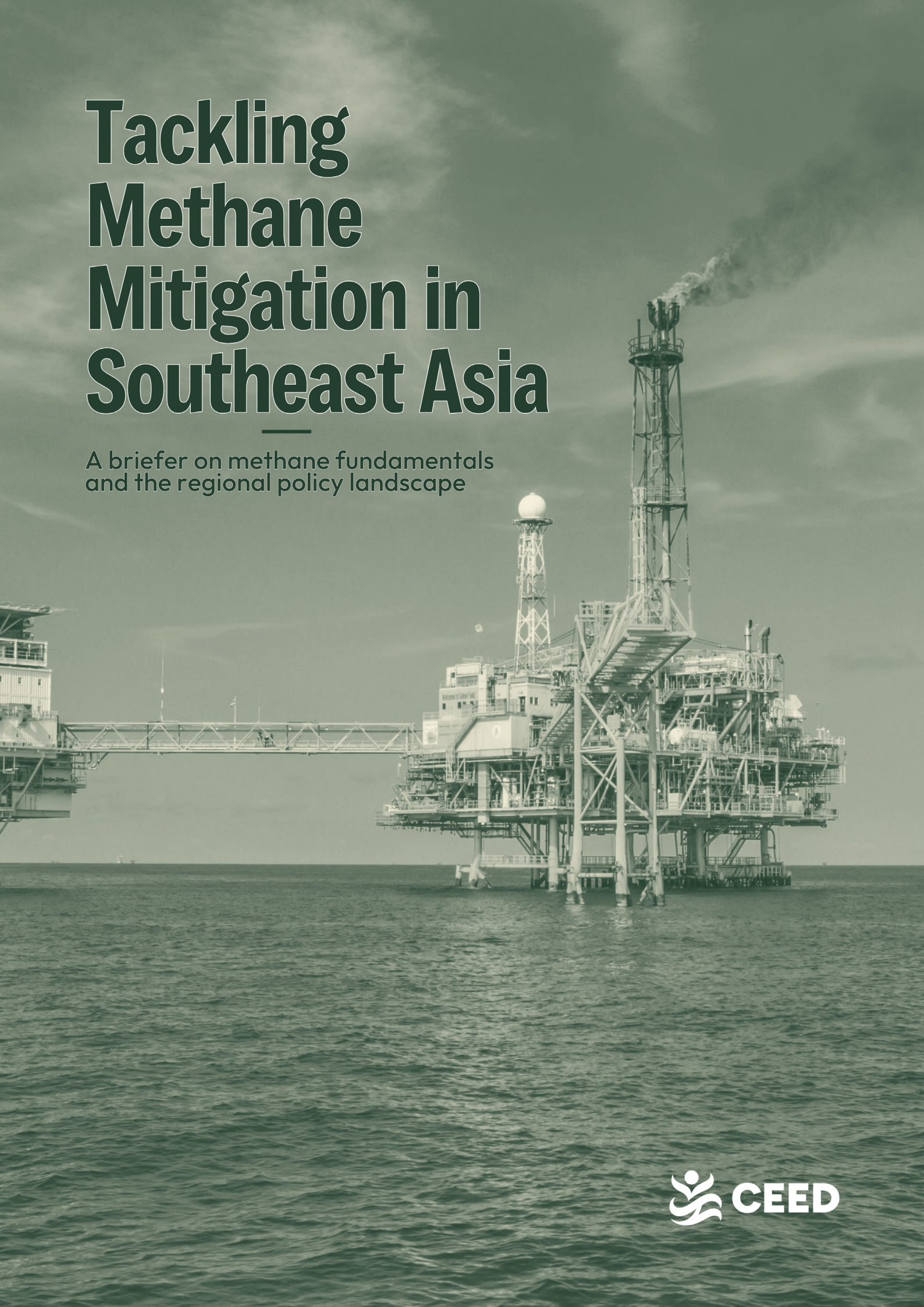
Tackling Methane Mitigation in Southeast Asia

A briefer on methane fundamentals and the regional policy landscape



CEED

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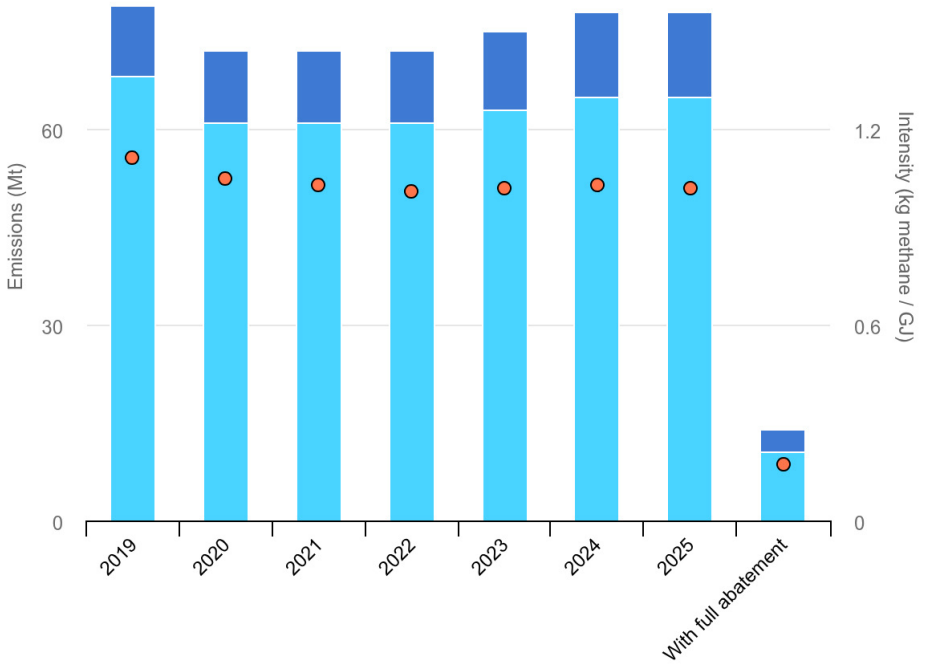
METHANE AND WHY IT MATTERS

What is methane?

Methane (CH4) is a greenhouse gas and a short-lived climate pollutant. Over a 20-year timescale, methane has a warming impact 86 times greater than carbon dioxide (CO2).[1] Although methane remains in the atmosphere for only 7 to 12 years, compared with centuries for carbon dioxide, one molecule of methane traps more heat than a molecule of carbon dioxide.[2]

In 2020, annual global methane emissions from human activities alone were estimated to be at approximately 352 million tonnes (Mt), of which 135 Mt from energy or more than 38% of the total emissions.[3] With the current legislation, the total global emissions is projected to continue rising up to 369 Mt per year in 2030. Within the oil gas industry, upstream activities account for 80% of the emissions. Methane emissions also persist from abandoned facilities, which were estimated to have emitted 3.5 Mt in 2025.[4]

Source: Global Methane Tracker 2026, International Energy Agency



This does not come as a surprise given that methane and other pollutants are released throughout the oil and gas supply chain as part of routine operations at each stage. Both upstream and downstream operators practice flaring, or the burning of gas that is too costly to store or sell, presents a safety risk, or contains highly toxic compounds. They also directly release methane gas to the atmosphere, in a process known as venting, for maintenance of wells, pipelines, and tanks or well completion.[5] Methane can also be released through leaks during the transportation and processing of oil and gas.

What are the impacts of methane?

On climate	• Over a 20-year timescale, methane has a warming impact 86 times greater than carbon dioxide (CO_2).[6] • Methane has caused 30% of the increase in global temperature since the Industrial Revolution.
On health	• Its contribution to climate change increases exposure to extreme heat and climate-sensitive diseases (vector-borne, water-borne diseases, cardiovascular and respiratory diseases) • Long-term exposure to air pollutants is associated with premature mortality from respiratory and cardiovascular diseases and cancer. • Methane gas poisoning can displace oxygen and cause acute health effects. • Severe exposure can cause irregular breathing, dizziness, loss of balance, numbness, and, in extreme cases, loss of consciousness and death due to respiratory or cardiovascular failure.[7]
On air quality	• Methane also contributes to the formation of ground-level ozone, a harmful air pollutant that affects human health. Ground-level ozone damages airways, triggers asthma attacks, and worsens lung diseases.

Case Study. A 21-year-old resident who lived near Iraq's largest oil field died of chemicals linked to gas flaring.

Ali Hussein Jaloud, a 21-year-old Iraqi, lived near Rumaila, Iraq's largest oil field, is known to flare more gas than any other oil field in the world. The results of a pollution monitoring testing amongst the host communities undertaken by BBC in their investigation revealed the presence of high levels of exposure to cancer-causing chemicals. Ali was diagnosed with leukaemia at 15 and his doctors ruled pollution as a probable cause for his cancer. While he survived the two years of treatment, the cancer returned in December 2022. He died in April 2023. Before Ali's death, an Iraqi minister already admitted that pollution from oil production is the main reason for the rising number of cancer rates in the country.[8] After Ali's death, his family filed a case against BP in the UK seeking damages for Ali's death.[9]

Why does mitigating methane matter?

