-carbon investments and tapping the sustainable debt market (see Section 3.4.2). Oil majors might not have incentives to seek sustainable debt financing, given their strong cash position. However, the IOCs have a significant role in helping with their nonoperated assets, which account for 50 percent of IOCs' equity production, with a large portion managed by NOCs or NOC-owned

entities.[51] IOCs' participation in Oil and Gas Climate Initiative (OGCI), OGDC, and OGMP 2.0 is a promising development to share best practices on methane abatement projects with NOCs and others in the sector (see Figure 4 in the previous chapter).

3. ***Independent E&Ps:*** E&Ps are typically smaller companies that are often more regionally focused or specialize in certain markets or resources, primarily upstream activities such as E&P.[52] These companies require significant funds for drilling, extracting, processing, and transporting oil and gas. Most independents lack the liquidity to finance these activities internally and often rely on third-party financing, such as reserve-based credit facilities. These loans are secured by proven oil and gas reserves, with borrowing capacity adjusted based on reserve values. However, during times of oil price declines, the value of these reserves drops, potentially reducing borrowing limits, triggering liquidity crises, or requiring additional collateral or debt repayment.[53] This challenge is compounded by the fact that some global banks are increasingly moving away from financing the oil and gas sector to align with climate commitments, further straining lending facilities for independent E&P companies. Given the current financing landscape, independent E&Ps could consider any financing option—whether a labeled instrument or not—that incorporates methane abatement goals and are likely willing to comply with stringent yet practical covenants to secure the funding needed.

4. ***Midstream, Refinery and Marketing Companies, and OFSCs:*** Midstream companies are responsible for managing pipeline systems for the long-distance transportation of gas or liquids to end consumers. Refinery and marketing companies operate downstream, focusing on processing, transporting, and selling refined petroleum products. OFSCs are specialized firms that support the oil and gas industry by providing essential equipment, technologies, and expertise for exploration, extraction, and production operations.[54] The World Bank and the IEA have identified these entities as key in driving methane abatement projects.

5. ***Other Eligible Parts of the Oil and Gas Sector Value Chain:*** Several other segments of the oil and gas value chain may also be applicable, such as storage companies, liquefied natural gas liquefaction sovereign entities and facilities, integrated joint ventures, and joint venture operating companies.

Given the limitations and constraints that oil and gas companies face when issuing green bonds and SLBs, for some, adding methane-related conditionalities to conventional bonds might be the best way forward, as discussed in chapter 4.

3.3 Incentives and Challenges for Capital Providers

To better understand the various perspectives of capital providers, the Methane Finance Working Group's subgroup, FWG, conducted six working sessions with over 50 capital providers in each session, from over a hundred participants in total, and separately organized around 40 bilateral discussions. Capital providers include financial asset owners, asset managers, banks, debt capital markets specialists, and structuring agents. The goal of these sessions was to understand the interest in deploying capital for methane abatement projects, the barriers that various institutions face in participating in labeled transactions from oil and gas companies, the types of financial structures that could be used to address these concerns, and the potential demand for these types of structures. Once the stakeholders agreed on the main impediments, the Working Group focused on resolving those challenges where feasible to create an enabling financial ecosystem for these transactions.

Capital providers often face challenges investing in the oil and gas sector because of misalignment with broader climate goals and pledges. Additionally, emerging regulations regarding fund labeling in the EU may limit the ability of banks, financial asset owners, and financial asset managers to participate in labeled financing structures dedicated to the decarbonization of oil and gas companies. Through its discussions, the FWG brainstormed various ways to build credibility and guardrails into the Guidance to give market participants additional confidence that these transactions have a high likelihood of leading to real and tangible reductions in methane emissions. The main takeaways from those discussions are as follows:

1. ***There is demand for credible sustainable debt instruments targeting methane abatement in the oil and gas sector, but with clear guardrails. Even when not required by a specific mandate, investors with climate goals prefer instruments that can generate returns while also contributing to carbon emission reduction targets, including possibly methane abatement.*** However, for credibility and to avoid greenwashing risks, these instruments should clearly outline the approach to methane reduction, ensuring transparency and measurable progress. Strong governance structures and assurance mechanisms are crucial for boosting investor confidence, particularly regarding credit risk, which in turn enhances the attractiveness of the investment. The assurance provided by these governance frameworks reinforces the security and credibility of such transactions. In addition to the specific KPIs, activities, and projects targeted by labeled instruments, the overall transition strategy of oil and gas companies is a key factor in determining whether banks will finance these entities. One important incentive for the financial community to back these instruments is that they enhance emissions disclosure and establish clear baselines, as the lack of disclosure is a primary

concern in financing and investing in the oil and gas sector. Providing transparent, accurate emissions data and clear reduction targets would help banks and investors better assess the potential impact of methane abatement projects and mitigate concerns about greenwashing, as discussed earlier. Additionally, addressing the shortage of qualified second-party opinion providers with relevant subject matter expertise is essential. Ensuring independent verification of methane abatement efforts will enhance the credibility of projects and attract more investors.

2. ***High-quality instruments featuring credible methane abatement criteria offer an opportunity for investors with carbon reduction targets for their portfolios.*** Some climate-focused investors are cautious about supporting methane transactions in the oil and gas sector, fearing that they may prolong the life of fossil fuel assets or lead to additional exploration, contributing to carbon lock-in. Others may refrain because of concerns about financing fossil fuels in light of issuer-level exclusions. Yet others might just be hesitant about real or perceived greenwashing risks of thematic instruments issued by the oil and gas sector. While some debt capital market specialists in the FWG noted that sustainable debt transactions have had limited traction in the oil and gas sector, with methane abatement still not mainstream among investors, many acknowledged that addressing the risk of greenwashing—real and perceived—would attract investors to the sector. For many investors, divesting from large, established firms often included in major stock and bond indices is challenging because of fiduciary duty considerations. (Pension funds, for example, have long-term obligations to their beneficiaries.) As such, instruments incorporating methane abatement offer an attractive opportunity to invest in companies that are included in indices and are actively reducing emissions, leading to real economic decarbonization that aligns with their organizations' broader environmental goals. In addition, methane abatement improves asset integrity and could have positive impacts on a company's long-term competitiveness and balance sheet over time. The overlap between improved asset quality and methane emissions reduction should be considered by investors participating in these transactions as potential premiums.

3. ***Sustainable instruments targeting methane abatement face measurement-related challenges.*** Thematic instruments targeting methane reductions face several challenges related to the historic inaccuracy of industry-reported methane emissions data. First, inaccurate or unreliable methane emission measurements could complicate the establishment of credible KPIs, creating challenges for these instruments. Second, participants in the working group highlighted the need for KPIs and financial incentives to account for potential emission increases that could occur purely because the accuracy of methane emission measurements improves over time. It is important to ensure that companies are not penalized for these adjustments. Third, as capital seekers increasingly provide sustainable and impact reporting, some capital

providers expressed concern about the potential for cannibalization or substitution between sustainable debt and conventional transactions. Nevertheless, to the extent that sustainable debt replaces conventional debt, it should be less of a worry, as it should lead to targeted methane emission reductions and better disclosures without adding to the debt.

4. ***Projects exclusively targeting methane abatement may not be sufficient for a UoP bond to reach benchmark size and be liquid.*** Investors usually prefer a benchmark-sized bond (i.e., typically greater than $500 million in size) to ensure liquidity and sufficient float for trading. Participants in the FWG highlighted that since investments needed for the projects and activities tied to methane abatement may not be large enough to make the associated bond benchmark-sized, bundling methane abatement with other initiatives to reduce scope 1 and 2 emissions or UoP carve-outs can help address this investment scale challenge. By integrating methane abatement with other sustainable activities, companies can meet the minimum benchmark size required by investors, facilitating larger issuances and broader participation. Similarly, investors recommended exploring options within the existing thematic bond structures if a dedicated investor pool for methane abatement financing does not exist.

