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# Harvard Project on Climate Agreements

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## International Cooperation to Reduce Methane Emissions

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## THE HARVARD PROJECT ON CLIMATE AGREEMENTS

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# International Cooperation to Reduce Methane Emissions

Adriana Melchor, Robert Stavins, and Robert Stowe

## Introduction: Why methane matters

Sharply reducing anthropogenic methane emissions is one of the most critical strategies to achieve the Paris Agreement's goal of limiting global warming to 2.0°C this century, and if possible no more than 1.5°C. Methane has a short atmospheric lifetime and very high global warming potential, compared with carbon dioxide (CO<sub>2</sub>).<sup>1</sup> Therefore, although the absolute quantities of human-caused methane emissions are much less than those of CO<sub>2</sub>, methane-emissions abatement can significantly reduce concentrations, temperature, and climate damages, particularly in the short term. This would give the world more time to “bend the curve” on CO<sub>2</sub> emissions, conduct research on carbon removal, and, more generally, to implement longer-term strategies to mitigate and adapt to climate change.

More than half of global methane emissions derive from human activities: fossil fuels (35% of anthropogenic emissions), agriculture (40%), and waste (20%).<sup>2</sup> The concentration of methane in the atmosphere has nearly tripled from preindustrial levels. Data published in January 2022 show that methane concentration has now reached approximately 1,900 parts per billion, as compared to approximately 1,650 parts per billion in 1985.<sup>3</sup> An uptick in global

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<sup>1</sup> Climate and Clean Air Coalition and United Nations Environment Programme, “Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions,” 2021. [https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA\\_ES.pdf](https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA_ES.pdf).

<sup>2</sup> Climate and Clean Air Coalition, “Benefits and Costs of Mitigating Methane Emissions,” 2022 (frequently updated). <https://www.ccacoalition.org/en/content/benefits-and-costs-mitigating-methane-emissions>.

<sup>3</sup> Jeff Tollefson, “Scientists Raise Alarm over ‘Dangerously Fast’ Growth in Atmospheric Methane,” *Nature*, February 8, 2022, <https://www.nature.com/articles/d41586-022-00312-2>.

methane levels since 2007 has prompted concerns that global warming is creating a feedback loop, accelerating release from Arctic permafrost and other natural repositories of methane.<sup>4</sup>

In recognition of the urgency of reducing methane emissions, several voluntary international multiparty agreements and initiatives have recently been concluded to accelerate collective action and establish formal mechanisms for monitoring the implementation of methane-related commitments. While these initiatives reflect ambition on the part of public, private, and civil society actors with regard to methane, the implementation of these initiatives presents challenges for governments, emitting sectors, and other parties.

### **An International target on methane emissions: The Global Methane Pledge**

Historically, methane-emission reductions have been addressed through local and national laws and under voluntary programs, with few international agreements having specific targets for methane.<sup>5</sup> Nonetheless, as of October 2022, most Nationally Determined Contributions (NDCs) submitted by parties to the Paris Agreement included methane emissions within their GHG reduction targets.<sup>6</sup> In a landmark agreement announced on the sidelines of COP26 in 2021, progress was made towards setting an internationally-agreed methane emissions target and strengthening support for existing international methane reduction initiatives. The Global Methane Pledge (GMP) – co-authored by the United States government and the European Commission – has now been signed by 125 countries that have agreed to take voluntary actions to contribute to a collective effort to reduce aggregate global methane

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<sup>4</sup> Tollefson, 2022.

<sup>5</sup> Climate and Clean Air Coalition and UN Environment Programme, “Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions.” 2021. <https://www.ccacoalition.org/en/resources/global-methane-assessment-full-report>

<sup>6</sup> Taryn Fransen et al., “The State of Nationally Determined Contributions: 2022.” World Resources Institute, October 2022. <https://www.wri.org/research/state-nationally-determined-contributions-2022>

emissions at least 30% from 2020 levels by 2030, which could eliminate over 0.2°C warming by 2050.<sup>7</sup>

For some countries, the GMP is their first significant policy commitment on methane, either at the domestic or international level.<sup>8</sup> GMP signatories include many major emitters, including the US, the European Union, Japan, South Korea, and major oil producers, such as Iraq and Saudi Arabia.<sup>9</sup> However, some of the most important players have yet to sign the Pledge, including China and Russia. China has pursued an alternative, bilateral approach – the US-China Joint Glasgow Declaration<sup>10</sup> -- which contains several statements of cooperation on methane-emissions reduction. In the Declaration, China committed to develop a “comprehensive and ambitious National Action Plan on methane, aiming to achieve a significant effect on methane emissions control and reductions in the 2020s.” Other bilateral commitments include enhancing the measurement of methane emissions, exchanging information on methane emissions policies, and fostering joint research into methane emission reduction strategies.<sup>11</sup>

The G7 and G20 may strengthen international cooperation on methane among highly industrialized countries. The communique of the June 2022 G7 meeting, for example, contains a

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<sup>7</sup> “Global Methane Pledge,” <https://www.globalmethanepledge.org>.