As mentioned, methane has a stronger warming potential than carbon dioxide but also a shorter lifespan; thus, it makes reducing methane all the more important, as reducing it now can slow the rate of warming over the coming decades–especially with the climate crisis. Scientists have long sounded the alarm on the unprecedented rise of global temperature, with the past eleven years being known to be the eleven warmest on record.[10]

A report by the United Nations Environment Programme and the Climate and Clean Air Coalition found that targeted methane mitigation can deliver greater near-term temperature reductions than decarbonization alone. When compared with constant 2020 emissions, the climate impact of focused methane mitigation is greater than that of decarbonization throughout the first half of the century. However, this does not diminish the importance of decarbonization, which becomes increasingly important from the 2040s onward and provides substantial long-term climate and air quality benefits. Rather, the report emphasizes that decarbonization alone has limited near-term temperature effects. It notes that decarbonization through fossil fuel phaseout, without targeted methane reduction measures, may not mitigate warming in the near term because it also removes

co-emitted cooling pollutants, primarily sulfur dioxide (SO_2). Without additional measures to reduce methane and other non-CO_2 greenhouse gases, decarbonization may therefore result in modest warming during the first one and a half to two and a half decades following fossil fuel phaseout.[11] Similarly, the Intergovernmental Panel on Climate Change Sixth Assessment Report (IPCC AR6) and UNEP's 2021 Global Methane Assessment highlight that meeting temperature goals requires methane reductions alongside, not instead of, rapid carbon dioxide reductions.[12]

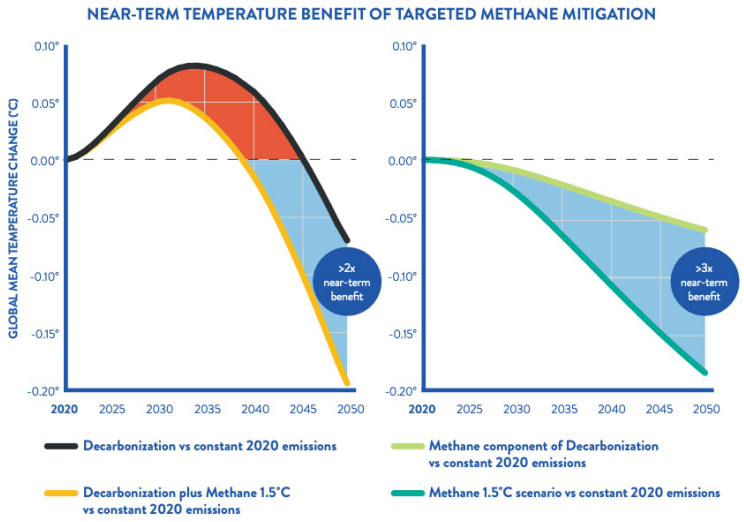


Figure 8. (Left) The climate response under a decarbonization scenario that phases out unabated fossil fuel use (black) compared to a decarbonization scenario plus targeted methane measures consistent with a 1.5°C scenario (orange). Note that the decarbonization scenario reduces all pollutants including some methane. (Right) The climate response to only the change in methane emissions under a decarbonization scenario (light green) compared to decarbonization plus targeted methane reductions consistent with 1.5°C (turquoise), all relative to constant 2020 emissions. Values are averages across IPCC Shared Socioeconomic Pathways (SSP) scenarios 1, 2 and 5.

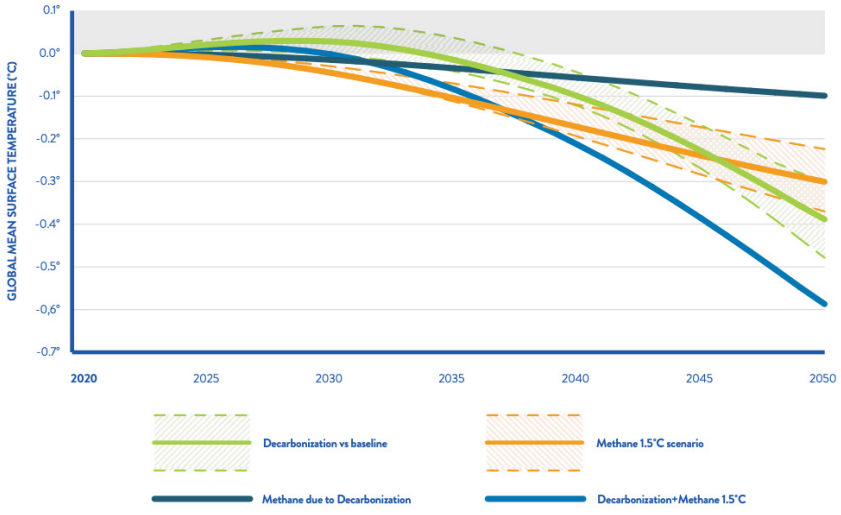


Figure 9. The climate response to all pollutants (including methane) under a decarbonization scenario (green), to methane alone under both decarbonization (blue) and a 1.5°C scenario, and to both decarbonization and methane under a 1.5°C scenario (orange) relative to the projected baseline changes. Solid lines show the averages across SSPs 1, 2 and 5 with dashed lines portraying the range across those three scenarios. Note that although the maximum effect of decarbonization exceeds the minimum effect of methane in the late 2030s such a comparison is unrealistic as the effects of both sets of pollutants vary systematically across these scenarios (i.e. the maximum should be compared with the maximum, the average with the average, and the minimum with the corresponding minimum).

Source: Global Methane assessment: 2030 Baseline Report

In the 1.5°C scenario under IPCC AR6, global methane emissions should decrease steadily to 45% below 2020 levels by 2040 and fall further to 52% by 2050. Implementation of targeted methane control measures coupled with parallel efforts to decarbonize global energy and transportation systems, along with shifts in demand-side behaviour including the adoption of healthier diets and reducing food waste, could reduce annual emissions to 164 Mt per year by 2050, 53% reduction below 2020 levels and fully aligning with the 1.5°C climate targets.[13]

Beyond climate commitments, methane reduction is also imperative to limit the health, agricultural, and economic impacts of rising global emissions. As mentioned, methane is a key precursor of ground-level ozone, a super pollutant that has harmful effects on air quality, human health, and vegetation. Reducing methane emissions lowers concentrations of ground-level ozone across urban, rural, and remote areas worldwide.

The Global Methane Status Report shows that full implementation of available solutions to reduce methane could result in the following:[14]

By 2030	By 2050
180,000 avoided premature deaths from ground-level ozone exposure per year	290,000 avoided premature deaths per year
560,000 avoided asthma-related emergency-room visits	900,000 avoided asthma-related emergency-room visits
19 billion tonnes of avoided crop losses	30 billion tonnes of avoided crop losses
53 billion hours of avoided lost labor for outdoor workers	80 billion hours of avoided lost labor for outdoor workers
USD 330 billion of associated benefit valuation annually	USD 500 billion of associated benefit valuation annually

Reducing methane emissions therefore not only slows global warming but also helps protect agricultural production and the food systems that depend on it and most importantly the lives of communities affected by methane-emitting projects.

While it is important to highlight the benefits of methane reduction, more so is the fact that reducing methane is not only a beneficial policy choice but a binding legal obligation for States under international law. In its 2025 Advisory Opinion on the Obligations of States in Respect of Climate Change, the International Court of Justice (ICJ) affirmed that States have obligations to protect the climate system and the environment under customary international law, international human rights law, climate change treaties, the law of the sea, and other environmental treaties. Based on the Advisory Opinion, one of the obligations of a State is to ensure the protection of the climate system and other parts of the environment from anthropogenic greenhouse gas emission[15]–which includes methane. This duty includes the obligation to prevent significant harm to the environment by acting with due diligence, which requires not only the adoption of appropriate rules and measures, but also ensuring their implementation.[16] States have the duty to regulate private actors and their failure to do so by not taking the necessary regulatory and legislative measures to limit the quantity of emissions caused by private actors under its jurisdiction makes the state liable.[17] The Court further recognizes that due diligence requires States to actively pursue the scientific information necessary for them to assess the probability and seriousness of harm[18] and to use readily available technologies to address risks.[19]

Thus, for methane regulation, it is not enough that States have methane regulations and policies to curb methane and other greenhouse gases, but they are also obliged to pursue methane detection and monitoring and use readily available technologies to address its risks. Additionally, we can situate the methane regulation within the broader obligation of States to transition away from fossil fuels. As the Court held, the failure of a State to take appropriate action to protect the climate system from GHG emissions, including through the granting of fossil fuel exploration licences or the provision of fossil fuel subsidies, may constitute an internationally wrongful act which is attributable to that State.[20] Hence, what is ultimately required from States is to establish systems for detecting

and monitoring emissions, regulate and oversee operators, and integrate methane reduction into broader strategies for the phaseout of fossil fuels.