5. ***Additional considerations are needed to raise methane finance for NOCs.***

    a. *Low incentives for NOCs in methane abatement projects:* Some capital providers believe that for NOCs, even the possibility of issuing sustainable debt with a "greenium"—the ability to issue sustainable debt at a lower interest rate and, therefore, lower cost relative to conventional bonds of the same maturity—might not be sufficient to incentivize greater adoption of such instruments. They also shared that most of these NOCs have limited access to capital and technical resources, further compounded by competing sovereign-level priorities, which makes investing in methane abatement projects often a low priority for them. These investors believe that NOCs will likely require a monetary incentive to invest in methane abatement. By opening up multilateral financing mechanisms to the oil and gas sector, NOCs would not only have greater access to the funds necessary to support methane abatement initiatives and their transition to a low-carbon economy but would also be able to raise their ambition further in reducing methane emissions more rapidly.

    b. *Reporting challenges of methane emissions complicate the use of thematic structures:* Monitoring, measuring, and reporting methane emissions remain a challenge, which plays a part in how the KPIs are defined and financial incentives are structured. Some investors suggested that one approach would be to start with simple structures: developing covenants linked to methane to be inserted into existing conventional bond structures, with other metrics, such as membership of OGMP 2.0, to further support methane reduction. (Chapter 4 of this

working paper builds on this concept.) Another step could be to provide funding with technical assistance to abate methane. The structure should be a win-win for the capital seekers and providers, with simple guidelines and scalable solutions to help NOCs drive real impact.

3.4 Mitigating Fungibility Risk and the Perception of Greenwashing

As discussed earlier, participants in the Methane Finance Working Group raised concerns regarding greenwashing. These concerns might arise if a company commits to the KPIs of an SLB but fails to achieve any meaningful reductions in methane emissions with minimal penalties or if the applicable projects are defined too loosely for UoP bonds. Similarly, another related concern cited was the fungibility of capital—that is, part of the proceeds raised using a KPI instrument could lead to additional oil and gas production.

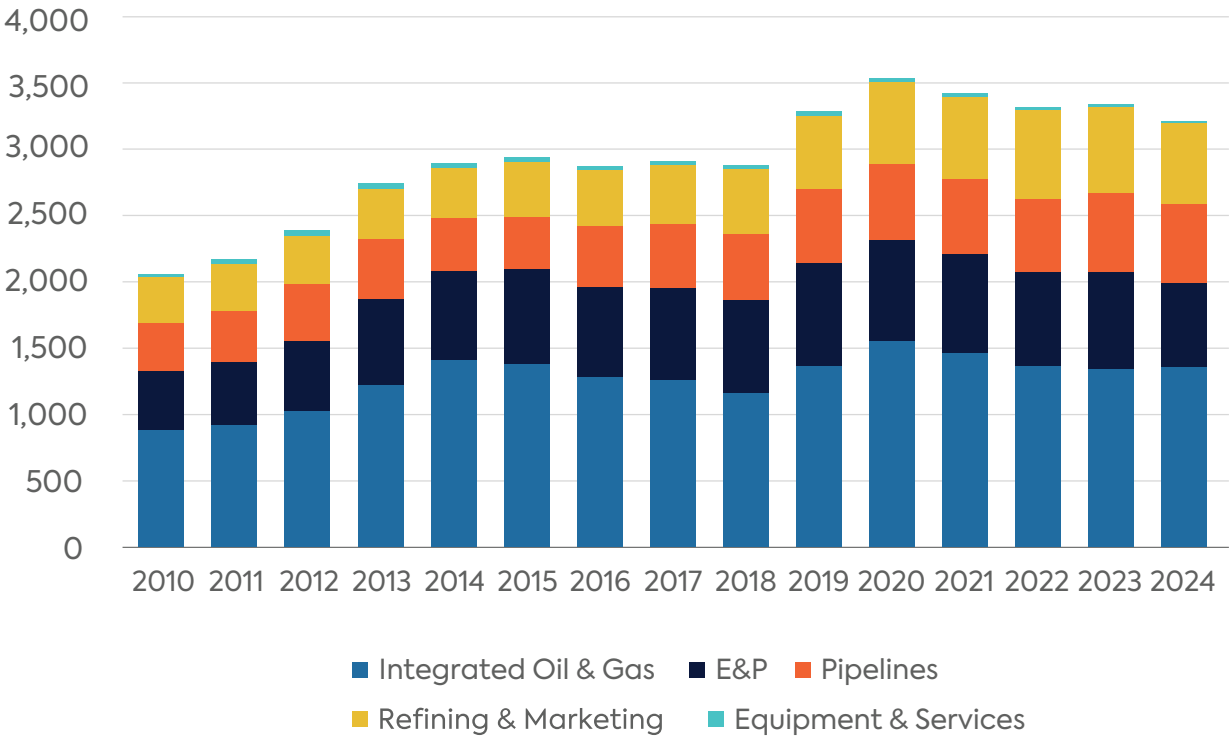
While fungibility and greenwashing risks certainly exist, and investors need to be vigilant about them, the likelihood that the instruments with features recommended in the Guidance are used for that purpose should be low for the reasons cited below, which are expanded in the sections that follow:

1. Regarding fungibility, the amount of funding needed for methane abatement in the time horizon through 2030 is quite small in the context of the total debt of the oil and gas sector. As such, it is unlikely to be the driver for increased oil and gas production. The risk can be further alleviated by adding, to the extent possible, methane abatement conditionality to any of the existing debt that is rolled over.
2. Regarding greenwashing, the oil and gas sector has been issuing green bonds and SLBs over the past few years, indicating that investors are willing to buy these bonds, provided they are structured credibly by targeting appropriate projects, activities, and KPIs accompanied by company-level climate goals. The technical recommendations and guardrails provided in the Guidance aim to reduce this risk for thematic bonds targeting methane abatement.

3.4.1 Funding Amount Needed Relative to Outstanding Debt

As mentioned at the outset, the total financing needed for methane abatement in the oil and gas sector is estimated to be between $100 and $200 billion. In comparison, the total debt—covering short-term and long-term bonds and loans of the sector—is around $3.2 trillion (Figure 7).

Figure 7: Total outstanding debt of global oil and gas companies (USD billion)



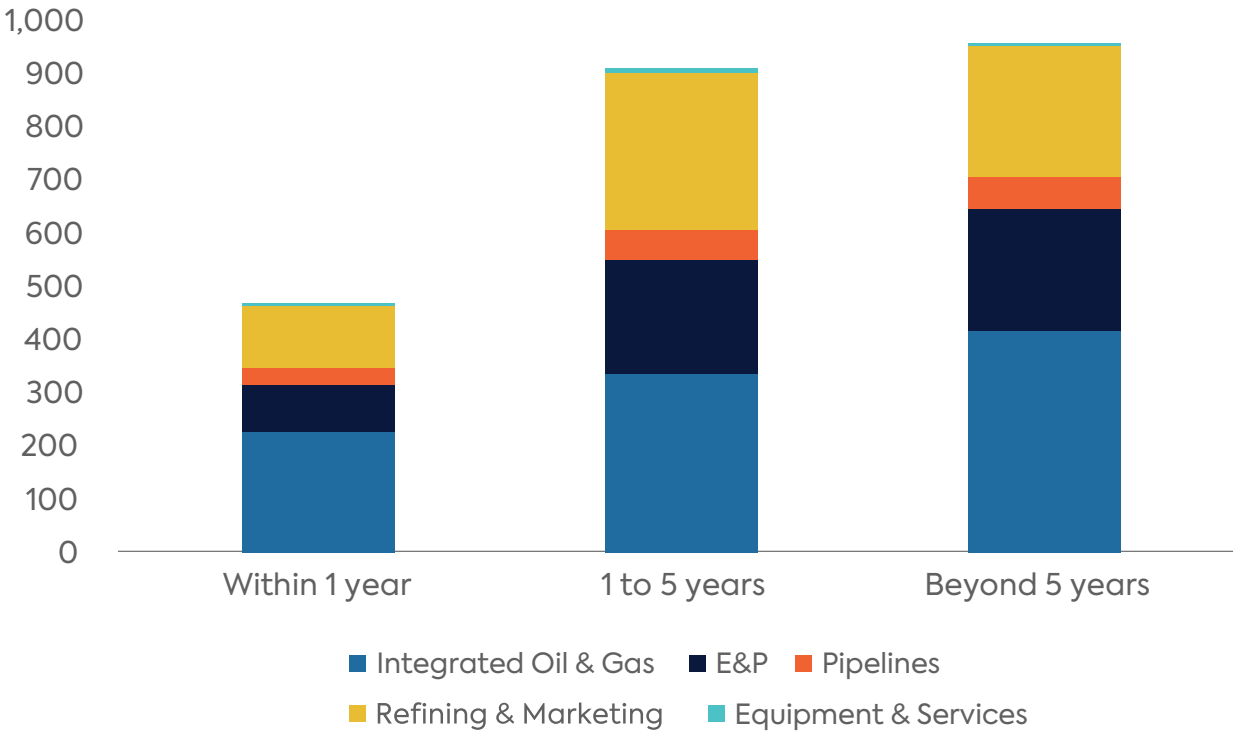
Note: The debt data is for the 3,000 oil and gas companies with the largest market caps as of November 2024.
Source: Bloomberg; data as of December 2024.

