# Methane Tracker 2020

Reducing the environmental impact of oil and gas supply is a pivotal element of global energy transitions

Fuel report — March 2020



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**Acknowledgements**

This 2020 update to the IEA's methane tracker includes detailed estimates for 2019 that incorporate new data for oil and gas supply as well as the latest evidence from the scientific literature and measurement campaigns.

Oil and gas producers that can demonstrate that they are taking strong action to reduce methane emissions can credibly argue that their resources should be preferred over higher-emission options. It is crucial for the oil and gas industry to be proactive in limiting, in all ways possible, the environmental impact of oil and gas supply, and for policy makers to recognise this is a pivotal element of global energy transitions.

**Read a discussion of our latest findings on methane emissions**

**Global methane emissions from oil and gas**

# Overview

Oil and natural gas will be part of the energy system for decades to come – even under ambitious efforts to reduce greenhouse gas emissions in line with the Paris Agreement. As part of today's energy transitions, it is therefore vital to reduce the immediate environmental impacts associated with producing and consuming these fuels. Reducing methane emissions is a powerful and cost-effective way to act, providing an essential complement to action on reducing $CO_2$.

## Methane and climate change

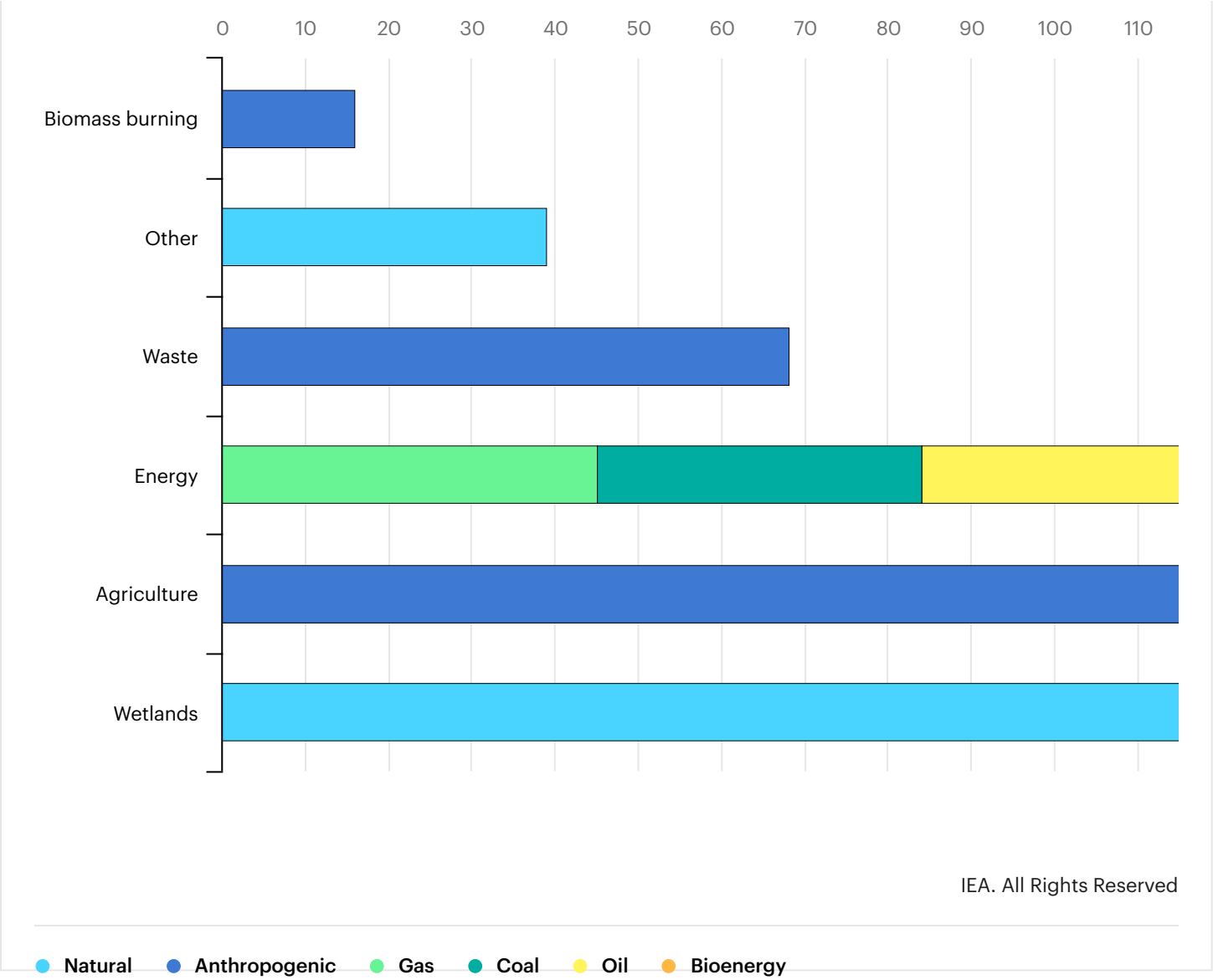
The concentration of methane in the atmosphere is currently around two-and-half times greater than pre-industrial levels and is increasing steadily. This rise has important implications for climate change.