The need to rapidly curb methane emissions is increasingly recognized by countries. The Global Methane Pledge (GMP), launched at COP26 in 2021 by the European Union and the United States, brings together participant states to commit to take voluntary actions to contribute to a collective effort to reduce global methane emissions at least 30% from 2020 levels by 2030 in order to align with the 1.5°C pathway and deliver significant benefits for human and ecosystem health, food security, and economies. Currently, it has 160 participating states, including Indonesia, Malaysia, Philippines, Singapore, and Vietnam. The GMP is working on building frameworks for methane reduction through national methane plans, sectoral pathways, and methane abatement financing.[21]

How is methane detected?

Detecting where and how much methane is emitted is important in determining the appropriate response. The Regulation (EU) 2024/1787 provides a framework for linking methane detection to defined mitigation and reporting requirements. It requires operators to repair or replace all components found to be emitting methane at or above the above specified levels, measured at standard temperature and pressure and using detection devices in accordance with the manufacturer's specifications for operation and maintenance. The thresholds vary depending on the type of LDAR survey and the location of the component:[22]

LDAR survey	Threshold requiring repair or replacement
Type 1	7000 ppmv of methane or 17 g/hr of methane
Type 2–aboveground offshore components above the sea level	500 ppmv of methane or 1 g/hr of methane
Type 2–second step of LDAR surveys of underground components	1000 ppmv of methane or 5 g/r of methane
Type 2–below the sea level or below the seabed	7000 ppmv of methane or 17 g/hr of methane

The Regulation also establishes a framework for responding to super-emitting events, defined as an event where a source or a set of closely connected sources in a site emits above 100 kg of methane per hour.[23] When a super-emitting event is detected, the Commission is required to promptly notify the relevant Member State or third country and, where feasible, the producer, and request information on the event and the remedial measures taken or planned to mitigate or stop it.[24]

Methane can be detected and quantified using complementary technologies operating at different spatial and temporal scales: satellite or space-based detection, airborne monitoring, and ground-based tools.

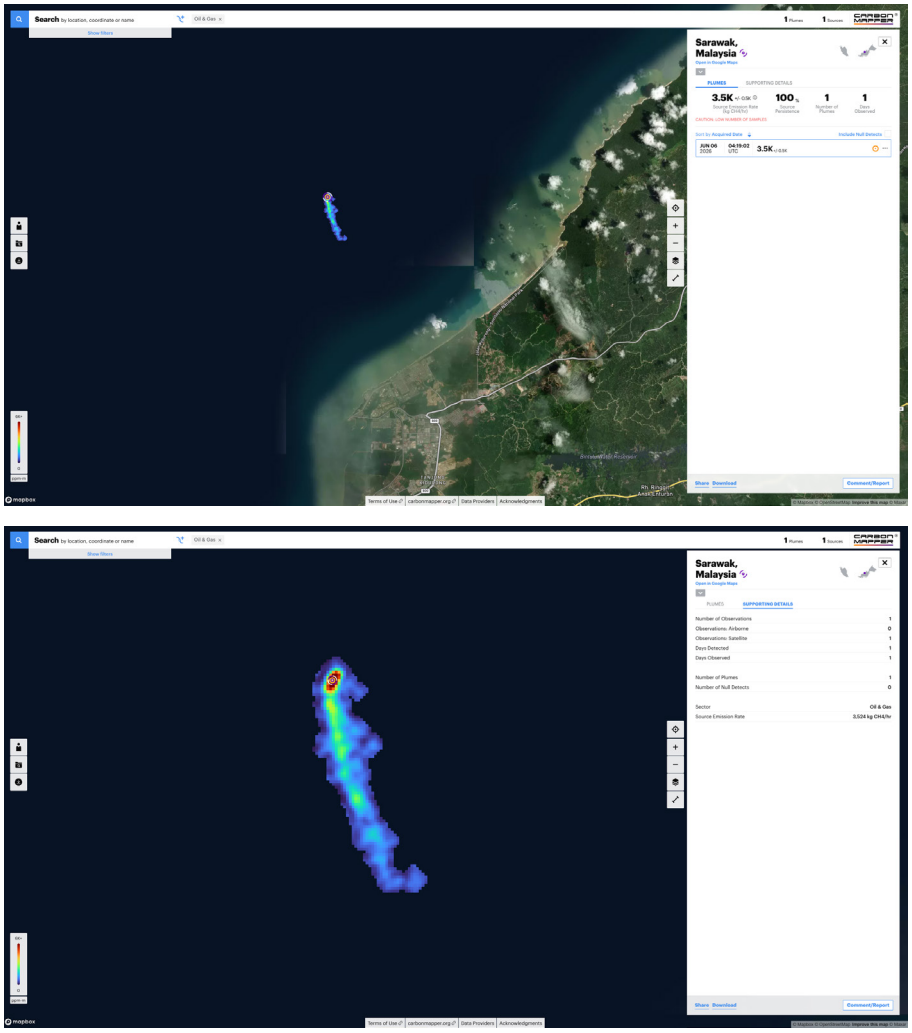
Technology[25]	Typical scale	Purpose	Limitations
Global satellite	Regional	Flags hot spot basins, long term trends, inventory checks, major leaks over large areas	Miss most individual leaks; attribution is coarse only; struggle to collect data over overcast or cloud-covered regions As satellite observations capture methane concentrations during a brief overpass, leaks that occur between the overpasses may go undetected
Targeted imaging satellites	Basin to facility	Finding large super emitters at named facilities	
Aircraft mounted sensors MethaneAIR, Global Airborne Observatory,	Basin to facility	Measuring total emissions from clusters, validating satellites	Costly and episodic; needs extensive planning, aviation access, favorable weather conditions; limited to capturing emissions at a single point in time only
UAV/drones	Facility	Checking priority sites, verifying weather, airspace rules, fixes, mapping plumes	Battery limits, range of coverage; limited to capturing emissions at a single point in time only
Ground-based tower	Field to facility	Quantify methane fluxes and high temporal precision	Placement constraints; overlapping sources
Mobile labs (vehicles) Facility	Facility	Estimating source strengths along roads, checking networks	Limited off-road reach; depends on road access and traffic
Handheld and on site Components instruments	Components	Pinpointing leaks, confirming repair, compliance checks	Very local; needs trained staff on the ground; focus heavily on surface component leaks and often miss elevated combustion issues, unlit flaring, or large intermittent venting events.

Satellites may be classified further based on their coverage:[26]

Kind of satellite	Purpose	Coverage	Examples
1. Global mapping	Characterizing emissions at regional scale and country scale	Quasi-daily global coverage with relatively coarse spatial resolution (7 km x 5.5 km for TROPOMI) and moderately high precision	TROPOMI, GOSAT-GW
2. Point source imagers	Detect and quantify plumes from individual point sources	High spatial resolution (i.e., 25-50 m) and sufficient spectral sensitivity to detect emissions in the range 100-500 kg/h	GHGSat, PRISMA, CarbonMapper, EnMAP, Satlantis
3. Hybrid area flux mappers	Bridge the first two categories, providing total emissions data from area or regional sources for targeted regions		MethaneSAT

In sum, effective methane monitoring requires utilizing all these technologies together and the data they produce in order to have a clear picture of methane emissions in a specific region or area. These observations can also be compared with bottom-up emissions inventories, which estimate emissions using activity data and emission factors. Combining these approaches helps address the temporal and spatial limitations of individual technologies, constrain the magnitude and location of emissions, and track how emissions change over time.

Case study. Methane plume detected in Sarawak, Indonesia by Carbon Mapper.



Source: Carbon Mapper

Carbon Mapper is a non-profit organization that uses precision visible-infrared imaging spectrometers on satellites, aircraft, and other space-based systems, to detect, pinpoint, and quantify methane and carbon dioxide point-source emissions. Since it was found in 2021, it has detected 36,653 methane plumes and 748 million kg of methane per hour.

Its portal allows users to view observations from specific regions, countries, and locations, such as the methane plume linked to an oil and gas activity in offshore Sarawak, Malaysia, detected on 6 June 2026. According to Carbon Mapper data, this observation recorded an estimated 3,500 kg of methane per hour. The portal also indicates how many observations have been recorded in the specific area–for Sarawak, Malaysia, only one observation was available.[27] This goes to show that while remote sensing can identify significant emissions, there is still a need for repeated observations and triangulation with other monitoring methods.

THE GLOBAL METHANE PLEDGE

Methane (CH_4) is a greenhouse gas and a short-lived climate pollutant that has been and remains to be a significant driver of climate change and air pollution. The fact that methane has a high warming potency but short atmospheric lifespan makes mitigating it particularly important to slow the rate of warming over the coming decades. The fossil fuel sector is a particularly important sector to prioritize because of the direct and indirect effects it has on climate, environment, as well as the availability of cost-effective technological means and measures to mitigate its effects.

Methane mitigation requires policies that ensure that methane emissions are detected and disclosed. In order to make methane mitigation effective, it is imperative that policies and regulations which ensure emission sources are identified, that emissions are quantified, and methane mitigation measures are verified, are in place in all countries globally.

Hence, after decades of international climate agreements largely focusing on carbon dioxide, the international community has shifted its focus on methane mitigation–leading to a major breakthrough with the Global Methane Pledge (GMP) in 2021.