Although some individual companies could face difficulties in accessing additional financing, for the sector as a whole, the total capital that needs to be deployed for methane abatement financing is less than 6 percent of the outstanding debt. In other words, even if the entire estimated amount of $100–$200 billion needed for methane abatement is raised via debt, its impact on the sector's capital allocation strategy should not be material and unlikely to be the driver for increased oil and gas production.

The need for increased borrowing for methane abatement can be further diminished by attaching methane reduction requirements to some of the *existing* debt that is getting rolled over, either as conventional instruments with covenants (as discussed in Chapter 4) or thematic instruments (as described in the Guidance). Indeed, given how large the rollover amount is, no *new* debt needs to be raised to specifically target methane reduction. Of the $3.2 trillion outstanding debt for the oil and gas sector, data on maturity breakdown is available for companies with $2.3 trillion of debt outstanding. For the companies for which the breakdown is available, almost 60% of the debt

matures in under five years (Figure 8) or before the 2030 timeline used in the net-zero scenario for achieving a 75 percent reduction in methane emissions. At least some, if not most, of this maturing debt will likely be rolled over. There is thus an opportunity to attach methane abatement requirements, in new labeled or unlabeled debt, to as much of the bonds or loans being rolled over as possible. This is an important reason why this working paper suggests including methane abatement conditions in conventional instruments, as discussed in chapter 4, when labeled instruments are not viable either because of the lack of demand from investors or because it is not feasible for the capital seeker to issue these bonds.

Figure 8: Maturity profile of 70 percent of the outstanding debt of oil and gas companies with breakdown available (USD billion)



Note: Of the $3.2 trillion in outstanding debt for the oil and gas sector, maturity breakdown is available for $2.3 trillion, which is shown in this figure.

Source: Bloomberg; data as of December 2024.

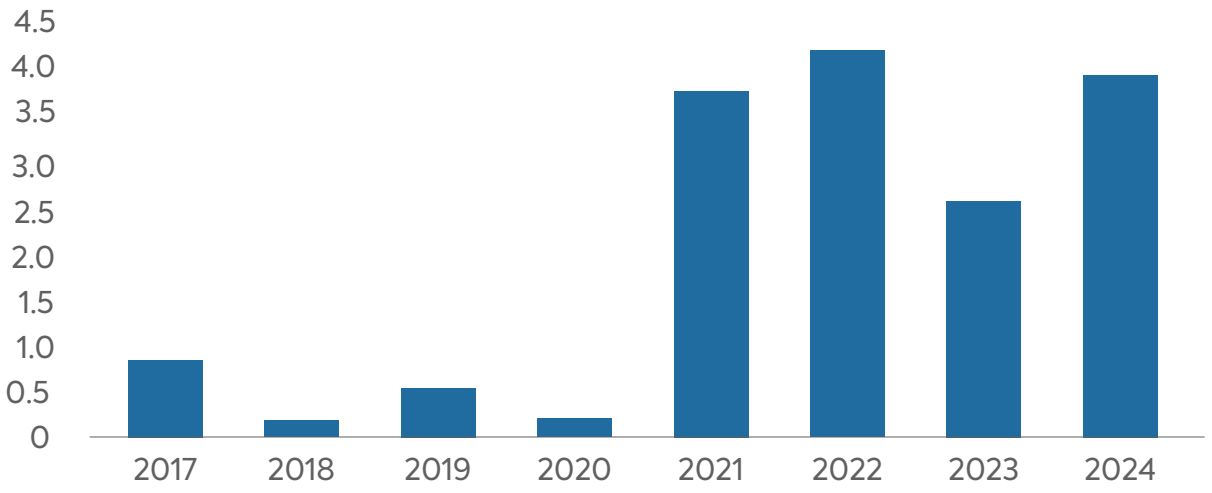
3.4.2 Thematic Bonds Issued by Oil and Gas Companies

The proposal for oil and gas companies to issue thematic bonds to finance methane abatement activities and projects is not entirely new. Many oil and gas companies have successfully issued thematic bonds, especially since 2021, albeit they have not targeted methane, except for one bond

that included reducing methane emission intensity among its KPIs. Nevertheless, previous issuances by the sector are important to analyze for the following reasons:

- A combination of companies working in upstream, midstream, and downstream sectors have successfully issued thematic bonds totaling almost $30 billion (Figures 9 to 12), with the SLBs issued by these companies making up over 3 percent of the total market, demonstrating acceptance by investors focused on sustainability. The total amount of issuance is quite small—both in the context of over $5 trillion in outstanding thematic bonds and $3.2 trillion in outstanding debt of oil and gas companies. Nevertheless, the issuance to date demonstrates that first, the concept of oil and gas companies issuing thematic bonds is not novel, and second, investors can get past their greenwashing concerns provided there is a credible sustainability framework that includes the company's climate goals together with well-defined and verifiable projects, activities, and KPIs.
- Even though methane emissions have not been the main target of these bonds, they provide a template for the types of projects and KPIs that are acceptable to issuers and investors. Moreover, the inclusion of methane intensity reduction in the climate targets that are a part of sustainable bond frameworks provides a roadmap to follow (Figures 13 to 16 in the appendix). Finally, the SLB that already includes a KPI linked to reducing methane emission intensity sets an important precedent, even though the bond also includes other KPIs, such as targeting overall GHG intensity. Indeed, the Methane Finance Working Group has taken this concept and strengthened the standards for KPI-linked and UoP instruments. This is a steep change in the level of ambition, verification, and emissions reductions compared with the thematic bonds issued thus far.

Figure 9: Use-of-proceeds bonds issued by oil and gas companies (USD billion)



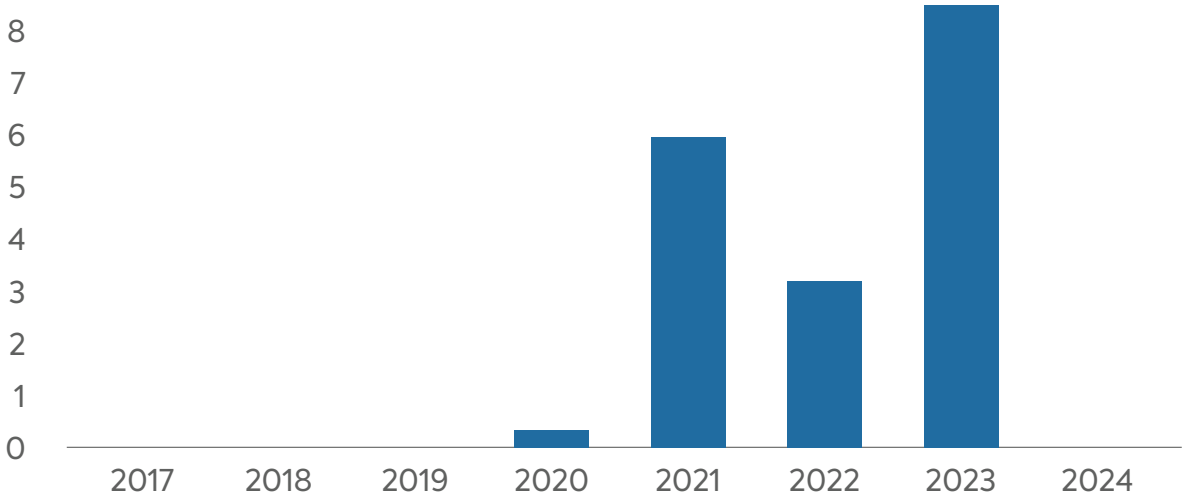
Source: Bloomberg; data as of November 2024.

Figure 10: Oil and gas companies that have issued UoP bonds, with sectors and amounts

Entity	Oil and gas sectors	UoP bond amt (USD mn)
Natural Petroleum and NG Pipeline Network	Midstream	$6,184
Neste Oyj	Downstream	$2,303
PetroChina Co Ltd	Upstream, Midstream, Downstream	$797
ORLEN SA	Downstream	$609
Repsol International Finance BV	Upstream, Midstream, Downstream	$560
SK Energy Co Ltd	Upstream, Midstream, Downstream	$416
China Petroleum & Chemical Corp	Upstream, Midstream, Downstream	$400
Oriental Energy Co Ltd	Downstream	$368
HD Hyundai Oilbank Co Ltd	Downstream	$360
Preem Holdings AB	Downstream	$358
SK Inc	Upstream, Midstream, Downstream	$289
Zhongram Investment Ltd Co	Downstream	$185
China Petrochemical Corp	Upstream, Midstream, Downstream	$168
ENEOS Holdings Inc	Upstream, Midstream, Downstream	$144
GS Energy Corp	Upstream, Midstream, Downstream	$116
GS Caltex Corp	Downstream	$111
CPC Corp/Taiwan	Upstream, Midstream, Downstream	$93
Inpex Corp	Upstream	$88
PTT PCL	Upstream, Midstream, Downstream	$63
S-Oil Corp	Downstream	$50
Total		**$13,662**

Source: Bloomberg; data as of November 2024.