<sup>8</sup> Global Methane Pledge.

<sup>9</sup> “The Global Methane Pledge (IEA),” <https://www.iea.org/reports/global-methane-tracker-2022/the-global-methane-pledge>.

<sup>10</sup> Office of the Spokesperson, US Department of State, “U.S.-China Joint Glasgow Declaration on Enhancing Climate Action in the 2020s,” November 10, 2021, <https://www.state.gov/u-s-china-joint-glasgow-declaration-on-enhancing-climate-action-in-the-2020s/>.

<sup>11</sup> U.S.-China Joint Glasgow Declaration on Enhancing Climate Action in the 2020s.

paragraph reaffirming the group's commitments to the GMP and specifying next steps for implementation.<sup>12</sup>

To facilitate and monitor implementation of the GMP, the International Methane Emissions Observatory (IMEO) was launched by the United Nations Environment Programme (UNEP) at the G20 Summit in November 2021, with support from the European Commission, with the goal of improving global reporting on methane emissions and ensuring public transparency of such reporting.

As an extension of the GMP, in June 2022 the US and EU announced a new Global Methane Pledge Energy Pathway to accelerate methane-emissions reductions in the oil and gas sector and strengthen global energy security.<sup>13</sup> Argentina, Canada, Denmark, Egypt, Germany, Italy, Japan, Mexico, Nigeria, Norway, and Oman have joined the Pathway, alongside the US and the EU. The GMP Energy Pathway encourages participating nations to “capture the maximum potential of cost-effective methane mitigation in the oil and gas sector” and eliminate routine flaring no later than 2030. To support the Pathway, countries and other supporting organizations pledged to provide \$59 million in funding and in-kind assistance.

## **Implementing the Pledge**

To help operationalize the GMP, IMEO is planning to develop a global, public dataset of empirically verified methane emissions, starting with the fossil fuel sector, but with a view to

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<sup>12</sup> G7 Presidency, Germany, “G7 Climate, Energy and Environment Ministers’ Communiqué,” May 27, 2022, 7, [https://www.bmuv.de/fileadmin/Daten\\_BMU/Download\\_PDF/Europa\\_International/g7\\_climate\\_energy\\_environment\\_ministers\\_communique\\_bf.pdf](https://www.bmuv.de/fileadmin/Daten_BMU/Download_PDF/Europa_International/g7_climate_energy_environment_ministers_communique_bf.pdf).

<sup>13</sup> US Department of State, “U.S.-EU Joint Press Release on the Global Methane Pledge Energy Pathway,” June 17, 2022, <https://www.state.gov/u-s-eu-joint-press-release-on-the-global-methane-pledge-energy-pathway/>.

expanding to other major emitting sectors, including agriculture and waste.<sup>14</sup> In fact, IMEO was founded to fill gaps in data collection for global methane emissions because these gaps have historically limited the ability of policymakers and industry to understand the scope of the problem and develop appropriate mitigation strategies.<sup>15</sup> Available methane data is currently based largely on generic bottom-up, emissions-factor-based calculations, which have tended to underestimate measured methane emissions.<sup>16</sup> IMEO intends to address this problem by incorporating wider-ranging reporting from industry.

IMEO will integrate data mainly from four streams: industry reporting from the Oil and Gas Methane Partnership 2.0 (OGMP 2.0); direct measurement data from scientific studies; remote sensing data; and national inventories.<sup>17</sup> OGMP 2.0 is a measurement-based reporting framework aimed at improving the accuracy and transparency of methane-emissions reporting in the oil and gas sector,<sup>18</sup> and is an initiative of the Climate and Clean Air Coalition (CCAC), led by UNEP, the European Commission, and the Environmental Defense Fund.<sup>19</sup> In order to participate in the partnership, companies must sign a Memorandum of Understanding with UNEP, which formally commits them to comply with the OGMP 2.0 Reporting Framework,<sup>20</sup>

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<sup>14</sup> “IMEO - UNEP,” <https://www.unep.org/explore-topics/energy/what-we-do/imeo>.