The Global Methane Pledge was launched in 2021 by the European Union and the United States at COP26, in the first major methane event hosted in COP's recent history.[28] The pledge aimed to support the commitment under the Paris Agreement to keep warming well below 2°C and pursue efforts to limit warming to 1.5°C. It also recognizes that while there are multiple useful international initiatives that address methane, there is a need for high-level political engagement in order to catalyze global methane action.

Parties to the Pledge commit to work on cutting methane emissions by 30% from 2020 levels by the end of 2030 primarily through taking comprehensive domestic actions. Notably, the Global Methane Pledge does not include commitment to adopt methane targets in the countries' NDCs nor a commitment to craft a methane action plan. Rather, the GMP complements the Paris Agreement and the requirement of providing their nationally declared contributions through the commitments of parties to pursue domestic measures, focusing on standards to achieve all feasible reductions through technological innovation, incentives, and partnerships, while improving greenhouse gas inventory reporting, and supporting existing international methane emission reduction initiatives.

Prior to the Global Methane Pledge, methane was treated as just one of the components of the greenhouse gas emissions. Greenhouse gases, in general, are addressed under the UNFCCC, adopted in 1992, where signatories commit to stabilize atmospheric greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system.[29] It was the Kyoto Protocol, adopted in 1997, that specifically identified methane as one of the six (6) greenhouse gases that are the primary area of concern.

More targeted international efforts to address methane emerged in the years that followed. In 2004, the Methane to Markets Partnership, an international public-private partnership committed to reducing methane emissions by capturing methane and turning it to an energy source, was formed by 14 countries, including the United States, China, and Japan, and several key industry groups. It was later renamed in 2010 as the Global Methane Initiative.[30] In 2012, the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC) was established by the UN Environment Programme (UNEP) as a voluntary partnership of over 200 governments, intergovernmental organizations, businesses, scientific institutions and civil society organizations to address super pollutants–including methane. With the CCAC, methane was elevated not just as a greenhouse gas but as a super pollutant.[31] The CCAC subsequently launched the Oil and Gas Methane Partnership (OGMP) in 2014, a voluntary initiative to help companies reduce methane emissions in the oil and gas sector by providing a comprehensive reporting and measurement framework.[32]

The Paris Agreement, adopted in 2015, continued to address methane although within the broader framework of greenhouse gas mitigation. Under the agreement, countries submit nationally determined contributions (NDCs), which set their climate mitigation commitments, including commitments to reduce greenhouse gases.

Then came the Global Methane Pledge–introduced in September 2021 with only six members initially signifying support. However, upon formally launching in November 2021, 105 countries had signed the pledge. As of 2026, 159 countries have signed the pledge, representing more than 70% of the global economy and half of anthropogenic methane emissions.

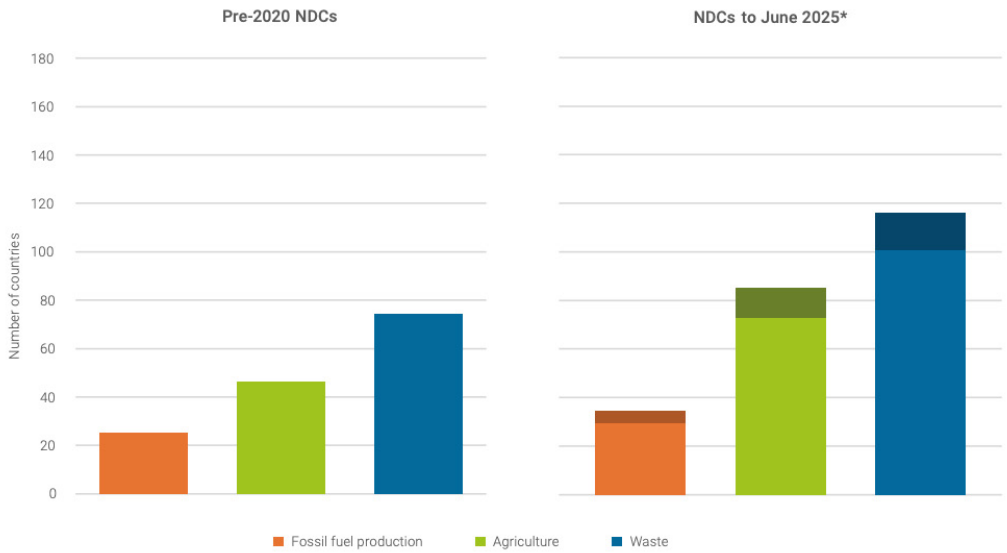
While six of the major global emitters, including the United States, Brazil, and Indonesia, have joined the pledge[33], other top emitting countries, such as China, Russia, and India have remained non-signatories.

Status of the Global Methane Pledge

Since its launch, the growth of methane emissions have become slower than what was anticipated. The new current legislation (CLE) scenario projects that emissions in 2030 will be 14 Mt lower than previously estimated, equivalent to more than 10% of current annual methane emissions from the energy sector globally.[34]

The number of signatories in the GMP is also increasing steadily in the last five years. More importantly, countries' political commitments to reduce methane emissions have grown substantially in both number and specificity, reflecting a broader global ownership of national methane mitigation planning, as shown in the latest Nationally Determined Contributions (NDCs) and Methane Action Plans (MAPs).

Figure ES 2: **Number of countries including methane mitigation measures in Nationally Determined Contributions (NDCs) by sector, pre-2020 and to June 2025. NDC3.0 are indicated by darker shade. *Submitted as of 01 June 2025.**



Source: Global Methane Status Report (2025)

However, despite the progress since the launch of GMP, the UNEP's Global Methane Status Report in 2025 indicates that the world remains off track to meet the 2030 target.[35]

The Report found that only 65% of countries who are parties to the Paris Agreement have integrated methane into their NDCs. Global methane emissions have also increased by approximately 2% from 2020, projected to grow by 5% by 2030 and 21% by 2050 unless additional action is taken. Methane finance for abatement falls short of the estimated US$ 127 billion/year needed to fully implement the maximum technically feasible reductions by 2030. The Report further provides that even with the full implementation of the current NDCs, they could drive methane emissions reductions only up to 8% by 2030, which falls short of the 30% goal by the Global Methane Pledge.

However, the current slowdown in achieving the targets does not mean it is out of reach. The Report underscored that achieving the 30% target remains feasible provided that aggressive, policy-driven reforms are implemented immediately. It also showed the following:

- The energy sector offers the greatest potential for rapid and cost-effective methane mitigation, which would account for 72% of abatement opportunities by 2030.
- Meeting the 2030 GMP target will require further raising of ambition to the full implementation of the maximum technically feasible reductions (MTFR) globally, with mitigation potential varying between countries and across the three main emitting sectors (energy, agriculture, and waste) by 2030.
- With full implementation of all technical measures globally, annual methane emissions in 2030 could be reduced by 131 Mt below CLE 2030 levels, representing a 32% reduction compared with 2020 emissions levels–even exceeding the 30% target set in the GMP.

In addition to the Global Methane Pledge, several global initiatives actively target methane emissions reduction. These include the Oil and Gas Methane Partnership 2.0 (OGMP 2.0), which establishes standardized measurement and reporting frameworks for energy companies; the World Bank-led Zero Routine Flaring initiative; and the industry-led Oil and Gas Decarbonization Charter launched at COP28.

A brief look into the European Union's methane regulation

The European Union's methane regulation (Regulation (EU) 2024/1787) establishes a comprehensive legal framework for the European energy sector to accurately measure, monitor, report, and verify methane emissions in the coal, oil, and gas industries. While also mandating significant reductions in said emissions through leak detection and repair surveys, plugging inactive wells, and restricting venting and flaring, it also applies to operations of these industries, including exploration, production, transmission, distribution and storage.

The Regulation compels the different EU Member States to designate authorities to enforce compliance, conduct inspections, investigate public complaints, and oversee independent third-party verification. It also requires importers of crude oil, gas, and coal to provide data on third-country mitigation measures, which shall be inputted and placed into a centralized methane transparency database and global monitoring tools.