Figure 11: KPI bonds issued by oil and gas companies (USD billion)



Source: Bloomberg; data as of November 2024.

Figure 12: Oil and gas companies that have issued KPI bonds, with sectors and amounts

Entity	**Oil and gas sectors**	**SLB bond amt** (USD mn)
Eni SpA	Upstream, Midstream, Downstream	$5,222
Enbridge Inc	Midstream	$5,121
Kinetik Holdings LP	Upstream, Midstream	$1,800
Repsol Europe Finance Sarl	Upstream, Midstream, Downstream	$1,477
ENEOS Holdings Inc	Upstream, Midstream, Downstream	$744
ORLEN SA	Downstream	$524
Solaris Midstream Holdings LLC	Midstream	$400
Tamarack Valley Energy Ltd	Upstream, Midstream, Downstream	$237
Ampol Ltd	Downstream	$105
Total		**$15,630**

Source: Bloomberg; data as of November 2024.

3.5 Conditions for a Sustainable Debt Market to Drive Methane Abatement

Several considerations, derived from the Methane Finance Working Group's discussions with capital providers in the FWG, could either enable or impede financing for methane abatement projects in the sustainable debt market. These include the adaptability of financial structures to diverse issuer needs, the clarity and simplicity of KPIs, the accuracy of baseline data, and the design of accountability mechanisms that prevent greenwashing. By addressing these factors, the market can create more effective and scalable solutions for methane abatement. Knowing this, these factors were incorporated into the detailed technical recommendations for KPI and UoP instruments provided in the Guidance.

The following sections expand on these considerations based on the FWG discussions:

- ***Establishing science-based consensus around technical recommendations:*** For securities marketed to institutional investors, the credibility of impact is essential. To build credibility, the Methane Finance Working Group developed technical guidelines using the expertise of the TWG, which is composed of engineers, climate experts, and methane specialists. The TWG developed recommendations for performance targets, performance indicators, qualifying activities, data quality, auditing, and verification.
- ***Providing flexibility given the heterogeneity of the sector:*** While methane targets and abatement activities remain consistent, the speed of implementation should be customized to match the absolute highest ambition that can be executed by an individual capital seeker. Because of the differences across companies, the Guidance provides flexibility to fit companies across a range of sizes (defined either by the equity market capitalization or production quantities), credit quality, governance arrangements, balance sheet considerations, technical capabilities, and liquidity. It's important to consider how to finance different companies across the sector, with the potential for pilot issuances from high-quality companies further along in their methane abatement pathway to kick-start a market so that issuers lagging in terms of methane emissions reductions can also eventually participate.
- ***Accommodating small companies to achieve a benchmark-sized bond:*** Achieving the benchmark size for a bond ~~ty~~typically, at least $500 million ~~to~~ fund methane abatement projects remains a key challenge, especially for UoP bonds of smaller companies. Methane abatement is one part of a company's scope 1 and 2 emissions reduction pathway. Frameworks for bonds, loans, and project finance can consider scaling their emission reduction programs to include other projects with meaningful scope 1 and 2 reductions. However, the allocation to projects

should be commensurate with the size of the methane emissions problem, and they should be approved as green by the second-party opinion provider. For smaller companies, including methane projects among other projects consistent with GHG reductions, could help a UoP bond reach benchmark size. Similarly, one approach for NOCs could be for the petrostate to issue a UoP sovereign bond that pairs methane abatement initiatives with infrastructure projects, such as captured gas power generation, which can easily scale the size of the capital program. These transactions would benefit from clear guardrails and assurances from methane abatement experts to ensure their scalability and success, which is the objective of the Guidance.

- ***Combining UoP and KPI components:*** Another potential solution to ensuring a benchmark-sized bond is to integrate UoP with KPI components, such as activity-linked KPIs evolving into emissions-linked KPIs (e.g., replacing 95 percent of pneumatic controllers). This approach addresses size and scale challenges in emerging market and developing economies' (EMDEs) bond issuance, simplifies verification processes, and enhances scalability. Drawing from utility markets that have adopted similar approaches, the focus should be on creating large, liquid, simple, and easily understandable instruments to maintain market appeal and avoid complicated structures.
- ***Ensuring simplicity and clarity in bonds:*** For bonds marketed to institutional investors, simplicity is essential. Developing clear and straightforward KPIs or minimum standards is also important for smaller companies and NOCs to enable the oil and gas sector to reduce methane emissions. This approach ensures financial instruments are accessible and attractive to issuers and investors alike, enhancing their market appeal.
- ***Overcoming data quality challenges with creative yet verifiable solutions:*** At present, methane emissions data quality remains unreliable. To overcome data quality issues, establishing credible baselines is crucial. Further, establishing a baseline should be concurrent with fixing leaks and inefficiencies. One suggestion is to set reduction targets without a fixed start date. For instance, a 70 percent emissions reduction target by 2030, based on the date baseline emissions are determined, would avoid penalizing companies for higher emissions identified because the accuracy of measurement methodologies improves over time. Keeping this in mind, the qualifying activities listed for UoP instruments (see the Guidance) can be easily translated into activity-based KPIs with easily auditable paper trails and ex-post verification.
- ***Identifying qualified standards and ensuring auditability:*** Establishing precise standards is necessary for ensuring auditability. Internal process adjustments may be required to align operational standards and provide a strong level of assurance. This could involve assessing a combination of quantitative and qualitative measures when verifying activity-based KPIs, ensuring transparency and consistency in the evaluation process.

- ***Tailoring accountability mechanisms:*** Adapting accountability mechanisms to different jurisdictions and company categories is crucial. A key part of the responsible allocation of capital is the governance assessment, especially in emerging market sovereigns and corporates. Hence, market perception of the credibility of the sovereign or the corporation will be key to determining the strength of accountability mechanisms needed for the issuance. Incentives such as coupon step-downs~~lo~~wering of interest payments~~in~~ KPI bonds, when the target is achieved, could benefit emerging market companies seeking cheaper capital but may not be suitable for investment-grade and developed market companies. However, coupon step-down mechanisms should not simply serve as a system for arbitraging cheaper pricing but rather reinforce the feedback loop for transition activities. The step-down process could be viewed as resetting rates to their original levels with safeguards in place. Accountability mechanisms could also include soft covenants, and because of the complexity of determining step-up rates, these mechanisms should remain flexible.

4. Considerations for Conventional Transactions to Drive Methane Abatement

Thematic bonds and loans are the preferred approaches to finance methane abatement, given the success of the asset class in supporting the energy transition due to the strong buy-in from investors and the rigorous governance, reporting, and external verification requirements built into their design. However, when labeled instruments are not feasible for a capital seeker to issue, this working paper[55] suggests including covenants or provisions targeting methane abatement in bonds, loans, and other conventional financial instruments.[56] In other words, if issuing a sustainable bond or loan is not a viable option, an alternative might be to attach conditionalities to conventional instruments for lowering methane emissions. This is particularly relevant given that the oil and gas sector currently has more than $3 trillion of outstanding debt. Of this, for companies with $2.3 trillion of debt for which maturity breakdown is available, 60 percent is coming due before 2030. At least some if not most of which is likely to be rolled over (Figure 8).

Before exploring how these types of conditionalities could work with conventional instruments, the next section presents some of the challenges and opportunities of pursuing methane objectives through conventional finance.

4.1 Investors' Views on Including Methane Abatement in Conventional Instruments

Below are some of the highlights from the FWG roundtable discussions on introducing methane abatement conditionalities into conventional transactions:

1. ***An agnostic financial structure will develop the foundation for more bespoke transactions and allow for more flexible governance to support a variety of issuers.*** By integrating elements from both KPI-linked transactions and UoP structures into covenants, methane abatement goals can be more widely adopted into transactions while also unlocking the potential for methane abatement financing at the sovereign level. This is important because while the use of thematic instruments has grown rapidly in recent years, they still represent less than 3 percent of annual global bond issuances.[57]
2. ***Covenants in existing bond indentures are often too restrictive, suggesting the need for soft***

covenants. During the discussion, the need for potentially less punitive covenants that could be adapted for methane abatement came up. The penalty for not meeting a covenant can be quite harsh, as it typically results in the acceleration of the principal payment. The investors and other FWG participants broadly agreed that such a condition is too extreme for not meeting methane abatement targets and argued for milder penalties similar to KPI-linked instruments in which the penalty amounts to a small increase in interest payments if a predetermined target is not met. A harsh penalty would dissuade a capital seeker from including such a covenant in a bond or loan indenture in the first place, defeating the goal of meeting the methane reduction target by 2030.