Estimates of methane emissions are subject to a high degree of uncertainty, but the most recent comprehensive estimate suggests that annual global methane emissions are around 570 million tonnes (Mt). This includes emissions from natural sources (around 40% of emissions), and those originating from human activity (the remaining 60% - known as anthropogenic emissions).

The largest source of anthropogenic methane emissions is agriculture, responsible for around a quarter of the total, closely followed by the energy sector, which includes emissions from coal, oil, natural gas and biofuels.

**Sources of methane emissions** **Open**

MT of methane




Methane has important implications for climate change, particularly in the near term.

Two key characteristics determine the impact of different greenhouse gases on the climate: the length of time they remain in the atmosphere and their ability to absorb energy. Methane has a much shorter atmospheric lifetime than $CO_2$ (around 12 years compared with centuries for $CO_2$) but it is a much more potent greenhouse gas, absorbing much more energy while it exists in the atmosphere.

There are various ways to combine these factors to estimate the effect on global warming; the most common is the global warming potential (GWP). This can be used to express a tonne of a greenhouse-gas emitted in $CO_2$ equivalent terms, in order to provide a single measure of total greenhouse-gas emissions (in $CO_2$-eq).

The Intergovernmental Panel on Climate Change (IPCC) has indicated a GWP for methane between 84-87 when considering its impact over a 20-year timeframe ($GWP_{20}$) and between 28-36 when considering its impact over a 100-year timeframe ($GWP_{100}$). This means that one tonne of methane can considered to be equivalent to 28 to 36 tonnes of $CO_2$ if looking at its impact over 100 years.

In addition to its climate impacts, methane also affects air quality because it is an ingredient in the formation of ground level (tropospheric) ozone, a dangerous air pollutant.

## Why focus on methane emissions from oil and gas?

It is important to tackle all sources of methane emissions arising from human activity, but there are reasons to focus on emissions from oil and gas operations.

First, although emissions also come from coal and bioenergy, oil and gas operations are likely the largest source of emissions from the energy sector.

Second, our analysis shows clear scope to reduce them cost-effectively. Unlike $CO_2$, methane – the main component of natural gas – has commercial value: the additional methane captured can often be monetised directly, and this is typically easier in the oil and gas sectors than elsewhere in the energy sector. This means that emissions reductions could result in economic savings or be carried out at low cost.

Our scenario projections also suggest that oil and, particularly, natural gas will play important roles in the energy system for decades to come, even under strong decarbonisation scenarios such as the IEA's Sustainable Development Scenario.

Gas can play an important supporting role in energy transitions by replacing more polluting fuels; it may also deliver services that are difficult to provide cost-effectively with low-carbon alternatives, such as peak winter heating, seasonal storage, or high temperature heat for industry. However, fulfilling this role requires that adverse social and environmental impacts are minimised: immediate and major reductions in methane emissions are central to this.

**Changes in the average global emissions intensity of oil and natural gas operations in the Sustainable Development Scenario, 2018-2030** **Open**