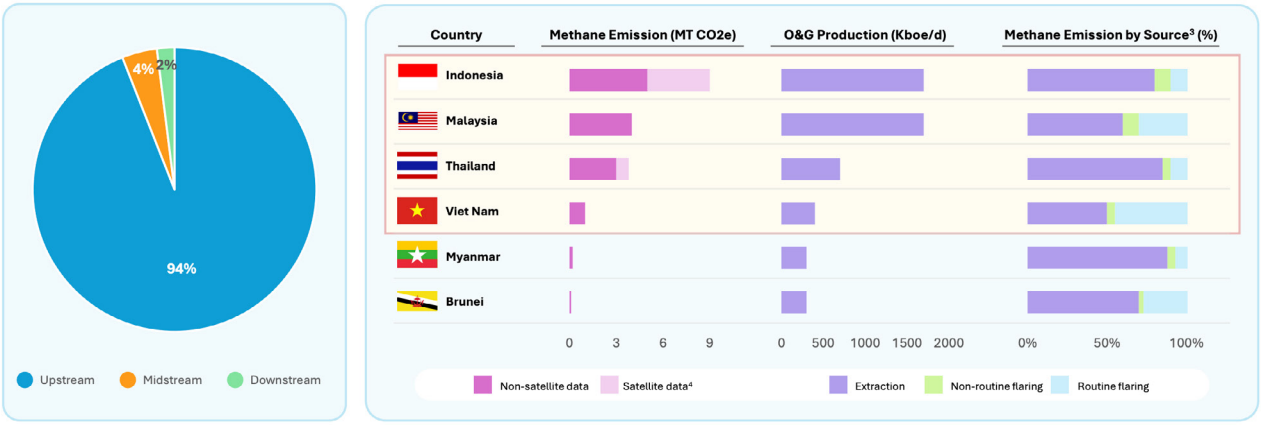
- Oil and gas sector: Operators must report source-level direct emissions that are aligned with OGMP 2.0 Level 4, submit their leak detection and repair (LDAR) programs and strict repair thresholds within 15 days but with strict exemptions, and bans flaring and general venting.
- Coal sector: Mandates monitoring and reporting of methane emissions at source level for underground mines and drainage stations, methane emission factors for surface coal, or mitigation measures for abandoned and closed underground coal mines. It also bans destruction and removal efficiency below 99% for flare stacks or venting more than 5 tonnes of methane per kilotonne of coal mined.
- Importers of crude oil, gas, and coal: Obligates importers to submit annual compliance data of third-country exporters' monitoring, reporting, and verification measures (MRVs), LDAR implementation, and flaring controls. It also establishes the EU Methane Transparency Database and Methane Performance profiles which evaluate importer and exporter compliance, as well as a rapid reaction mechanism to track super-emitting events globally and formally notify jurisdictions and producers requesting immediate mitigation details.

Regulation (EU) 2024/1787 establishes a phased implementation framework running from 2024 to 2030, beginning with foundational contract rules, leak detection requirements, and national authority setups in Phase 1 (2024) and Phase 2 (2025). In Phase 3 (2026), domestic operational restrictions take effect – banning routine venting and flaring while establishing direct OGMP Level 4 source-level measurement, public well-plugging plans, and global super-emitter tracking. Phase 4 (2027) extends enforcement to third-country fossil fuel imports via equivalent MRV standards and requires domestic OGMP Level 5 site-level reconciliation. Finally, Phase 5 (2028–2030) culminates in an absolute ban on venting and flaring from equipment at closed coal mines and the full enforcement of statutory maximum methane intensity caps on all domestic and imported energy supplies.

Despite the substantial progress in this regulatory framework, the European Commission is considering a delay of at least one year for Phase 4 implementation. This proposed postponement stems from the pushback by the oil and gas industry and member state governments like France, Italy and Germany, who cite severe ongoing energy supply disruption due to the ongoing US-Israel war against Iran.[36]

METHANE POLICY LANDSCAPE IN SOUTHEAST ASIA

In 2024, Southeast Asia's energy sector generated 26% of total methane emissions, according to the Association of Southeast Asian Nations (ASEAN) Centre for Energy. Within the energy sector, 10% from coal, 10% from oil and gas, and 6% from bioenergy.[37] Driven by large-scale oil and gas production, Indonesia, Malaysia, Thailand, and Vietnam account for the majority of these emissions, 84% of which is from upstream operations. Upstream methane intensities for oil and gas in Southeast Asia are around the global average, with lower intensities in Malaysia and Brunei.[38]



Notes: (1) Other countries, such as the Philippines, Cambodia, Singapore, and Lao PDR, have small or little to no oil and gas production; (2) Includes methane emissions estimated using satellite data; (3) Extraction refers to drilling, production, and processing; (4) Satellite imagery can capture substantial onshore emissions but is unable to capture offshore emissions due to technical constraints. Hence, Indonesia's emissions are estimated to be relatively higher.

Source: Methane Policy Readiness in ASEAN's Oil and Gas Sector: Assessments of Indonesia, Malaysia, Thailand, Viet Nam, ASEAN Centre for Energy

At the regional level, ASEAN has launched several initiatives to advance methane mitigation, including:

- Optimising Methane Emissions Governance and Abatement in ASEAN Oil and Gas Sector (OMEGA) Project: Led by the ASEAN Centre for Energy (ACE), this initiative assists countries in strengthening methane policies and regulations, establishing robust Measurement, Reporting, and Verification (MRV) systems, and building technical capacity across the energy sector.
- Methane Management Roadmap for Oil and Gas in ASEAN: A regional strategic framework designed to align sub-sector mitigation targets and unlock economic and environmental benefits across member states.
- Methane Abatement Towards Sustainable Petroleum Industry (MAESTRO) Dashboard: A publicly accessible tool that tracks and monitors emissions in the oil and gas sector.

Methane abatement across Southeast Asia's energy sector relies on targeted technical solutions. The oil and gas industry achieves reductions through: vapor recovery systems, associated gas capture, and systematic leak detection and repair (LDAR) practices.[39]

Participation in the Global Methane Pledge varies across Southeast Asia. Seven countries in the region namely, Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Timor-Leste, and Vietnam have officially signed on to the pledge. Conversely, four countries namely, Brunei, Lao PDR, Myanmar, and Thailand have yet to join.

Despite these differing levels of commitment, 10 out of 11 countries in Southeast Asia explicitly mention methane in their Nationally Determined Contributions (NDCs). Countries are also advancing mitigation through national-level methane target or plan and corporate decarbonization targets set by state-owned oil companies, such as PETRONAS (Malaysia), Pertamina (Indonesia), and PTTEP (Thailand). Notably, Cambodia and Vietnam lead the region as the only two countries to have established dedicated national methane action plans with specific country-level reduction targets.[40]

Country	Global Methane Pledge	NDC mentioning methane	National methane target/plan	National oil companies methane target/plan
Brunei	✗	✓	✗	✗
Cambodia	✓	✓	✓	✗
Indonesia	✓	✓	✗	✓
Lao PDR	✗	✓	✗	✗
Malaysia	✓	✓	✗	✓
Myanmar	✗	✗	✗	✗
Philippines	✓	✓	✗	✗
Singapore	✓	✓	✗	✗
Thailand	✗	✓	✗	✓
Timor Leste	✓	✓	✗	✗
Viet Nam	✓	✓	✓	✗

Brunei

✗ Non-signatory to Global Methane Pledge

Brunei remains heavily reliant on its oil and gas industry, which accounts for 58% of its GDP and 92% of its exports--the energy sector drives 74% of the nation's total methane emissions through fugitive leaks and fuel combustion.[41]

Under its updated Nationally Determined Contribution (NDC 3.0) submitted in 2025, Brunei aims to reduce its greenhouse gas (GHG) emissions, including methane, by 20% by 2035. However, this target remains conditional on receiving international support through financing, technology transfer, and capacity building.[42]

In Brunei's National Climate Change Policy (BNCCP), the government established key strategies which include methane reduction measures such as mandatory reporting of carbon inventory of GHG including methane, reduce industrial emissions by 2035 through eliminating routine flaring by 2030, reduce industrial emissions, and establish long-term industrial emission reduction targets.[43]

Cambodia

✓ Signatory to Global Methane Pledge

Cambodia's methane profile is largely driven by the agricultural and waste sectors, with the energy sector accounting for just 1% of total national methane emissions. National methane mitigation commitments are concentrated primarily on agriculture and waste management, though targeted energy-sector measures remain part of the strategy.

These initiatives are integrated into Cambodia's broader climate framework and updated NDC 3.0 (2025), which commits to cutting economy-wide GHG emissions by 16% unconditionally and up to 55% conditionally by 2035 relative to business-as-usual projections outline an aggregate GHG reduction target rather than dedicated targets for methane.[44]

In parallel, energy-related measures under Cambodia's methane reduction roadmap focus on transitioning from coal to renewable energy, targeting a 72% renewable energy share (expandable to 80% with conditional support), alongside grid modernization, decentralized energy solutions, and expanded energy efficiency programs.[45]

Indonesia

✓ Signatory to Global Methane Pledge

Indonesia is the largest methane emitter in Southeast Asia and ranks among the top ten fossil fuel methane emitters globally – placing 8th in 2025 estimates due to extensive coal mining and upstream oil and gas production.[46]

Indonesia's NDC 2.0 (2025) expanded its mitigation scope beyond waste-sector methane capture to incorporate upstream oil and gas flaring and venting reductions, energy mix diversification, land restoration, and marine conservation. Under its 2030 targets, Indonesia commits to an unconditional emissions reduction of 31.89% (and up to 43.2% conditionally) against business-as-usual levels, with methane mitigation explicitly integrated across energy transition and coal mine management frameworks.

Under the Ministry of Energy and Mineral Resources (MEMR), the government has issued specific regulations restricting gas flaring and venting in upstream operations. Furthermore, Presidential Regulation No. 98/2021 established a national carbon pricing framework. Pursuant to this regulation, MEMR launched a domestic Emissions Trading Scheme (ETS) for the power generation sector that explicitly covers methane emissions, while the Ministry of Environment and Forestry maintains a mandatory National GHG Inventory system to track and verify emissions.