3. ***Before including methane commitments in unlabeled transactions with soft covenants or provisions, several limitations need to be addressed.*** Limitations include the absence of proper accounting methods and reliable measurements of methane emissions, which raises the risk of greenwashing and could undermine investor confidence. Additionally, a key challenge for the soft covenant approach is the lack of clarity regarding the institutional framework necessary for credible reporting and execution of methane abatement efforts. Some capital providers opined that if there were intentions to include any methane pledges or conditions into a bond indenture, it might be better to aspire for the preferred option of a sustainability-linked format, given the attached measurement, reporting, and verification requirements.

4. ***It is paramount to address methane provisions, regardless of whether the transaction is labeled or unlabeled, by establishing a clear process for assessing current methane emissions and developing a mitigation plan with a qualified third party.*** Targets should be set, with or without funding, to demonstrate additionality when it comes to emission reductions, whether related to methane or otherwise. Oil and gas companies' methane abatement commitments could be used to screen transactions to ensure that the financing provided aligns with climate goals under NZE scenarios.

5. ***A possible solution to make conventional transactions more effective in methane abatement is to pair funding with technical assistance*** aimed at reducing methane emissions. Detecting and measuring methane emissions remains a significant challenge ~~es~~especially for NOCs and independent E&Ps ~~w~~which influences how KPI targets are set and how financial incentives are structured. A transaction structure that supports this incentive should create a win-win scenario for both capital seekers and providers, ensuring alignment of goals and outcomes.

6. ***Engagement policies could complement covenants or provisions in unlabeled transactions.*** Directly engaging with oil and gas companies offers an alternative for capital seekers to demonstrate leadership by ensuring that methane reduction targets are followed through. To be clear, though, they should not be seen as a substitute for labeled transactions.

7. ***Capital seekers that have set and publicly disclosed methane reduction targets in their annual reports could integrate these targets into their capital structures***, aligning all forms of financing with methane abatement efforts.

Based on investor feedback, therefore, a prudent step would be to provide guidelines for conditions covering methane emission reductions that can be attached to debt rollovers. Two possible approaches ~~n~~either of which has been implemented in any bond transaction thus far ~~c~~an be taken to link methane abatement to conventional finance transactions.

1. **Requiring pre-issuance conditions** that the capital seeker would need to meet, followed by detailed disclosures once the bond is issued and/or
2. **Including covenants or provisions in bonds and loans** that target methane reduction.

The following sections examine these two approaches in more detail and provide high-level examples of how they could work in practice.

4.2 Pre-Issuance Methane-Related Conditions

As mentioned earlier, if a conventional transaction is the only available option, then one approach to reducing methane emissions could be to attach pre-issuance conditions. Specifically, a prerequisite to issuance could be to condition lending to a set of activities or steps that need to be taken that embed methane abatement into the capital seekers' corporate practices. One such activity is becoming a member of one or more of the global methane initiatives listed in Figure 4 in Chapter 2, with a particular preference for the OGMP 2.0. This type of conditionality could center not only on pledges to reduce methane emissions as part of such membership but also on reporting requirements and alignment that are part of any of the existing voluntary corporate or national initiatives.

The UoP guidelines incorporate a list of key national-level methane initiatives, which include membership to OGMP 2.0,[58] Zero Routine Flaring by 2030 (ZRF) Initiative,[59] OGCI Aiming for Zero Methane Emissions,[60] OGDC,[61] and the Global Methane Pledge. Such membership requirements could also include reporting on methane emissions to investors if not already disclosed; for example, under the technical guidance of OGMP 2.0, asset or basin-level reporting on methane emissions is often not publicly disclosed to investors, only top-line corporate numbers.[62]

The suggested pre-requirements are in line with those required by the World Bank's GFMR, which includes measuring and reporting emissions through the OGMP 2.0 framework, achieving near-zero absolute methane emissions by 2030 by reducing methane intensity to below 0.2 percent, and achieving zero routine flaring by 2030.[63]

4.2.1 Best Practices for NOCs to Communicate Ambition

The UoP recommendations (see the Guidance) also suggest a couple of actions that NOCs, in particular, could take. These include incorporating methane reduction targets into sustainability reporting commitments for the NOCs that currently have not done so, particularly those not listed on stock exchanges.

Since methane abatement action in EMDEs requires alignment with the shareholder government, the best path forward ~~p~~particularly for engaging with capital providers ~~is~~ to align sovereign borrowing with the action of the NOC on methane. Specifically,

1. When an NOC does not borrow directly from the market, investors should seek to incorporate methane-related KPIs for the oil and gas sector into the sovereign's SLBs. The KPI-linked taxonomy in the Guidance covers sustainability performance targets consistent with a sovereign's sustainable development policies.
2. Multilateral, regional, and national development banks should explore lending facilities tied to methane abatement or sustainability-linked loans for methane action across the economy, including the oil and gas sector.
3. Methane emission reduction targets should be incorporated into the NDCs of sovereigns, especially those with NOCs.
4. While some of the initiatives cited, such as OGDC, include many NOCs, they still cover companies responsible for less than 50 percent of the oil produced globally (see Figure 4). Any type of lending to sovereigns represents an opportunity to condition issuance or refinancing to membership in any of the different voluntary methane reduction initiatives cited earlier if the sovereign is not yet a member.

4.3 Incorporating a Methane Abatement Covenant or Provision

Covenants and lending provisions can be used to incorporate methane emissions reporting and abatement requirements into a bond or loan indenture. Covenants are legally binding agreements reached between lenders and borrowers, which clearly outline what an issuer can or cannot do. They are typically meant to protect investors from the issuer overextending itself while allowing the issuer to run its business without undue restrictions.[64] As such, covenants are commonly used in bond issuance to regulate certain actions, such as paying dividends, incurring debt, and entering into a transaction with an affiliate. Historically, covenants have not encompassed climate-related clauses, and the suggestion in this working paper to do so is still untested.

Nevertheless, since climate can be a major financial risk to businesses, some investors have started proposing that climate provisions be included as covenants in unlabeled debt.[65] Some of these suggestions include requiring climate reporting linked to the issuer's transition plan, barring investments in high-emission businesses with transition risks, restricting new emission-intensive lines of business, capping nongreen capital expenditures, and limiting the change of control to high-emitting companies with no transition plans, among others. The same covenants can be tailored to specifically target methane abatement as well.

Reporting covenants, for example, are standard in many corporate bonds. While reporting covenants have been typically used for requiring the publication of timely financial information, they could be modified to include methane reporting and even linked to some of the KPIs proposed in the Guidance. These types of reporting covenants are particularly useful in the case of NOCs since these bonds are generally not registered with the SEC. Moreover, many NOCs are 100 percent owned by their governments and thus are not listed on stock exchanges, avoiding the reporting requirements of listed oil and gas companies. Other covenants that could be adapted for methane abatement include restricting investments in oil and gas assets or mergers with companies that do not include methane abatement plans.[66]

Besides covenants in bonds, methane abatement provisions can be incorporated into any type of financing structure between a bank or lending institution and an oil and gas capital seeker. The Methane Finance Working Group's goal is to make methane provisions the norm in any kind of lending facility.

The following are reasons why lending provisions in conventional transactions can represent a particularly promising route for methane action:

1. ***Bespoke structures:*** Specific methane solutions and requirements can be tailored to the methane challenges of the capital seeker.
2. ***Monitoring:*** Frequency and evaluation of progress can be built into the lending facility.
3. ***Flexibility:*** Lending provisions can more easily incorporate penalties and rewards for methane action than bond covenants since the former is typically negotiated bilaterally, unlike the latter.
4. ***Engagement with the capital seeker*** can be more targeted to a result-driven approach based on the provisions of the lending agreement.[67]

One of the complications of including covenants or provisions linked to methane abatement is the attached penalty for not meeting the legally enforceable conditions for issuing the debt. As mentioned earlier, not meeting covenants and provisions typically results in harsh penalties,

including a technical default, which seems quite extreme in the context of methane abatement and unlikely to be adopted by capital seekers. However, there are examples of high-yield bonds with softer penalties. For instance, not meeting a covenant can result in restrictions on a company's ability to secure future debt with company assets ("limitation on liens"), not exceeding a specified leverage ratio ("limitation on indebtedness"), and limiting cash outflows, including dividends, acquisitions, and investments by the company ("limitation on restricted payments").[68] Similar softer penalties for noncompliance—such as a small increase in interest payments in line with KPI-linked instruments—would be appropriate when targeting methane emission reductions and would align with the objective of the Methane Finance Working Group.