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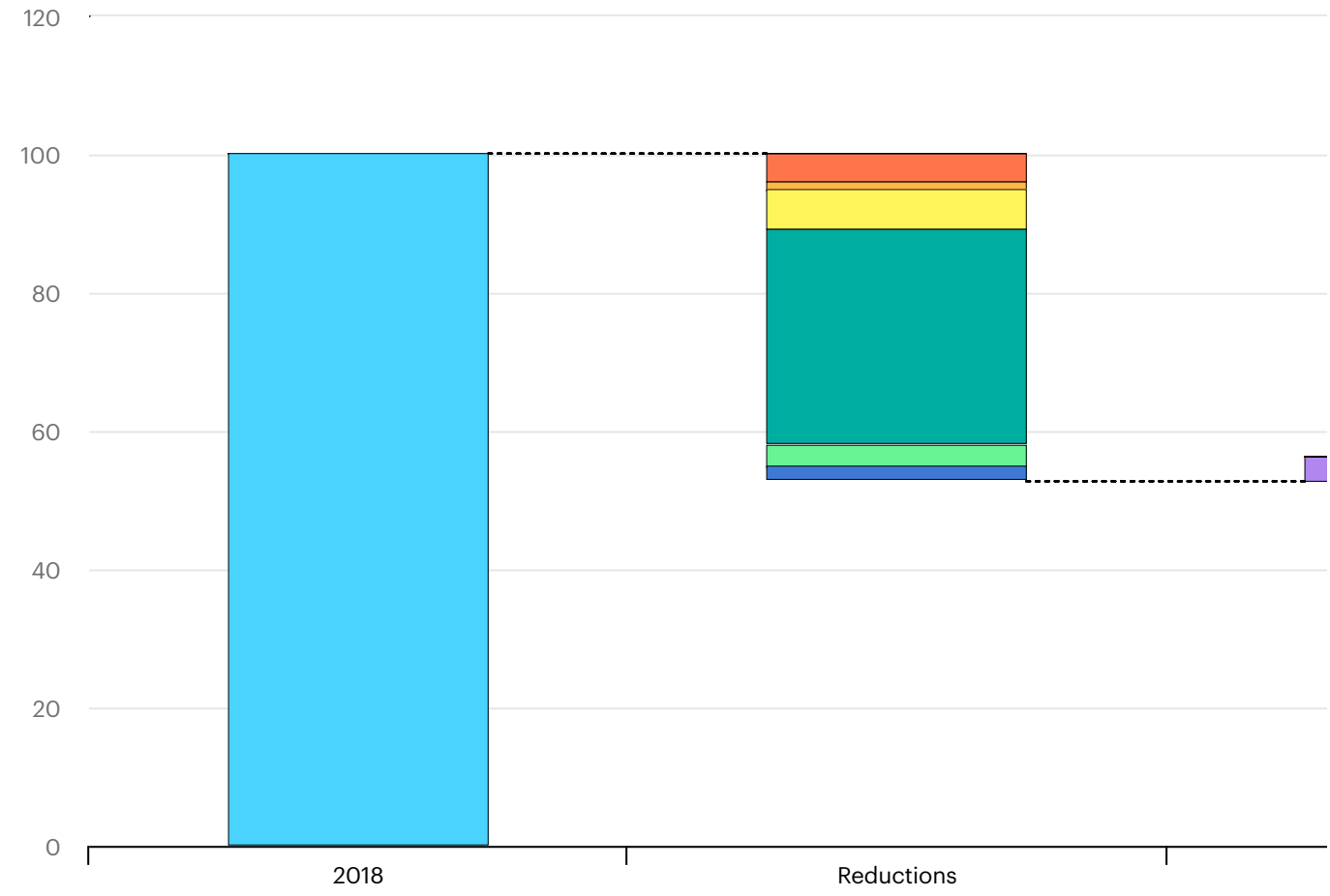