National oil company PT Pertamina aims to reduce its methane emissions by 40% by 2030 and commit to Zero Routine Flaring (ZRF) by 2030. PT Pertamina has also aligned its reporting with the Oil and Gas Methane Partnership 2.0 (OGMP 2.0) Gold Standard.[47] At the regional level, PT Pertamina co-developed and actively participated in the ASEAN Methane Leadership Program (MLP), while systematically deploying Leak Detection and Repair (LDAR) programs and vapor recovery units across its major upstream and midstream assets.

Malaysia

✓ Signatory to Global Methane Pledge

The energy sector, composed of fugitive emissions and fuel combustion, accounts for 37% of Malaysia's methane emissions.[48] Malaysia is the second largest methane emitter in Southeast Asia.

In its NDC 3.0 (2025), Malaysia integrated its methane reduction under its target to reduce economy-wide carbon intensity by 45% against 2005 levels by 2030.[49] At the national level policy, Malaysia's draft National Climate Change Bill (RUU PIN) includes a Measurement, Monitoring, Verification and Reporting (MMRV) framework featuring facility-level GHG emissions reporting and thresholds.

National oil company PETRONAS aims to achieve a 70% absolute reduction in gas operation emissions groupwide by 2030.[50] PETRONAS is implementing leak detection and repair (LDAR) technologies using drones, satellites, and thermal imaging across its operations, alongside eliminating continuous flaring and phasing out routine venting in upstream facilities.

Myanmar

✗ Non-signatory to Global Methane Pledge

Myanmar's NDC 2.0 does not include specific targets for energy-sector methane, focusing its methane reduction measures on the waste sector. However, the NDC sets significant broader energy targets for 2030. Unconditionally, Myanmar aims to reduce coal capacity by 54.4% against business-as-usual (BAU) levels, lowering it from 7,940 MW to 3,620 MW, while maintaining renewable energy capacity at 2,000 MW. With conditional international support and technology transfer, the country targets a 53.3% increase in RE capacity over BAU to 3,070 MW and a 73.3% reduction in coal capacity down to 2,120 MW.[51]

Lao PDR

✗ Non-signatory to Global Methane Pledge

Lao PDR's energy-sector methane profile is driven primarily by fugitive emissions from hydropower reservoirs and limited fossil fuel use.[52]

In June 2026, Lao PDR validated its updated NDC 3.0 (pending submission to the UNFCCC), taking a broad, economy-wide approach that includes the energy sector.[53] In parallel, a 2024–2025 review of the 9th Five-Year Energy and Mining Development Plan informed preparations for the 10th Plan (2026–2030). This framework reaffirms hydropower as the grid's backbone while expanding solar capacity and grid modernization. Through solar mini-grids and remote off-grid solutions, the country is on track to achieve near-universal electrification, targeting 98% access by the end of 2025.[54]

Philippines

✓ Signatory to Global Methane Pledge

Under its updated NDC 3.0 (2026), the Philippines targets an economy-wide net GHG emissions reduction of 75% against business-as-usual projections for 2025–2035– comprising a 7% unconditional reduction and a 68% conditional target contingent on international support. The NDC states it aligns its energy-sector strategy with the Philippine Energy Plan 2023-2050.[55]

As a member of the Climate and Clean Air Coalition (CCAC), the Philippines has developed its national action plan on short-lived climate pollutants (SLCPs) and methane roadmap. These comprehensive documents provide a clear direction for implementation, including 13 priority mitigation measures spanning sectors like waste, agriculture, energy, and transport.[56] For the energy sector, mitigation measures include promoting use of renewable energy and reduction of biomass cooking.[57]

Unlike regional peers, the Philippine National Oil Company (PNOC) does not set standalone methane targets, aligning its strategy directly with national climate policy.

Singapore

✓ Signatory to Global Methane Pledge

Singapore's NDC 2.0 is also an economy-wide absolute GHG emissions reduction target which aims to reduce emissions to between 45 to 50 MtCO2e in 2035. While still primarily powered by imported liquified natural gas (LNG), which amounts to 95% of its fuel generation mix, it aims to achieve at least 2 GW from solar power deployment by 2030. On top of this, it also aims to embark on raising clean electricity importation from 4GW to 6GW by 2035 to meet one-third of Singapore's electricity needs.[58]

Thailand

✗ Non-signatory to Global Methane Pledge

Thailand is one of the significant methane-emitting nations in Southeast Asia, with its energy sector playing a key role.

In its updated NDC 3.0 (2025), Thailand commits to an economy-wide greenhouse gas reduction target of 30% to 40% by 2030 below its Business-As-Usual (BAU) baseline, with the higher 40% target conditional on receiving international technology transfer and financial support. The outcomes of the UNFCCC's Global Stocktake (GST) were incorporated into the shaping of NDC 3.0 to align with the Paris Agreement's 1.5°C goal and the country's long-term net-zero by 2050 target.[59]

On a domestic level, Thailand has its National Greenhouse Gas Reduction Guidelines for 2021-2030 in order to better meet its obligations under the United Nations Framework Convention on Climate Change. Its current greenhouse gas inventory tracks six major greenhouse gasses, namely carbon Dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexaflouride (SF6).[60]

While Thailand is not an official signatory to the Global Methane Pledge, its domestic targets closely align with the pledge's broader goals. Current policies mandate strict operational monitoring, standard compliance, and fugitive emissions controls across gas facilities, including transmission pipelines, LNG regasification terminals, and gas-fired power plants.

Furthermore, the draft Climate Change Act, expected to come into force by early 2027, will establish a legally binding Measurement, Reporting, and Verification (MRV) framework for regulated entities in the energy sector.[61]

At the enterprise level, state-owned entities PTT Public Company Limited and its exploration and production arm, PTTEP, lead the operational execution of the energy sector's decarbonization and net-zero by 2050 targets. PTTEP has set an explicit operational target to reduce its methane emission intensity to less than 0.2%. PTTEP implements methane management across all operated exploration and production projects, including gas flaring, stationary combustion, equipment leaks, venting from production processes and LDAR program to monitor, detect, and manage methane leakage.[62]

Timor Leste

✓ Signatory to Global Methane Pledge

Under its NDC 3.0 (2026), Timor-Leste will continue its NDC 2.0 measures through 2030 while proposing new strategies through 2035 based on the latest outcomes of climate processes. Timor Leste commits to continue development sustainable low-carbon strategies and demonstrate progress in implementation such as consistent monitoring, reporting and verification of its GHG emissions.[63]

While it aims to provide more transparency on its oil and gas industry operations as well as its extractive industry reporting online database as part of its unconditional commitments, the creation of a National GHG inventory as well as its Low Carbon Development Strategy is incumbent on financial and technical support as well as technology transfer as part of its conditional commitments.

Vietnam

✓ Signatory to Global Methane Pledge

Vietnam's updated NDC (2022) sets economy-wide GHG reduction targets including methane. Under this commitment, Vietnam raised its unconditional emission reduction target from 9% to 15.8%, and its conditional target from 27% to 43.5% relative to business-as-usual projections. To achieve these goals, the NDC specifically calls for research collaboration and technology transfer to curb methane leakage across fossil fuel extraction (coal, oil, and gas).[64]

Following its Global Methane Pledge endorsement, Vietnam launched its Methane Action Plan 2030. Unlike Cambodia's plan, which focuses predominantly on the waste sector, Vietnam integrates energy sector interventions alongside its broader climate goals. The plan targets overall methane reductions below 2020 levels of 13.34% by 2025 and 30% by 2030.

To meet these targets, Vietnam is establishing regulatory frameworks to incentivize associated gas collection, enforce leak detection equipment installations, promote renewables, and mandate methane drainage in underground coal mines. Implementation and annual MRV assessments will be co-managed by the Ministry of Natural Resources and Environment, the Ministry of Agriculture and Rural Development, the Ministry of Industry and Trade, and the Ministry of Science and Technology according to their respective mandates.

On an operational level, state-owned enterprise Petrovietnam (PVN) serves as the primary executive body for energy sector targets, aligning its corporate transition plan with national policies. PVN is currently retrofitting offshore and onshore gas facilities to capture low-pressure associated gas, deploying facility-wide MRV audits, and utilizing captured gas for domestic power production under Power Development Plan 8 (PDP8).[65]

WHY METHANE MITIGATION IS CRUCIAL FOR CLIMATE ACTION?

Taking the principles under the 2025 ICJ AO and the evidence of harms attributable to methane, combating methane emission of the fossil fuel sector must take a two-pronged approach.