<sup>15</sup> United Nations Environment Programme, “IMEO History,” <https://www.unep.org/explore-topics/energy/what-we-do/methane/imeo-history>.

<sup>16</sup> United Nations Environment Programme, “IMEO History.”

<sup>17</sup> United Nations Environment Programme, “Methane Observatory Launched to Boost Action on Powerful Climate-Warming Gas,” October 31, 2021, <https://www.unep.org/news-and-stories/press-release/methane-observatory-launched-boost-action-powerful-climate-warming>.

<sup>18</sup> “OGMP 2.0,” <https://www.ogmpartnership.com/>.

<sup>19</sup> UNEP, European Commission, Environmental Defense Fund, and Climate and Clean Air Coalition, “Oil and Gas Industry Commits to New Framework to Monitor, Report and Reduce Methane Emissions,” November 23, 2020, [https://www.edf.org/sites/default/files/documents/OGMP%202.0%20Press%20Release\\_FINAL.pdf](https://www.edf.org/sites/default/files/documents/OGMP%202.0%20Press%20Release_FINAL.pdf).

<sup>20</sup> “Join the OGMP,” <https://www.ogmpartnership.com/join-ogmp-20>.



which in turn provides an approach for reporting Scope 1 methane emissions from oil and gas value chains.<sup>21</sup> Together, IMEO and the OGMP 2.0 serve as critical links between the high-level ambition of the GMP and on-the-ground actions of industry participants responsible for a major portion of anthropogenic methane emissions.

A related voluntary initiative, the Methane Guiding Principles (MGP), was launched in 2017 to reduce methane emissions from the natural gas supply chain. Signatories to the MGP are a coalition of major oil and gas companies, including BP, Shell, ExxonMobil, Gazprom, and Chevron. Supporting Organizations include the International Energy Agency, the Environmental Defense Fund, other NGOs, international governmental organizations, and industry associations. MGP signatories commit to five principles:<sup>22</sup> (1) continually reduce methane emissions' (2) advance strong performance across the gas supply chain; (3) improve accuracy of methane emissions data; (4) advocate sound policy and regulations on methane emissions; and (5) increase transparency. In addition, signatories commit to publicly disclose how well they are abiding by these principles and disclose how well they are adhering to the OGMP 2.0 reporting framework. Signatories are expected to commit to support at least one emissions-reduction project annually (in-kind and/or financially), details of which will be publicly reported.

Finally – and importantly – the MGP, with its signatories and Supporting Organizations, has developed a Methane Policy Toolkit to assist GMP countries in the development and implementation of national methane reduction action plans by providing an overview of the

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<sup>21</sup> Scope 1 emissions are those from facilities, vehicles, and other resources directly owned and operated by the firm reporting emissions. United Nations Environment Programme, “Oil and Gas Methane Partnership (OGMP) 2.0 Framework,” 2020, <https://www.ccacoalition.org/en/resources/oil-and-gas-methane-partnership-ogmp-20-framework>.

<sup>22</sup> <https://methaneguidingprinciples.org>

various policy levers, strategies, and resources that governments can use to reduce emissions, and demonstrating the role of the oil and gas sector in meeting the goals of the Pledge.<sup>23</sup>

### **Cross-sector coalitions: the Global Methane Alliance**

While MGP and OGMP 2.0 are led primarily by the private sector, the Global Methane Alliance (GMA), launched in 2019, is an intergovernmental initiative, which brings together cross-sector stakeholders to support methane reduction targets in the oil and gas industry.<sup>24</sup> The Alliance was launched by CCAC – which is a voluntary partnership including governments, intergovernmental organizations (IGOs), businesses, scientists, and civil society organizations whose activities are financed through UNEP.<sup>25</sup> Countries that join the Alliance commit to including specific methane emissions targets from the oil and gas sector in their NDCs, with technical assistance and policy support from IGOs and NGOs.<sup>26</sup> Participating oil and gas companies will share knowledge, technologies, and best management practices.

In terms of the capacity for industry to implement these initiatives, mitigation in the oil and gas sector is considered particularly promising because it is possible to avoid more than 70% of current emissions with existing technology, and some 45% could be avoided at little to

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<sup>23</sup> Methane Guiding Principles, “Methane Policy Toolkit,” 2022, <https://methaneguidingprinciples.org/methane-policy-toolkit/#1655715162779-ddb408ae-10d8>.

<sup>24</sup> Climate and Clean Air Act Coalition, “Global Methane Alliance,” n.d., <https://www.ccacoalition.org/en/activity/global-methane-alliance>.