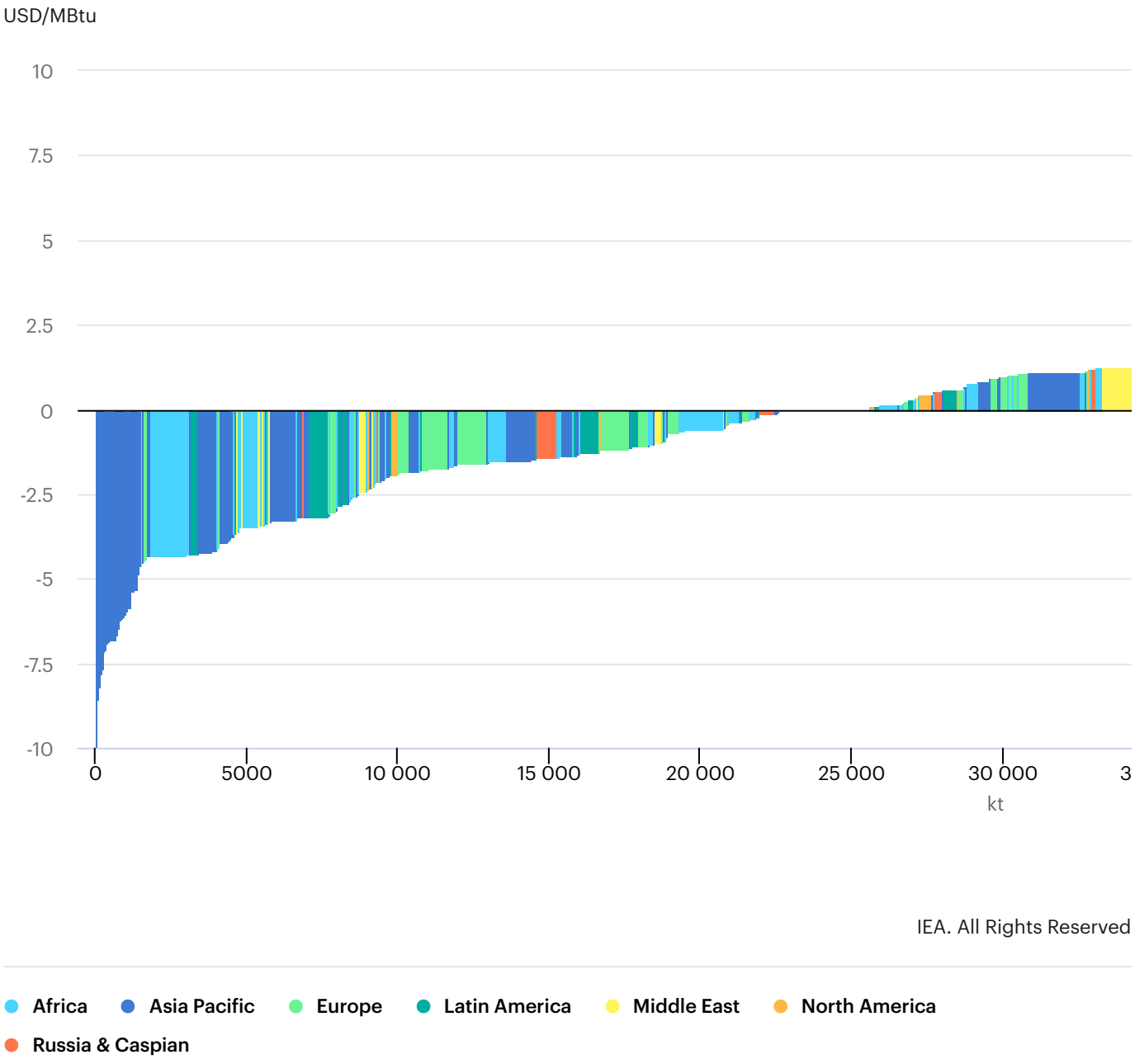

Emissions intensity
Use of CCUS in refining
Use of renewables in operations
Methane reductions
Reduce flaring and venting Co2
Oil to gas shift
Efficiency improvements
Change in resources produced and refined

## A compelling case for action

The World Energy Outlook has produced detailed estimates for methane emissions from oil and gas operations, which form the basis for the detailed data available in this methane tracker. We also developed first-of-a-kind global marginal methane abatement cost curves. These curves describe the reduction potentials as well as the costs and revenues of measures to mitigate methane emissions globally.

Marginal abatement cost curve for oil- and gas-related methane emissions globally

Open






Africa Asia Pacific Europe Latin America Middle East North America Russia & Caspian

We estimate that it is technically possible to avoid around three quarters of today's methane emissions from global oil and gas operations. Even more significantly, around 40% of current methane emissions could be avoided at no net cost.

If a high share of current emissions can be mitigated using measures that will pay for themselves from the methane recovered, why have these not already been widely adopted?

There are three primary categories of obstacles that serve to limit the uptake of mitigation measures:

- a lack of complete **information** regarding the problem, including a lack awareness about emission levels or the cost-effectiveness of abatement
- inadequate **infrastructure** or underdeveloped/saturated local markets that make it difficult to match abated gas to a productive use
- misaligned **investment** incentives, arising from competition for capital within companies with a variety of investment opportunities, insufficiently quick payback periods, or the possibility of split incentives (where the owner of the equipment does not directly benefit from reducing leaks or the owner of the gas doesn't see its full value).

The benefit to overcoming these hurdles would be enormous. Implementing only the abatement measures that have positive net present values in the WEO's Stated Policies Scenario would reduce the temperature rise in 2100 by 0.07 °C compared with a trajectory that has no explicit reductions.

This may not sound like much, but it is immense in climate terms. To yield the same reduction in the temperature rise by reducing $CO_2$ emissions would require emitting 160 billion fewer tonnes of $CO_2$ over the rest of the century. This is broadly equivalent to the $CO_2$ emissions that would be saved by immediately shutting down 60% of the world's coal-fired power plants that are in operation today and replacing them with zero-emissions generation.

Action is also essential in the Sustainable Development Scenario. We incorporate even more stringent reductions in oil and gas methane emissions in this scenario, as failing to do so would require even faster reductions in $CO_2$. Alongside the rapid declines in $CO_2$ emissions in the Sustainable Development Scenario, and therefore reductions in fossil-fuel consumption, it remains critical to tackle methane emissions as well.

Industry and other stakeholder recognise that policy and regulation can play a key role in addressing barriers to action and can align incentives to encourage companies to act. Different regulatory approaches could be used to structure a regulatory regime, and each jurisidiction will need to make adaptations to address their particular circumstances. We are working with governments and industry to provide tools to bolster actions in this area.

## Analysis

All analysis

Article

# Global methane emissions from oil and gas

Insights from the updated IEA Methane Tracker

31 March 2020

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## Methane from oil & gas

## The Energy Mix

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