Appendix: Features of SLBs and Green Bonds Issued by Selected Oil and Gas Companies

Figure 13: Characteristics of SLBs issued by oil and gas companies

	Headquarters	Oil and gas sector	Long term climate goals	Medium term climate goals	Amount issued (USD mn)	Second party opinion	Annual post-issuance review
Enbridge	Canada	Transporting crude oil, natural gas, and natural gas liquids	2050	2050: Reduce methane emissions across value chains by 1% or less 2030: 35% GHG emissions intensity reduction vs 2018	5,121	ISS ESG	Limited assurance
Eneos	Japan	E&P, manufacture and sale of petroleum products	2040	2030: 46% GHG absolute emissions reduction for Scope 1 and 2 vs 2013	744	Japan Credit Rating Agency	None
Eni	France	E&P, refining of petroleum products	2050	2050: near zero methane emissions, net zero upstream business (Scope 1 and 2) 2030: net zero throughout group (Scope 1 and 2)	5,222	Moody's Investor's Service	Limited assurance

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	Headquarters	Oil and gas sector	Long term climate goals	Medium term climate goals	Amount issued (USD mn)	Second party opinion	Annual post-issuance review
Kinetik	United States	Production, transportation, storage, and distribution of natural gas	2050	2030: 30% methane emissions intensity reduction (Scope 1 and 2), 35% GHG emissions intensity reduction (Scope 1 and 2) vs 2021	1,800	ISS ESG	Limited assurance
Repsol	Spain	E&P, refining, distribution of natural gas	2050	2050: Reduce methane intensity to 0.2% in E&P operated assets 2030: 30% net emissions reduction for Scope 1, 2, and 3 vs 2016	1,477	ISS ESG	Limited assurance
Tamarack Valley Energy	Canada	E&P	none	2050: 40% methane-specific emissions intensity reduction vs 2020, 39% corporate emissions intensity reduction (Scope 1 and 2) vs 2020	237	S&P Global Ratings	Limited assurance

Note: Highlighted cells cover methane-related goals.
Source: Compilation of company and third-party reports.

Figure 14: KPIs and SPTs of SLBs issued by oil and gas companies

	KPI 1	KPI 2	KPI 3	KPI 4	SPT 1	SPT 2	SPT 3	SPT 4
Enbridge	Emissions Intensity Reduction (Scope 1 and 2)	Represen-tation of racial and ethnic diversiy as % work-force	Women on baord of directors	None	Reduce KPI 1 by 35% by 2030 vs 2018 baseline	Achieve KPI 2 by 28% represen-tation in workforce by 2025 vs 2018 base-line	Achieve KPI 3 by 40% of female represen-tation on the Board of Directors by 2025	None
Eneos	Net CO_2 emission of the ENEOS Group (Scope 1 and 2)	None	None	None	Reduce KPI 1 by 46% by 2030 vs 2013 baseline	Achieve net zero for KPI 1 by 2040	None	None
Eni	Renewable Installed Capacity (Eni share)	Net Carbon Footprint Upstream (Scope 1 and 2)	NET GHG Lifecycle Emissions (Scope 1,2, and 3)	Net Carbon Intensity (Scope 1, 2, and 3)	Achieve KPI 1 with 5 GW by 2025, 5.25 GW by 2026 and 11 GW by 2030 vs 2021 baseline	Reduce KPI 2 by 50% by 2024, 65% by 2025, and 100% by 2030 vs 2018 baseline	Reduce KPI 3 by 35% by 2030, 55% by 2035, 80% by 2040, and 100% by 2050 vs 2018 baseline	Reduce KPI 4 by 15% by 2030, 50% by 2040, and 100% by 2050 vs 2018 baseline
Kinetik	Green-house Gas Emissions Intensity	Methane Emissions Intensity	Female Represen-tation in Corporate Officer Positions	None	Reduce KPI by 35% by 2030 vs 2021 baseline	Reduce KPI 2 by 30% by 2030 vs 2021 baseline	Increase KPI 3 rep-resentation to 30% by 2026 vs 2021 baseline	None

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	KPI 1	KPI 2	KPI 3	KPI 4	SPT 1	SPT 2	SPT 3	SPT 4
Repsol	Geren-house Gas Emissions Intensity	Absolute Scope 3 Greenhouse Gas Emission	Percentage of women in senior leadership roles	None	Reduce KPI by 15% for Scope 1, 2, and 3 by 2025 vs 2016 baseline	Reduce KPI by 28% for Scope 1, 2, and 3 by 2025 vs 2020 baselines	Reduce KPI 1 by 55% for Scope 1, 2, and 3 by 2040 vs 2016 baseline	None
Tamarack Valley Energy	Gerenhouse Gas Emissions Intensity (Scope 1 and 2)	Indigenous Represen-tation as Percentage of Work-force	None	None	Reduce KPI 1 by 39% by 2025 vs 2020 baseline	Increase KPI 2 reprenta-tion to 6% by 2025 vs 2020 baseline	None	None

Note: Highlighted cells cover methane-related targets.
Source: Compilation of company and third-party reports.

Figure 15: Characteristics of UoP bonds issued by oil and gas companies

	Headquarters	Oil and gas sector	Long term climate goals	Medium term climate goals	Amount issued (USD mn)	Second party opinion	Annual post-issuance review
Cosmo Energy	Japan	IOC	2050	2030: 30% absolute GHG emissions reduction for Scope 1 & 2 vs 2013	65	R&I	None
Eneos	Japan	E&P	2040	2030: 46% GHG absolute emissions reduction for Scope 1 and 2 vs 2013	144	DNV	None
GS Energy	South Korea	E&P	2050	2040: 40% absolute GHG emissions reduction vs 2018	227	KPMG	None
Inpex	Japan	E&P 2050	2050	2030: zero routine flaring, maintain methane emissions intensity at 0.1%, >= 30% net carbon intensity emissions reduction for Scope 1 and 2 vs 2019	88	DNV	Yes, did not specify level of assurance
Neste Oyj	Finland	Refining and Marketing	2035	2030: 50% absolute GHG emissions reduction for Scope 1 and 2 vs 2019	2,303	S&P Global Ratings	Limited assurance
Orlen	Poland	IOC (Production, Processing, and Power Generation and Distribution)	2050	2030: zero routine flaring, zero methane venting, 25% absolute GHG emissions reduction for Scope 1 and 2 vs 2019	609	Vigeo Eiris	Limited assurance

	Headquarters	Oil and gas sector	Long term climate goals	Medium term climate goals	Amount issued (USD mn)	Second party opinion	Annual post-issuance review
Preem	Sweden	Refining and Marketing	2035	None	358	Cicero	Limited assurance
PTT	Thailand	E&P	2040: carbon neutral 2050: net zero	2030: 15% absolute GHG emissions reduction vs 2020	63	DNV	Yes, did not specify level of assurance
Repsol	Spain	E&P, Refining Distribution and Marketing, Petrochemicals	2050	2025: Reduce methane intensity to 0.2% in E&P operated reduction 2030: 30% net emissions reduction for Scope 1, 2, and 3 vs 2016	560	Vigeo Eiris	Yes, did not specify level of assurance
SK Innovation	South Korea	E&P, manufacture ans sale of petroleum products	2050	2030: 50% absolute carbon emissions reduction for Scope 1 and 2 vs 2019	705	Cicero	None
Tokyo Gas	Japan	E&P	2040: 50% carbon neutrality in gas 2050: net zero	2030: 20% absolute CO_2 emissions reduction vs 2022	96	DNV	Yes, did not specify level of assurance
China Petroleum (Sinopec)	China	E&P, Refining Distribution and Marketing of Petrochemicals	2050	2025: 50% methane intensity reduction vs 2020 2030: carbon peaking emisions by the date	569	No public frame-work	No public framework

Note: Highlighted cells cover methane-related targets. Source: Compilation of company and third-party reports.

