OIL AND GAS CLIMATE INITIATIVE

10 YEARS

Gaining momentum

PROGRESS REPORT 2024

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CEO foreword – A decade of impact

This year marks 10 years since we launched OGCI – a unique CEO-led climate initiative – at the UN Climate Summit in New York, with the ambition to work together to tackle the climate challenge.

Working together has helped us to achieve emissions reductions faster than we would have been able to individually.

At a public roundtable at CERAWeek in Houston in March, we discussed how that CEO-level collaboration has helped our companies accelerate action and impact on methane, carbon capture, utilization and storage (CCUS) and other low-carbon technologies and solutions.

Our members were the first in the oil and gas industry to agree collective targets to reduce our operated upstream methane and carbon intensity.

That first upstream methane intensity target was achieved ahead of schedule. So we strengthened it and achieved that too.

Meeting that target has demonstrated what is achievable and set a standard for the industry to aim for.

Since 2017, our member companies have together reduced our total operated upstream methane emissions by 55% and cut greenhouse gas emissions from flaring upstream by 47%.[1]

Over the same period, we reduced the upstream carbon intensity of our operated oil and gas by 21%, putting us on track to meet our 2025 target.

At the same time, we have been laying the foundations for the future and for other companies to join our efforts.

Since 2017, our member companies have invested $95.8 billion in the low-carbon technologies and solutions that will be needed for the energy transition.[2]

This includes a record of $29.7 billion in 2023 – more than during any other year since the launch of OGCI.

Occidental CEO Vicki Hollub and OGCI Chairman Bob Dudley in Houston, March 2024.

Those dollars have been invested in renewables, biogas, biofuels, methanol and ammonia that could help reduce emissions from shipping, aviation, trucking and other sectors.

They have also been invested in developing the CCUS hubs that will help industries like steel, cement and chemicals reduce their emissions, as well as direct air capture (DAC) projects that will play an important role in reaching a net zero future.

Our member companies are helping to scale up over 40 CCUS hubs, some of which are already starting up.

In September, Eni's Ravenna CCS hub in Italy began injecting CO_2. Later in the month, a joint venture between Equinor, Shell and TotalEnergies completed the Northern Lights facility in Norway, which is now ready to receive and store CO_2.

More projects are set to start up next year, including Occidental's commercial-scale STRATOS DAC project in Texas.

Some of the innovative technologies that certain energy-intensive sectors are using today – and will need in the future – have been seeded and grown by the $1.1 billion Climate Investment fund OGCI's member companies launched in 2016.

To support and enable more oil producers and other sectors to reduce their emissions, we have shared what we learned over the past decade.

1 OGCI Performance Data
2 OGCI Performance Data. Low-carbon energy technologies include but are not limited to wind, solar and other renewable energies, carbon-efficient energy management, carbon capture, utilization and storage, blue and green hydrogen, biofuels, synfuels, energy storage and sustainable mobility. Total low-carbon investment includes investment, acquisitions and research and development.

BP CEO Murray Auchincloss and TotalEnergies CEO Patrick Pouyanné in Houston in March 2024.

We have reached out to our own industry and beyond forging partnerships in other sectors, such as cement shipping and aviation.

And we have partnered with multilateral organizations, NGOs and academic institutions.

These dialogues have provided us with insights, advice, and guidance, helping us advance and broaden our impact, creating new opportunities for the future.

The upstream methane intensity target we set in 2018 and later strengthened is now widely used across industry and in legislation as a marker of best practice.[3]

And the Aiming for Zero Methane Emissions Initiative that we launched in 2022 has helped encourage companies and solutions providers to employ a zero-tolerance approach to methane emissions.

To generate greater emissions reductions, we are intensifying our work to engage more of our industry and share with them knowledge and tools to reduce emissions.

This past year we stepped up our efforts to reach more of the national oil companies that are major producers of the world's oil and gas.

In 2023–2024:

- We helped shape the Oil & Gas Decarbonization Charter (OGDC), an initiative launched at COP28. OGCI is the Secretariat of OGDC through March 2027.
- OGDC unites more than 50 companies producing over 40% of the world's oil across 100 countries in an ambition to achieve near zero methane emissions by 2030 on a path to net zero operations within the Paris Agreement timeframe.
- Importantly, around two-thirds of these companies are national oil companies, some of which are among the largest companies in their countries and have significant regional influence.
- This year, we extended our flagship Satellite Monitoring Campaign (SMC) to reduce methane emissions to more operators and countries, including in Central Asia, North Africa and South America.
- The SMC has already enabled our partners and local operators in countries including Iraq, Algeria and Kazakhstan, to reduce their methane emissions.
- And we continued to reduce our own upstream methane emissions, flaring and carbon intensity again this year – as we have done every year since we started.