<sup>25</sup> “Global Methane Alliance”.

<sup>26</sup> “Global Methane Alliance”.

no cost.<sup>27</sup> This explains why several initiatives have emerged to drive down emissions in the sector.

However, there is also the question of how methane emissions can be abated outside of oil and gas. Agriculture contributes at least 40% (up to 46%) of global anthropogenic methane emissions, and these are on a path to increase roughly by 40% by 2050, due in part to rising food production<sup>28</sup>. Despite this, estimates of the potential for measures to curb methane emissions from agriculture have been relatively modest and often very costly.<sup>29</sup> This presents challenges for countries such as France, Brazil, and New Zealand, whose methane emissions are mainly tied to livestock. In general, emissions related to livestock are the largest source of methane within the agriculture and waste sector.<sup>30</sup>

Given these challenges, it will be important to explore opportunities for global, multi-stakeholder collective action targeted at agriculture. Such actions may target behavioural-change measures along with financial commitments and technological deployment to lower

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<sup>27</sup> International Energy Agency, “Curtailling Methane Emissions from Fossil Fuel Operations: Pathways to a 75% Cut by 2030” (International Energy Agency, March 2022), <https://www.iea.org/reports/curtailing-methane-emissions-from-fossil-fuel-operations>.

<sup>28</sup> Tim Searchinger et al., “Opportunities to Reduce Methane Emissions from Global Agriculture,” November 2021, [https://scholar.princeton.edu/sites/default/files/methane\\_discussion\\_paper\\_nov\\_2021.pdf](https://scholar.princeton.edu/sites/default/files/methane_discussion_paper_nov_2021.pdf).

<sup>29</sup> United Nations Environment Programme, “Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions.” [https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA\\_ES.pdf](https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA_ES.pdf)

<sup>30</sup> Climate and Clean Air Coalition, United Nations Environment Programme, “Global Methane Assessment”. <https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions>

methane emissions through reducing food waste and loss, improving livestock management, and the adoption of human diets with less meat and dairy content<sup>31</sup>.

## **Implementation: Challenges and Opportunities**

If the GMP dictates the overarching global methane emissions target that IMEO, OGMP 2.0, MGP, the GMA, and related initiatives are collectively working to meet, the success of these efforts depends on the capacity and commitment of methane-emitting sectors to develop robust strategies for abatement and on governments' capacity to implement GMP commitments through respective domestic policies.

All initiatives discussed in the previous sections are voluntary; there are no enforcement mechanisms. In particular, as the overarching intergovernmental commitment on methane, the GMP is not binding on nations that sign it, and does not specify a set amount of methane emissions that each country must reduce within a specific timeframe. Instead, it sets an aggregate goal for participating nations to meet by 2030, and therefore relies significantly on peer pressure and public scrutiny as incentives for governments to comply with this objective. This has lowered the cost of entry for many countries – even those that are not particularly cooperative on the broader international climate agenda – to sign on<sup>32</sup>.

By recognizing that one-size-fits-all targets would not be suitable for countries at different stages of development,<sup>33</sup> the GMP potentially leaves the door open for inertia or

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<sup>31</sup> United Nations Environment Programme, “Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions.” [https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA\\_ES.pdf](https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA_ES.pdf)

<sup>32</sup> Jennifer A Dlouhy and John Ainger, “Kerry’s Secret to Sealing a Global Methane Deal: Lower the Bar,” *Bloomberg*, November 2, 2021, <https://www.bloomberg.com/news/articles/2021-11-02/the-challenge-of-implementing-the-global-methane-pledge#xj4y7vzkg>.

<sup>33</sup> Jennifer A Dlouhy and John Ainger, “Kerry’s Secret to Sealing a Global Methane Deal: Lower the Bar.” <https://news.bloomberglaw.com/environment-and-energy/as-global-methane-pact-takes-off-hurdle-shifts-to-enforcement>

inaction among signatory countries that are reliant on heavy industry and oil and gas production to drive economic growth. As a result, the private sector – and cross-sector coalitions and monitoring bodies such as IMEO – will need to play a significant role in holding GMP signatories accountable with regard to methane-emissions reductions.