Figure 16: Projects covered by UoP bonds issued by oil and gas companies

	UoP 1	UoP 2	UoP 3	All other use-of-proceeds projects	Environmental exclusions	Other exclusions
Cosmo Energy	Renewable Energy	Clean Transportation	Power Storage for Renewable Energy	CCUS, Pollution Prevention and Control; Env Adapted Products	None	None
Eneos	Renewable Energy	None	None	None	None	None
GS Energy	Pollution Prevention and Control	Sustainable Water Management	Energy Efficiency	None	None	None
Inpex	Renewable Energy	None	None	None	None	None
Neste Oyj	Eco-efficient and circular economy adapted projects	Renewable Energy	None	None	Fossil fuel refining or fossil-based feedstocks	None
Orlen	Renewable Energy	Clean Transportation	Pollution Prevention and Control	None	Fossil fuel refinining and/ or fossil-fuel technology	None
Preem	Eco-efficient and circular economy adapted projects	Renewable Energy	Energy Efficiency	None	Must have net positive impact and not threaten biodiversity	Violate human rights under UN conventions

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	UoP 1	UoP 2	UoP 3	All other use-of-proceeds projects	Environmental exclusions	Other exclusions
PTT	Reforeatation Projects	None	None	None	None	None
Repsol	Energy Efficiency	Low Emission Technologies	None	None	Exploration of new oil and gas resources or reserves	None
SK Innovation	Low Carbon Transportation	Energy Efficiency	Green Building	None	Fossil-fuel related activities	None
Tokyo Gas	Renewable Energy	None	None	None	Harm to the environment	Corporate governance and social issues, e.g. human rights
China Petroleum (Sinopec)	Renewable Energy	CCUS	None	None	No public framework	No public framework

Source: Compilation of company and third-party reports.

Notes

1. UNEP, "Facts About Methane," https://www.unep.org/explore-topics/energy/facts-about-methane.
2. Core Writing Team, Hoesung Lee, and José Romero, eds., "Climate Change 2023 Synthesis Report: Summary for Policymakers," 2023, Intergovernmental Panel on Climate Change, pp. 1–34, https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf.
3. "Global Methane Tracker 2024," International Energy Agency, March 2024, https://www.iea.org/reports/global-methane-tracker-2024.
4. Ibid.
5. "Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions," United Nations Environment Programme, May 6, 2021, https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions.
6. "Oil & Gas Decarbonization Charter Launched to Accelerate Climate Action," COP28, December 2, 2023, https://www.ogdc.org/wp-content/uploads/2024/03/COP28-OG-Decarbonization-Charter.pdf .
7. GFMR focuses on providing grant funding, technical assistance, policy and regulatory reform advisory services, institutional strengthening, and mobilizing financing to support action by governments and operators, thereby jump-starting the deployment of flaring and methane reduction solutions. See GFMR's website: https://www.worldbank.org/en/programs/gasflaringreduction/brief/ggfr-to-evolve-to-the-global-flaring-methane-reduction-partnership.
8. "The Oil and Gas Industry in Net Zero Transitions," International Energy Agency, November 2023, https://www.iea.org/reports/the-oil-and-gas-industry-in-net-zero-transitions.
9. "Emissions from Oil and Gas Operations in Net Zero Transitions," International Energy Agency, May 2023, https://www.iea.org/reports/emissions-from-oil-and-gas-operations-in-net-zero-transitions.
10. "The Imperative of Cutting Methane from Fossil Fuels," International Energy Agency, October 2023, p. 3, https://www.iea.org/reports/the-imperative-of-cutting-methane-from-fossil-fuels.

11. "The Oil and Gas Industry in Net Zero Transitions," International Energy Agency, November 2023, https://www.iea.org/reports/the-oil-and-gas-industry-in-net-zero-transitions.

12. "Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach," International Energy Agency, September 2023, p. 108, https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach.

13. "Global Stocktake," COP28, December 12, 2023, https://unfccc.int/sites/default/files/resource/cma2023_L17_adv.pdf.

14. McKinsey estimates that existing technology can abate 80 to 90 percent of total upstream emissions today. See Gustaw Szarek et al., "The True Cost of Methane Abatement: A Crucial Step in the Oil and Gas Decarbonization," McKinsey, November 2024, https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-true-cost-of-methane-abatement-a-crucial-step-in-oil-and-gas-decarbonization.

15. "Global Methane Tracker 2024," International Energy Agency, March 2024, https://www.iea.org/reports/global-methane-tracker-2024.

16. Methane emissions from fossil fuels stood around 120 metric tons in 2023, unchanged since 2019, with the oil and gas sector representing about 2/3. See "Methane Emissions from Energy, 2000–2023," International Energy Agency, March 2024, https://www.iea.org/data-and-statistics/charts/methane-emissions-from-energy-2000-2023.

17. "Barriers and Solutions to Scaling-Up Methane Finance," Clean Air Task Force, June 2023, https://www.catf.us/resource/barriers-solutions-scaling-up-methane-finance/.

18. IEA (2025), Global Methane Tracker 2025, IEA, Paris https://www.iea.org/reports/global-methane-tracker-2025.

19. "Global Methane Tracker 2023," International Energy Agency, February 2023, https://www.iea.org/reports/global-methane-tracker-2023.

20. McKinsey's recent assessment of $200 billion of investment toward methane abatement (which includes flared gas) by 2030 assumes $80 billion in technological and operational excellence to reduce methane leakage and flaring. However, McKinsey estimates about $120 billion in additional investments at the upstream level to build new infrastructure to evacuate the associated gas recovered. See Gustaw Szarek et al., "The True Cost of Methane Abatement: A Crucial Step in the Oil and Gas Decarbonization," McKinsey, November 2024, https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-true-cost-of-methane-

abatement-a-crucial-step-in-oil-and-gas-decarbonization.

21. Financing flows for overall methane abatement increased by 18 percent in 2022, but only around $11 million were identified as methane finance in the fossil fuels industry, less than 1 percent of the methane financed tracked. (This amounted to only two methane finance transactions.) See Pedro de Aragão Fernandes et al., "Landscape of Methane Abatement Finance 2023," Climate Policy Initiative, November 30, 2023, https://www.climatepolicyinitiative.org/publication/landscape-of-methane-abatement-finance-2023/.

22. Pedro de Aragão Fernandes et al., "Landscape of Methane Abatement Finance 2023," Climate Policy Initiative, November 30, 2023, https://www.climatepolicyinitiative.org/publication/landscape-of-methane-abatement-finance-2023/.

23. This is according to OGMP 2.0, which refers to the "near-zero" emission intensity of the Oil and Gas Climate Initiative collective average target for upstream operations of 0.25 percent by 2025.

24. For a discussion about oil and gas demand under different decarbonization scenarios, including NZE, see "World Energy Outlook 2024," International Energy Agency, October 2024, https://www.iea.org/reports/world-energy-outlook-2024.

25. "The Imperative of Cutting Methane from Fossil Fuels," International Energy Agency, October 2023, https://www.iea.org/reports/the-imperative-of-cutting-methane-from-fossil-fuels.

26. Ibid.

27. The IEA estimates cumulative spending requirements of about $600 billion for decarbonizing oil and gas operations between 2022 and 2030 in line with NZE scenarios. Such decarbonization measures include methane abatement; eliminating nonemergency flaring; electrifying upstream facilities with low-emission electricity; equipping oil and gas processes with carbon capture, utilisation and storage; and expanding low-emission electrolysis in refining.

28. Conventional estimates of methane emissions from gas flaring assume a "methane destruction efficiency" of 98 percent, which means that 98 percent of the methane in the flare gas stream is combusted and converted to carbon dioxide and water, and 2 percent of the methane is directly released into the atmosphere unburned. They also assume that flares are lit and operating properly all the time. The World Bank argues that if the effective destruction efficiency of flares is just 1 percent lower (97 percent rather than 98 percent), the resulting methane emissions would increase by 50 percent,

and "if the effective destruction efficiency is 4 percent lower (94 percent), the methane emissions from gas flaring would be triple conventional estimates." See "Global Gas Flaring Tracker Report," World Bank, June 20, 2024, p. 16, https://thedocs.worldbank.org/en/doc/d01b4aebd8a10513c0e341de5e1f652e-0400072024/original/Global-Gas-Flaring-Tracker-Report-June-20-2024.pdf.

29. The NZE assumes that the global average methane intensity of natural gas supply falls from around 1.4 percent in 2022 to 0.5 percent in 2030 and 0.1 percent in 2050; for oil, the methane emissions intensity falls from 1.3 percent in 2022 to 0.3 percent in 2030 and 0.05 percent in 2050.

30. These estimates are based on oil and gas companies that currently have net-zero targets, including scope 1, 2, and 3 emissions, as reported by Bloomberg data and their reported production data as of 2024, also based on Bloomberg and accessed in November 2024.