Our 12 companies have achieved more in a decade than we thought possible, demonstrating that when the industry comes together it can play a powerful role advancing a net zero future.

Going forward we will strengthen our dialogue with those stakeholders, including from emerging economies. And we will focus on removing barriers, such as technologies, policies, costs and business models, to help scale up low-carbon solutions.

Refining priorities could help deliver the gigatonne-level emissions reductions needed and demonstrate the value our industry can bring to the energy transition.

There is more to do, and we are excited about the opportunities ahead.

3 See Environmental Defense Fund's 2022 White Paper on the Certification of Natural Gas with Low Methane Emissions and the US Inflation Reduction Act, which was signed into law in August 2022.

Amin Nasser
CEO Aramco

Murray Auchincloss
CEO bp plc

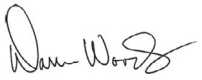
Michael K. Wirth
CEO Chevron Corporation

Dai Houliang
CEO CNPC

Claudio Descalzi
CEO Eni S.p.A.

Anders Opedal
CEO Equinor ASA

Darren Woods
CEO Exxon Mobil Corporation

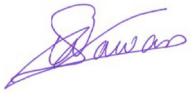


Vicki Hollub
CEO Occidental

Magda Chambriard
CEO Petróleo Brasileiro SA

Josu Jon Imaz
CEO Repsol S.A.

Wael Sawan
CEO Shell plc



Patrick Pouyanné
CEO TotalEnergies SE

OGCI CEOs reflect on a decade of collaboration

Working together has enabled OGCI's member companies to accelerate action on methane emissions, CCUS and other low-carbon technologies needed to achieve net zero, OGCI's CEOs said at a roundtable at this year's CERAWeek conference in Houston.

*"Partnerships are at their best when companies collaborate as well as challenge each other to drive progress in areas of mutual interest. OGCI's leadership in methane emissions reduction is a case in point."**

Wael Sawan, *CEO, Shell*

"With satellites, aircraft, drones and ground sensors, detecting methane leaks will be unavoidable. We've contributed to enabling some of this progress and there's no longer anywhere for methane to hide."

Bob Dudley, *Chairman, OGCI*

"For methane, we had average industry calculations but over the past decade, we've developed technologies individually and then collectively, which actually have started to measure methane. The collective power of the member companies and resulting progress in achieving near zero emissions is testament to the mission of OGCI."

Murray Auchincloss, *Chief Executive Officer, bp*

"We wanted to be a part of a group that thought differently. And, once we got inside the group, what we found is the passion behind the commitments and words."

Vicki Hollub, *President & Chief Executive Officer, Occidental*

"In these 10 years we have been able to work together, align ourselves and maintain focus. But also step outside our comfort zone to work together externally – which is not always easy."

Claudio Descalzi,
Chief Executive Officer, Eni

"Climate should be a collaboration between us all. And that's the spirit of what we've done together and must continue for the benefit of all of our stakeholders."

Patrick Pouyanné, *Chairman of the Board & Chief Executive Officer, TotalEnergies*

"At times, we have challenged one another to do more than each of us independently thought was possible, and I think together we've made great progress."

Darren Woods, *Chairman & Chief Executive Officer, Exxon Mobil Corporation*

"There is a lot of execution power in this group, and when we set the targets, you can see the progress from meeting to meeting as we move closer to achieving them."

Anders Opedal, *President & Chief Executive Officer, Equinor*

"We're going to continue to find these innovative solutions that none of us could have imagined just a few years ago."

Mike Wirth, *Chairman of the Board & Chief Executive Officer, Chevron Corporation*

* The Shell CEO was not present at the roundtable.