First, while methane is emitted by different industries, the fossil fuel sector is a particularly important sector to focus on. As mentioned, it is a major source of anthropogenic methane, emitting around 135 Mt per year. More importantly, methane emissions from fossil fuel projects can be abated using existing technologies at low cost. The Global Methane Tracker found that the energy sector holds 72% of global technical mitigation potential in 2030.[66]

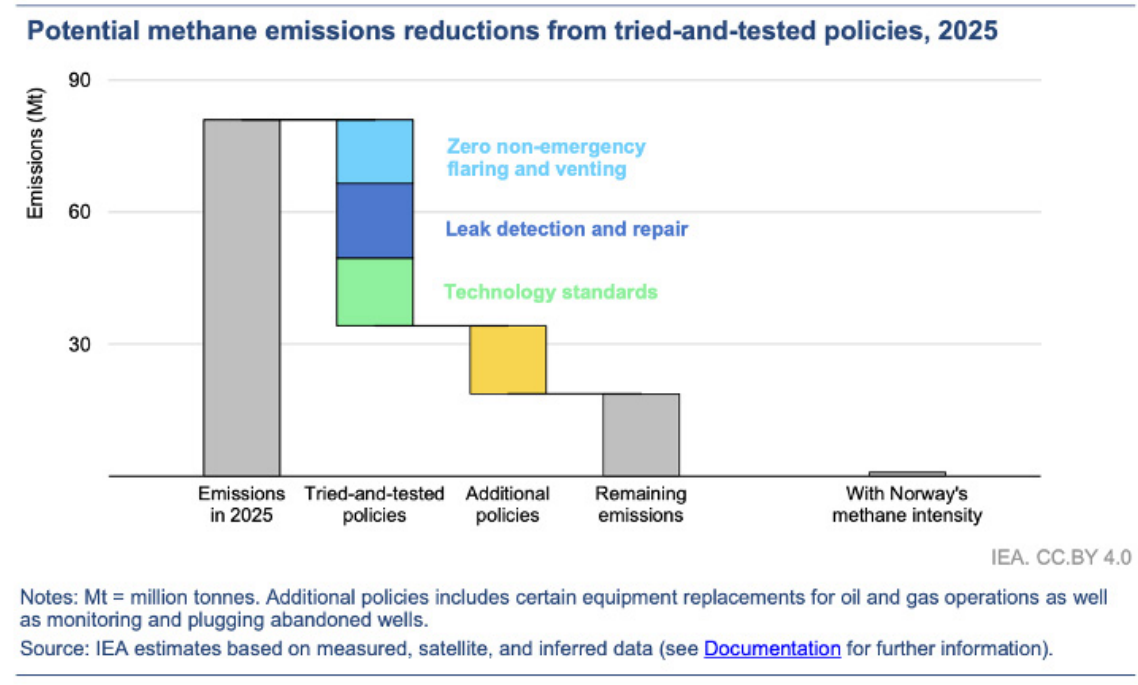
The two-pronged approach is (1) mitigating methane emissions from existing fossil-fuel operations and (2) stopping the expansion and ultimately phasing out fossil fuel production and infrastructure. The first prong is intended to be an immediate intervention while the second prong offers the structural solution.

The initial step to mitigating methane would be to ensure that methane is detected and disclosed. With the state duty under the ICJ AO to conduct due diligence and to use available technologies to address risks, governments need systems capable of identifying where methane is being released, quantifying emissions, identifying responsible operators, and verifying whether mitigation measures are actually working. Regular site specific monitoring, especially of fossil fuel facilities, is crucial for this work, especially as it would allow policymakers to identify projects that must be prioritized in decommissioning. Satellite monitoring as the first step to identify the source and ground-based detection technologies can be used for regular and continuous monitoring.

Second, it is also crucial to strengthen public education on methane pollution. Integrating methane pollution in climate, environmental, and public health discussions is important to raise awareness on the impacts of methane and build the capacity of institutions, regulators, communities, and relevant stakeholders. Education and capacity-building should include practical training on methane detection and monitoring and mechanisms for reporting and responding to suspected emissions. This is particularly important because methane is often invisible and difficult to detect without specialized equipment, which can limit public awareness of its presence and impacts.

Third, institutionalizing policies is important to ensure that methane mitigation becomes a binding obligation on private companies and governments. Other countries have institutionalized technical solutions to ensure methane abatement. These include regulations that limit flaring and venting, require leak detection and repair (LDAR) programmes, and establish technology standards.

For instance, Norway banned non-emergency flaring in 1971 and introduced a tax on natural gas venting and flaring in 2015. This measure has helped Norway maintain very low levels of flaring and methane emissions, giving it the lowest emissions intensity of any country. The IEA estimates that a global implementation of methane abatement policies has the potential to cut oil and gas methane emissions by more than half.[67]



Source: Global Methane Tracker 2026 (2026)

These regulations are practically feasible as the technical solutions required are mostly existing. Specifically, for oil and gas, upgrading equipment that emits by design (e.g., replacing wet compressor seals with dry ones), deploying vapor-recovery units (VRUs) to capture low-pressure or vented methane, implementing leak detection and repair (LDAR), replacing methane-emitting pumps and other equipment with electric devices, and using associated gas, for example to power microturbines for power generation help abate methane emissions.[68]

The second prong addresses the structural problem: the world's continued dependence on fossil fuels. Methane mitigation should not be used to justify the continued expansion of the fossil fuel industry. While existing technologies can significantly reduce methane emissions, no mitigation policy can eliminate them entirely. As long as oil and gas production continues, methane and other greenhouse gas emissions will continue to be generated, contributing to continued global warming and other environmental harms. Methane mitigation must therefore be pursued alongside, rather than in place of, efforts to phase out fossil fuels.

As the Climate Analytics found, in order for the Philippines to align with the 1.5°C goal, oil-fired generation should be phased out by 2025, coal-fired generation by 2030 to 2035, and fossil gas-fired generation kept below 0.5% by 2035 to 2040. The phaseout would be made possible by harnessing the country's massive renewable potential–estimated at 1,200 GW.[69]

The timeline provided by the Climate Analytics finds support with the Global Methane Status Report, which provided that decarbonization through fossil fuel phaseout becomes increasingly important from 2040s onward.

As global temperature rise is set to cross 1.5°C, the UNEP Overshoot Report emphasizes an urgent imperative: rapid, sustained cuts to greenhouse gas emissions, including methane. In the short term, sharp reductions in methane and other short-lived climate pollutants are critical to mitigating near-term warming.[70]

Taken together, the two-pronged approach would address the methane problem both in the short-term and long-term. For the short-term, methane emissions from existing fossil fuel projects must be detected, disclosed, regulated, and reduced using available technologies. The long-term solution would be to reduce dependence on fossil fuels and advance a timely phaseout, supported by the development of renewable energy. Therefore, methane regulation is not an alternative to fossil fuel phaseout, but an immediate intervention that complements it.

ENDNOTES

1. Mitigating Methane: A Global Health Strategy - Overview. 2023. Abt Associates on behalf of the Global Climate and Health Alliance. https://climateandhealthalliance.org/wp-content/uploads/2023/08/MethaneReport-Overview-FINAL.pdf.

2. National Aeronautics and Space Administration. 2026. "Methane - Earth Indicator." Science at NASA, February. https://science.nasa.gov/earth/explore/earth-indicators/methane/.

3. United Nations Environment Programme. 2025. Global Methane Status Report. Paris.

4. International Energy Agency. 2026. Key Findings Global Methane Tracker 2026.

5. Earthworks. "Earthworks: Flaring and Venting." https://earthworks.org/issues/flaring_and_venting/.

6. Mitigating Methane: A Global Health Strategy - Overview. 2023. Abt Associates on behalf of the Global Climate and Health Alliance. https://climateandhealthalliance.org/wp-content/uploads/2023/08/MethaneReport-Overview-FINAL.pdf.

7. Africa Centre for Energy Policy. 2024. Environmental and Health Impacts of Methane Emissions.

8. Kelly, Jess. 2023. "Ali Died Days Before He Could Challenge BP's CEO on the Dangers of Gas Flaring. Don't Let His Death Be in Vain." The Guardian, April 27. https://www.theguardian.com/commentisfree/2023/apr/27/ali-smoke-choked-bp-oilfield-death-gas-flaring.

9. Stallard, Esme, and Owen Pinnell. 2024. "Iraqi Father in Legal First Against BP Over Son's Death." BBC, April 23. https://www.bbc.com/news/science-environment-68829899.

10. World Meteorological Organization. 2026. "WMO Confirms 2025 Was One of Warmest Years on Record." January 13. https://wmo.int/news/media-centre/wmo-confirms-2025-was-one-of-warmest-years-record.

11. United Nations Environment Programme/Climate and Clean Air Coalition. 2022. Global Methane Assessment: 2030 Baseline Report.

12. United Nations Environment Programme. 2025b. Global Methane Status Report. United Nations Environment Programme.

13. Id.

14. Id.

15. ICJ AO, Par. 457, 3.B

16. ICJ AO, Par. 138

17. ICJ AO, Par. 428

18. ICJ AO, Par. 283

19. ICJ AO, Par. 286

20. ICJ AO, Par. 427

21. "Global Methane Pledge." https://www.globalmethanepledge.org/.

22. Regulation (EU) 2024/1787, Art. 14 §8

23. Regulation (EU) 2024/1787, Art. 2 §62

24. Regulation (EU) 2024/1787, Art. 31

25. IEA. 2026. "Key Findings – Global Methane Tracker 2026 – Analysis." https://www.iea.org/reports/global-methane-tracker-2026/key-findings.