Finally, for effective monitoring, it will be important to establish a common baseline to measure progress on meeting the GMP target, which could be challenging in certain countries where there are capacity or resource constraints in measuring emissions.<sup>34</sup> However, not having a clear baseline now need not deter action to begin reducing emissions, particularly in the coal, oil, and natural gas sectors, where the International Energy Agency has laid out various GMP-related strategies that can be implemented immediately even with limited information.<sup>35</sup>

### **Concluding thoughts: Geopolitical considerations in the context of the war in Ukraine**

The discussion above comes with a caveat, which is that all of the initiatives considered in this brief were launched in a very different energy-policy context from today's. Only months after the inauguration of the GMP at COP26, global energy markets were sent into a frenzy by Russia's invasion of Ukraine. EU countries now face a particularly bleak energy security situation: Russian supplies represented more than 40% of total imports of natural gas (whose primary component is methane) to the EU by February 2022.<sup>36</sup> Unsurprisingly, the war in Ukraine has now forced countries in Europe to race to secure new sources of energy that will

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<sup>34</sup> International Energy Agency, "The Global Methane Pledge (IEA)." <https://www.iea.org/reports/global-methane-tracker-2022/the-global-methane-pledge>.

<sup>35</sup> International Energy Agency, "Global Methane Tracker (2022)" (International Energy Agency, 2022), <https://www.iea.org/reports/global-methane-tracker-2022/the-global-methane-pledge>.

<sup>36</sup> Claudia Kemfert et al., "The Expansion of Natural Gas Infrastructure Puts Energy Transitions at Risk," *Nature Energy* 7 (July 4, 2022): 582–87. <https://www.nature.com/articles/s41560-022-01060-3>

replace Russian oil and gas, including from major oil exporters such as Saudi Arabia. At the same time, governments are under significant pressure to protect consumers from skyrocketing energy costs by expanding the production of less expensive fossil fuels in the short-term. Combined, these dynamics have created renewed incentives for global oil and gas companies to increase their output in the near future, making the commitments made by countries to reduce global methane emissions less feasible to achieve.

The future of multilateral efforts to reduce methane emissions – as well as to reduce greenhouse gases more broadly – depends, in part, on how policymakers choose to respond to the current energy crisis. Governments are rightly concerned with the immediate task of securing energy supplies ahead of the winter months and limiting the financial fallout as much as possible. However, even before the onset of the war, a major expansion of natural gas infrastructure was already underway, and this will likely increase in the near term given current circumstances.<sup>37</sup> Germany, as the EU's largest importer of Russian natural gas, is responding to the new situation with a draft law that approves new liquified natural gas (LNG) terminals that could import natural gas until 2043<sup>38</sup>.

The recent scramble for energy supplies may have dealt a short-term blow to global efforts to curb greenhouse gas emissions, but arguably it has also strengthened consensus that energy security will go hand-in-hand with transitioning away from fossil fuels and toward renewable sources. In a potential sign that governments welcome this idea, new IEA data show that global CO<sub>2</sub> emissions are on track to increase by a much smaller fraction than last year,<sup>39</sup>

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<sup>37</sup> Claudia Kemfert et al.

<sup>38</sup> Claudia Kemfert et al.

<sup>39</sup> An increase of 300 million tons in 2022 as compared to nearly 2 billion tons in 2021 resulting from the rapid recovery from the economic crisis triggered by the pandemic. International Energy Agency, "Defying Expectations, CO<sub>2</sub> Emissions from Global Fossil Fuel Combustion Are Set to Grow in 2022 by Only a Fraction of Last Year's Big Increase," October 19, 2022, <https://www.iea.org/news/defying->

suggesting that policy actions to invest in clean energy are resulting in structural changes to the energy economy.<sup>40</sup>

To ensure that commitments on methane emissions under the GMP and related frameworks are met, governments will need to pursue the dual goals of energy security and net-zero emissions. In this pursuit, governments and firms will need to learn to better manage the risks associated with the transition to clean energy, as well, perhaps, as the risks associated with an expanding, more interventionist role for government in ensuring energy security.<sup>41</sup>

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[expectations-co2-emissions-from-global-fossil-fuel-combustion-are-set-to-grow-in-2022-by-only-a-fraction-of-last-year-s-big-increase.](#)

<sup>40</sup> International Energy Agency.

<sup>41</sup> Jason Bordoff and Meghan L. O'Sullivan, "The New Energy Order: How Governments Will Transform Energy Markets," *Foreign Affairs* 101, no. 1 (February 2022): 131–44. <https://www.foreignaffairs.com/articles/energy/2022-06-07/markets-new-energy-order> . Jason Bordoff and Meghan L. O'Sullivan, "Green Upheaval: The New Geopolitics of Energy," *Foreign Affairs* 101, no. 1 (February 2022): 68–84. <https://www.foreignaffairs.com/articles/world/2021-11-30/geopolitics-energy-green-upheaval>



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