OGCI highlights[1]

OGCI member companies' total operated oil and gas production in 2023

43.3
Mboe/day

26%
of global output[2]

1%
of global greenhouse gas emissions[3]

OGCI members' total operated greenhouse gas emissions reductions in 2023 vs 2017 baseline

-21%
upstream carbon intensity

-19%
total GHG emissions (Scope 1)

-55%
total methane emissions upstream

-47%
GHG emissions from upstream flaring

OGCI member companies' total low-carbon investment[5]

$29.7 bn
total in 2023

+15%
2023 vs 2022

$95.8 bn
total since 2017

1 OGCI Performance Data, Chapter 4. All reported data is the aggregate for 12 companies, (unless otherwise stated in the tables), and independently verified by EY. One member company has been unable to submit audited performance data in time for the publication of the 2024 Progress Report and 2022 data for that company has been used in place of the 2023 data. Data for 2023 will be updated as needed in the next annual Progress Report, which is expected to be published in the fourth quarter of 2025.

2 On an operated basis. Provisional estimate of global oil and gas production of approximately 165 Mboe/day in 2023, based on IEA indicators for oil production of 97.8 Mboe/day and global natural gas production of 67.3 Mboe/day. OGCI member companies' share of total oil and gas production is 26.2% on an operated basis. Source: IEA Oil Market Report (January 2024), IEA Gas Market Report Q1 2024.

3 OGCI members total operated GHG emissions (Scope 1) in 2023 was 575 Mt CO_2e (see OGCI Performance Data, p. 32). Total GHG emissions excluding land-use, land-use change and forestry (LULUCF) was 57.4 Gt CO_2e in 2022, UNEP's latest Emissions Gap Report published in 2023, p. XVI.

4 Total low-carbon investment includes investment, acquisitions and research and development. Low-carbon energy technologies include but are not limited to wind, solar and other renewable energies, carbon-efficient energy management, carbon capture, utilization and storage, blue and green hydrogen, biofuels, synfuels, energy storage and sustainable mobility..

CHAPTER 1

Towards net zero operations

Credit Adobe Stock

OGCI supports the goals of the Paris Agreement and the need for the world to move to a net zero carbon emissions future. This will require an energy transition and a reduction in greenhouse gas emissions from oil and gas.

OGCI and its members by taking individual and collective action will help accelerate the energy transition through deep reductions in greenhouse gases.

To support this, OGCI's first strategic ambition is to achieve net zero greenhouse gas (GHG) emissions from operations under the 12 members' control and to use their influence to achieve the same in non-operated assets within the Paris Agreement timeframe.

This includes an ambition to achieve near zero methane emissions from operated oil and gas assets and zero routine flaring by 2030.[1]

OGCI is a platform where member companies can explore what is possible and what stakeholders expect, agree on collective targets and goals and take collective action, while sharing knowledge on measuring and tackling key emission sources. Key emission sources include energy used in production, flaring, methane leaks and methane venting.

OGCI tracks and reports annual progress of its member companies' GHG emissions reductions in its Performance Data (Chapter 4). EY verifies the data submitted by the companies, anonymizes it and reviews the consolidated data.

Equinor's Gina Krog platform is largely powered by hydroelectricity to reduce emissions.

According to OGCI's aggregated Performance Data for 2023:[2]

- OGCI member companies' collective upstream carbon intensity was 17.9 kilograms of carbon dioxide equivalent per barrel of oil equivalent (kg CO_2e/boe).
- This represents a 21% decrease compared with the 2017 baseline and a progression towards the group's 2025 target of 17 kg CO_2e/boe.
- OGCI member companies' total operated GHG emissions (Scope 1) were 575 million tonnes of CO_2e in 2023, a 19% decrease since 2017.
- OGCI member companies' collective upstream methane intensity was 0.14%, a 54% decrease versus 2017.
- Total operated upstream methane emissions was 0.89 Mt, 55% lower than in 2017.