26. UN Environment Programme. 2022. Global Methane Assessment: 2030 Baseline Report.

27. Carbon Mapper. 2026. "Sarawak, Malaysia." https://data.carbonmapper.org/?sectors=1B2&details=CH4_1B2_250m_113.04678_3.37200%3Fstatus%3Dnot_deleted&plume_id=tan20260606t041902c87s4001-A#13.85/3.36267/113.06272.

28. UNFCCC (United Nations Framework Convention on Climate Change). "World Leaders Kick-Start Accelerated Climate Action at COP26." https://unfccc.int/news/world-leaders-kick-start-accelerated-climate-action-at-cop26.

29. UNFCC, Article 2.

30. Global Methane Initiative. https://www.globalmethane.org/20years/

31. Climate and Clean Air Coalition. https://www.ccacoalition.org/.

32. Global Methane Org. https://globalmethane.org/challenge/ogmp.html

33. Abnett, Kate, Valerie Volcovici, Ilze Filks, and Jeff Mason. 2021. "More Than 100 Countries Join Pact to Slash Planet-Warming Methane Emissions." Reuters, November 2. https://www.reuters.com/world/middle-east/more-than-100-countries-join-pact-slash-planet-warming-methane-emissions-2021-11-02/.

34. United Nations Environment Programme. 2025c. Global Methane Status Report. November. https://doi.org/10.59117/20.500.11822/48921.

35. Id.

36. Twidale, Susanna, and Kate Abnett. 2026. "Explainer: What Are Europe's Methane Emissions Rules and Why Are They Being Delayed?" Reuters, September 29. https://www.reuters.com/business/energy/what-are-europes-methane-emissions-rules-why-are-they-being-delayed-2026-09-29/.

37. ASEAN Centre for Energy. "Methane Policy Readiness in ASEAN's Oil and Gas Sector Assessments of Indonesia, Malaysia, Thailand, Viet Nam." ASEAN Centre for Energy (ACE), October 6, 2026. https://aseanenergy.org/publications/methane-policy-readiness-in-aseans-oil-and-gas-sector-assessments-of-indonesia-malaysia-thailand-viet-nam.

38. Id.

39. ASEAN Centre for Energy, ASEAN Methane Insights Vol. 1-2026, https://aseanenergy.org/publications/asean-methane-insights-vol-1-2026

40. ASEAN Centre for Energy. "Methane Policy Readiness in ASEAN's Oil and Gas Sector Assessments of Indonesia, Malaysia, Thailand, Viet Nam." ASEAN Centre for Energy (ACE), October 6, 2026. https://aseanenergy.org/publications/methane-policy-readiness-in-aseans-oil-and-gas-sector-assessments-of-indonesia-malaysia-thailand-viet-nam.

41. ASEAN-Korea Cooperation for Methane Mitigation (AKCMM). 2022. "Methane Reduction Plan at a Glance." https://www.akcmm.org/country-level/brunei-darussalam/methane-reduction-plan-at-a-glance.

42. Brunei Darussalam's Third Nationally Determined Contribution under the United Nations Framework Convention on Climate Change. 2025. https://unfccc.int/sites/default/files/2025-10/%5BFinal%5D%20Brunei%20Darussalam%27s%20Nationally%20Determined%20Contribution%203.0.pdf.

43. 10 Key Strategies to shape Brunei Darussalam to Low-Carbon and Climate-Resilient. 2019. Brunei Darussalam National Council on Climate Change. https://climatechange.gov.bn/SitePages/Pages/bnccp-goals.aspx

44. Cambodia's Third Nationally Determined Contribution. 2025. https://unfccc.int/sites/default/files/2025-08/Cambodia-NDC%203.0_0.pdf

45. "Methane Reduction Roadmap for Cambodia." 2025. IGES. https://doi.org/10.57405/iges-14551.

46. IEA. 2026b. "Key Findings – Global Methane Tracker 2026 – Analysis." https://www.iea.org/reports/global-methane-tracker-2026/key-findings.

47. Razak, Imanuddin. "Pertamina Commited to Reducing Methane Emissions by 40 Percent By 2030." Indonesia Business Post, November 29, 2024. https://indonesiabusinesspost.com/3252/society-environment-and-culture/pertamina-commited-to-reducing-methane-emissions-by-40-percent-by-2030.

48. ASEAN-Korea Cooperation for Methane Mitigation. 2026. "Methane Reduction Plan at a Glance." https://www.akcmm.org/country-level/malaysia/methane-reduction-plan-at-a-glance.

49. Malaysia's Third National Determined Contribution. October 2025. https://unfccc.int/sites/default/files/2025-10/Malaysia%20NDC%203.0%20to%20UNFCCC%202025%20final.pdf

50. PETRONAS. 2024. Methane Guiding Principles Signatory Reporting. Petronas. https://www.petronas.com/sites/default/files/uploads/content/2024/PETRONAS-Methane-Guiding-Principles-Reporting-2024_0.pdf

51. Myanmar's Second Nationally Determined Contributions. July 2021. https://unfccc.int/sites/default/files/NDC/2022-06/Myanmar%20Updated%20%20NDC%20July%202021.pdf

52. ASEAN-Korea Cooperation for Methane Mitigation. "Overview of Methane in Lao PDR." https://www.akcmm.org/country-level/lao-pdr/methane-reduction-plan-at-a-glance.

53. Global Green Growth Institute. "Validation of Lao PDR's Energy and Industry Sector NDC 3.0." Global

Green Growth Institute, June 19, 2026. https://gggi.org/validation-of-lao-pdrs-energy-and-industry-sector-ndc-3-0/.

54. ASEAN Energy in 2026: Key Insights and Forward-Looking Perspectives on the Regional Energy Landscape. 2026. ASEAN Centre for Energy. https://storage.googleapis.com/aceweb-bucket-261225/pdf/publication/ASEAN%20Energy%20in%202026_Report_W8Bo740Dzbts85UlX4iC6f6KUihUO0KwfsBXLFXL.pdf.

55. Republic of the Philippines. 2026. Republic of the Philippines Nationally Determined Contribution (2026 NDC). https://unfccc.int/sites/default/files/2026-09/1.%20PH%20Nationally%20Determined%20Contribution%202026.0715.pdf.

56. Clean Air Asia. "A National Milestone for Clean Air and Climate: Philippines Finalizes SLCP National Plan and Methane Roadmap | Clean Air Asia." June 17, 2025. https://www.cleanairasia.org/our-news/national-milestone-clean-air-and-climate-philippines-finalizes-slcp-national-plan-and.

57. Climate & Clean Air Coalition. "National Action Plan to Reduce Short-Lived Climate Pollutants in the Philippines Integrated with the Methane Mitigation Roadmap." August 2025. https://www.ccacoalition.org/sites/default/files/resources/files/PH%20National%20SLCP%20Plan_20Aug2025.pdf.

58. Singapore's Second Nationally Determined Contribution (NDC) and Accompanying Information. https://unfccc.int/sites/default/files/2025-02/Singapore%20Second%20Nationally%20Determined%20Contribution.pdf.

59. Thailand's Third Nationally Determined Contribution, https://unfccc.int/sites/default/files/2025-11/TH%20NDC%203.0.pdf

60. National Greenhouse Gas Reduction Guidelines 2021-2030, https://hub.mnre.go.th/en/knowledge/detail/63111

61. Climate Policy Database. "Climate Change Act Draft Thailand." February 4, 2025. https://climatepolicydatabase.org/policies/climate-change-act-draft.

62. PTTEP Sustainability. "Climate Change Management." https://sustainability.pttep.com/en/environment/climate-change-management#:~:text=Goals%20*%201.%20Reduce%20greenhouse%20gas%20emissions,intensity%20to%20less%20than%200.2%25%20by%202030.

63. Timor-Leste's nationally determined contribution 2026-2035. 2026. https://unfccc.int/sites/default/files/2026-06/Timor-Leste%20Updated%20NDC%203.0.pdf.

64. Vietnam's Third Nationally Determined Contribution (NDC). https://unfccc.int/sites/default/files/NDC/2022-11/Viet%20Nam_NDC_2022_Eng.pdf.

65. Viet Nam Action Plan for Methane Emissions Reduction by 2030. July 7, 2023. https://www.iea.org/policies/17026-viet-nam-action-plan-for-methane-emissions-reduction-by-2030

66. IEA. "Understanding Methane Emissions – Global Methane Tracker 2025 – Analysis." 2025. https://www.iea.org/reports/global-methane-tracker-2025/understanding-methane-emissions.

67. Id.

68. IEA. "Key Findings – Global Methane Tracker 2026 – Analysis." 2026. https://www.iea.org/reports/global-methane-tracker-2026/key-findings.

69. Climate Analytics. "A 1.5°C Future Is Possible: Getting Fossil Fuels out of the Philippine Power Sector." November 15, 2023. https://climateanalytics.org/publications/a-15c-future-is-possible-getting-fossil-fuels-out-of-the-philippine-power-sector.

70. United Nations Environment Programme. Limiting Overshoot: Navigating Exceedance of 1.5°C and Pathways Towards Return. 2026. https://doi.org/10.59117/20.500.11822/49857.