31. "World Bank Steps Up Efforts to Address Methane Emissions," World Bank, December 4, 2023, https://www.worldbank.org/en/news/factsheet/2023/12/04/world-bank-steps-up-efforts-to-address-methane-emissions.

32. "Eyes on Methane," United Nations Environment Programme, November 2024, p. 11, https://www.unep.org/resources/eye-methane-2024.

33. "Financing Reductions in Oil and Gas Methane Emissions," International Energy Agency, 2023, https://www.iea.org/reports/financing-reductions-in-oil-and-gas-methane-emissions.

34. Gianni Lorenzato et al., "Financing Solutions to Reduce Natural Gas Flaring and Methane Emissions," World Bank, March 28, 2022, https://www.worldbank.org/en/programs/gasflaringreduction/publication/financing-solutions-to-reduce-natural-gas-flaring-and-methane-emissions.

35. "Climate Transition Finance Handbook," International Capital Market Association, 2023, https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/climate-transition-finance-handbook/.

36. "Climate and Sustainability Awareness Bonds," European Investment Bank, 2018, https://www.eib.org/en/investor-relations/cab/index.htm.

37. Patrice Cochelin, Bryan Popoola, and Emmanuel Volland, "Sustainable Bond Issuance to Approach $1 Trillion in 2024," S&P Global Ratings, February 13, 2024, https://www.spglobal.com/_assets/documents/ratings/research/101593071.pdf.

38. Gautam Jain, "Thematic Bonds: Financing Net-Zero Transition in Emerging Market and Developing Economies," Center on Global Energy Policy, Columbia University, December 12, 2022, https://www.energypolicy.columbia.edu/publications/thematic-bonds-financing-net-zero-transition-emerging-market-and-developing-economies/.

39. Ibid.

40. "Green Bond Principles," International Capital Market Association, June 2021, https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/ and "Sustainability-Linked Bond Principles," International Capital Market Association, June 2020, https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slbp/.

41. "EU Taxonomy for Sustainable Activities," European Commission, accessed December 2024, https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en.

42. "Certification Under the Climate Bonds Standard," Climate Bonds Initiative, accessed December 2024, https://www.climatebonds.net/certification.

43. "Barriers and Solutions to Scaling-Up Methane Finance," Clean Air Task Force, June 2023, https://www.catf.us/resource/barriers-solutions-scaling-up-methane-finance/.

44. Luisa Palacios and Catarina Vidotto Caricati, "Assessing ESG Risks in National Oil Companies: Transcending ESG Ratings with a Better Understanding of Governance," Center on Global Energy Policy, Columbia University, May 18, 2023, https://www.energypolicy.columbia.edu/publications/assessing-esg-risks-in-national-oil-companies-transcending-esg-ratings-with-a-better-understanding-of-governance/.

45. Ibid.

46. Ibid.

47. Andrew Howell and Pavel Laberko, "Can Investors Spur National Oil Companies Toward Methane Action?" World Economic Forum, July 2024, https://www.weforum.org/stories/2024/07/can-investors-spur-national-oil-companies-toward-methane-action/.

48. Stephanie Saunier and Torleif Haugland, "Methane Action at National Oil Companies: A Call for Ambitious Methane Reduction Targets," Environmental Defense Fund, March 24, 2024, https://business.edf.org/wp-content/blogs.dir/90/files/Methane-Action-at-NOCs_March-24.pdf and Andrew Howell and Pavel Laberko, "Can Investors Spur National Oil Companies

Toward Methane Action?" World Economic Forum, July 2024, https://www.weforum.org/stories/2024/07/can-investors-spur-national-oil-companies-toward-methane-action/.

49. "The Oil and Gas Industry in Net Zero Transitions," International Energy Agency, November 2023, https://iea.blob.core.windows.net/assets/f065ae5e-94ed-4fcb-8f17-8ceffde8bdd2/TheOilandGasIndustryinNetZeroTransitions.pdf.

50. Gautam Jain and Luisa Palacios, "Investing in Oil and Gas Transition Assets En Route to Net Zero," Center on Global Energy Policy, Columbia University, March 2, 2023, https://www.energypolicy.columbia.edu/publications/investing-in-oil-and-gas-transition-assets-en-route-to-net-zero/.

51. Andrew Baxter, Annika Squires, and Clare Staib-Kaufman, "Shared Duty: National, International Oil Companies Bound Together by Methane Obligations," Environmental Defense Fund, accessed December 2024, https://business.edf.org/wp-content/blogs.dir/90/files//EDF-Shared-Duty-JV-IOC-NOC.pdf.

52. "Oil and Gas Industry: A Research Guide," Library of Congress, accessed December 2024, https://guides.loc.gov/oil-and-gas-industry/companies.

53. Bradford J. Sandler et al., "Distressed Investor Considerations in E&P Oil and Gas Restructurings," 2020, https://www.pszjlaw.com/wp-content/uploads/2020/07/564_Distressed-Investor-Considerations-in-E_P-Oil-and-Gas-Restructurings.pdf.

54. Saud Al-Fattah, "The Role of National and International Oil Companies in the Petroleum Industry," United States Association for Energy Economics, July 28, 2013, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2299878.

55. This chapter lays out a broad framework for incorporating covenants and provisions in conventional instruments, but more work needs to be done in this space for it to be included in the Guidance, as it is currently not.

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57. Gautam Jain, "A Potential Path for Alleviating Currency Risk in Emerging Market Green Bonds," Center on Global Energy Policy, Columbia University, September 7, 2023, https://www.energypolicy.columbia.edu/publications/a-potential-path-for-alleviating-currency-risk-in-emerging-market-green-bonds/.

58. "The Oil & Gas Methane Partnership 2.0," Oil and Gas Methane Partnership 2.0, accessed December 2024, https://ogmpartnership.com/.

59. "Zero Routine Flaring by 2030 (ZRF)," World Bank Group, accessed December 2024, https://www.worldbank.org/en/programs/zero-routine-flaring-by-2030.

60. "OGCI Members Aim for Zero Methane Emissions from Oil and Gas Operations by 2030," Oil and Gas Climate Initiative, March 8, 2022, https://www.ogci.com/news/ogci-members-aim-for-zero-methane-emissions-from-oil-and-gas-operations-by-2030.

61. "The Oil and Gas Decarbonization Charter," Oil and Gas Climate Initiative, accessed December 2024, https://www.ogdc.org/about/.

62. "Technical Guidance Documents," Oil and Gas Methane Partnership 2.0, accessed December 2024, https://ogmpartnership.com/wp-content/uploads/2023/02/Level-1-and-level-2-TGD-Approved-by-SG_1.pdf.

63. "Global Flaring and Methane Reduction Partnership (GFMR)," World Bank Group, accessed December 2024, https://www.worldbank.org/en/programs/gasflaringreduction/methane-explained.

64. David Azarkh and Stephanie Rowan, "High Yield Indentures: Typical Covenants," LexisNexis, December 6, 2019, https://www.stblaw.com/docs/default-source/related-link-pdfs/lexis-nexis_high-yield-indentures_azarkh-rowan.pdf and James McDonald and Riley Graebner, "High-Yield Bonds: An Introduction to Material Covenants and Terms," Butterworths Journal of International Banking and Financial Law, April 2014, https://www.skadden.com/-/media/files/publications/2014/04/mcdonaldgraebnerhybcovenants(2).pdf.

65. "Net Zero Bondholder Stewardship: The Potential for Unlabelled Debt," Institutional Investors Group on Climate Change, September 23, 2024, p. 7, https://www.iigcc.org/resources/bondholder-stewardship-potential-unlabelled-debt-discussion-paper.

66. For more examples of covenants that could be adapted for methane-related requirements, see "Net Zero Bondholder Stewardship: The Potential for Unlabelled Debt," Institutional Investors Group on Climate Change, September 23, 2024, https://www.iigcc.org/resources/bondholder-stewardship-potential-unlabelled-debt-discussion-paper.

67. Gissell Lopez and Ben Ratner, "The Methane Emissions Opportunity: Our Perspective on Leveraging Technology in Continuous Improvement in the Oil & Gas Sector," JPMorgan Chase, November 2023, https://www.jpmorgan.com/content/dam/jpm/cib/complex/content/

redesign-custom-builds/carbon-compass/JPMC_methane.pdf.

68. "Introduction to High Yield Bond Covenants," Western Asset Management, June 6, 2011, https://www.westernasset.com/us/en/pdfs/whitepapers/introduction-to-high-yield-bond-covenants-2011-06.pdf.

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