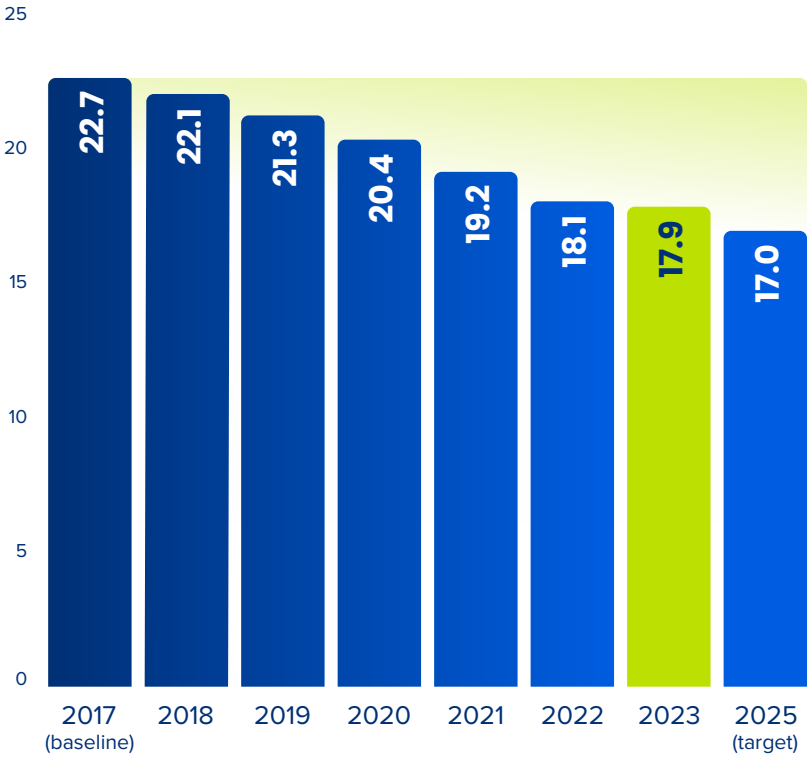
1 Per the World Bank "Zero Routine Flaring by 2030" Initiative
2 All reported data is the aggregate for 12 companies, (unless otherwise stated in the tables), and independently verified by EY. One member company has been unable to submit audited performance data in time for the publication of the 2024 Progress Report and 2022 data for that company has been used in place of the 2023 data. Data for 2023 will be updated as needed in the next annual Progress Report, which is expected to be published in the fourth quarter of 2025.

Reducing upstream carbon intensity

In 2020, OGCI members announced a target to reduce collective average upstream carbon intensity from operated oil and gas assets to between 20 kg and 21 kg CO_2e/boe by 2025. Due to quicker-than-expected progress, the target was updated in 2021 to 17 kg CO_2e/boe by 2025.

In 2023, OGCI member companies' collective upstream carbon intensity was 17.9 kg CO_2e/boe. This translates into a 3% reduction in total operated GHG emissions (Scope 1) across all sectors in 2023 versus 2022.[3]

Upstream carbon intensity is down 21% since 2017
(kilograms of CO_2e per boe)



How our members reduce carbon intensity

- Near zero methane emissions
- Zero routine flaring by 2030
- Co-generate electricity and use recovered heat
- Electrify some operations with low-carbon power
- Improve energy efficiency

Actions taken by OGCI member companies to reduce upstream operated carbon intensity include:

- Reducing methane emissions through a program of methane leak detection, equipment repair, maintenance, and the elimination of routine flaring and non-emergency venting.
- Implementing energy efficiency and optimization measures, including more efficient combustion of natural gas to reduce emissions from flaring and using recovered heat more efficiently.
- Using low-carbon electricity instead of fossil fuels to power operations, including at offshore oil platforms.

3 This figure includes direct (Scope 1) emissions of carbon dioxide, methane and nitrous oxide (for those companies that report it) from all operated activities (upstream as well as downstream, which includes refineries and petrochemicals). The methane emissions were converted to CO_2 equivalent using a 100-year time horizon global warming potential (GWP) of 25 for fossil-based methane as per IPCC AR4. Using the IPCC AR6 GWP of 29.8, the operated greenhouse gas emissions were 595 MtCO_2e in 2022 and 580 MtCO_2e in 2023. OGCI Performance Data, Chapter 4.

Reducing upstream methane intensity

In 2018, OGCI members agreed to a collective average upstream methane intensity target[4] for operated oil and gas assets of 0.25% by 2025. Due to quicker-than-expected progress, the target was updated in 2021 to well below 0.20%.

Setting the target provided a metric for OGCI member companies to assess their progress on methane reductions, helping companies to achieve efficient emissions reductions at their operations.

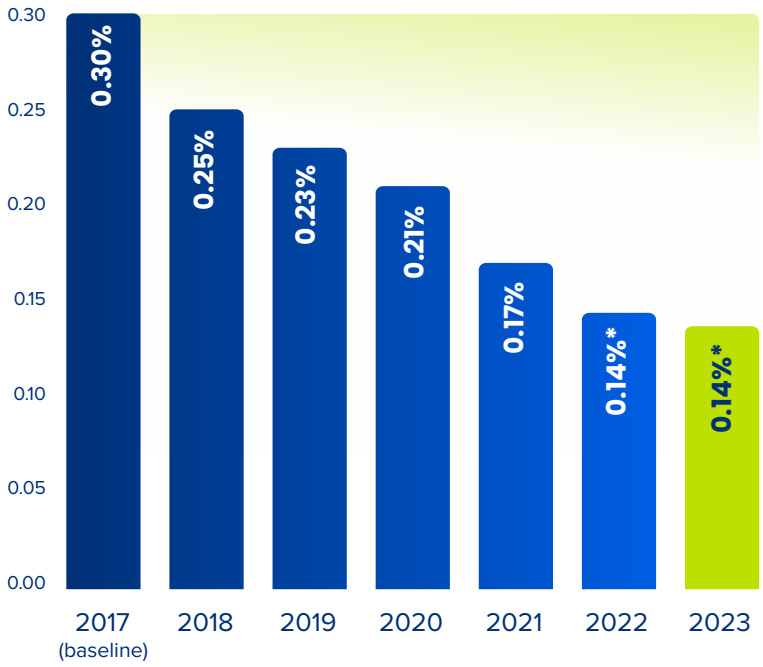
In 2023, OGCI member companies' collective aggregate operated upstream methane intensity was 0.14%, well below the 0.20% target.[5]

This reduction in intensity has translated into a 7% decrease in total operated methane emissions upstream in 2023 versus 2022.

OGCI's upstream methane intensity target now serves as a standard for other oil and gas producers to strive for.

It is central to the Aiming for Zero Methane Emissions Initiative that OGCI launched in 2022 (see Chapter 2), and is recognized by NGOs, the UN's Environment Programme and governments as best practice. It is also included as one of the core ambitions of the Oil & Gas Decarbonization Charter that was launched at COP28 in Dubai (see Chapter 2).

Upstream methane intensity is down 54% since 2017



*Percentages are rounded. 2022 was 0.144%, 2023 was 0.137%.

How our members reduce methane emissions

- Expand leak detection and repair campaigns
- Replace or upgrade high-emitting devices
- Reduce natural gas flaring
- Reduce venting in new and existing assets

Actions taken by OGCI member companies to reduce methane emissions include:

- Methane reduction projects such as conversions of pneumatic devices.
- The continuation of a campaign to detect and repair leaks, equipment repair and maintenance.
- Flaring reduction projects to reduce upstream flaring volumes.
- Reductions to flaring greenhouse gas emissions and non-emergency venting and the installation of additional online compressor stations and other flare reduction projects.

4 Includes total upstream methane emissions from all operated gas and oil assets. Emissions intensity is calculated as a share of marketed gas.
5 OGCI Performance Data, Chapter 4.

Measuring methane

Over the past decade, there's been a big push to improve the measurement of methane emissions in the oil and gas sector through monitoring, reporting and verification – a move that OGCI supports.

Accurately measuring methane emissions is critically important to prioritizing activities to mitigate methane. Previously, methane emissions were typically assessed and reported using standard emission factors based on aggregating available global data and data from specific basins.

This method did not always reflect what was happening at a particular site or asset and did not necessarily pick up sources of methane emissions in the oil and gas industry. This resulted in wide disparities in methane emissions estimates.

Now new technologies, including monitoring with satellites, drones and sensors, make it easier to detect and better quantify methane emissions. OGCI's member companies are using these technologies to address their methane emissions in a more meaningful way.

Through its flagship Satellite Monitoring Campaign (SMC), OGCI has helped demonstrate the use of satellites in detecting methane emissions so they can be located and abated. (See Chapter 2 for more detail on the SMC.)

OGCI's work to reduce methane emissions will continue as measurement technologies and methodologies evolve.

One notable change to reporting methodologies is in the US, where the Environmental Protection Agency has updated the methods for calculating methane emissions.

This is expected to increase reported methane emissions of companies operating in the US from 2024 onwards. While the numbers might change, OGCI member companies will continue to focus on reducing methane emissions.

Ten OGCI member companies are now part of the UN Environment Programme's Oil and Gas Methane Partnership 2.0 (OGMP 2.0).

OGMP 2.0 is a comprehensive, measurement-based reporting framework for the oil and gas industry aiming to improve the accuracy and transparency of methane emissions reporting to aid methane mitigation actions.

Other measures to reduce Scope 1 and 2 emissions

In 2023 and 2024, member companies worked to accelerate their reduction of operational Scope 1 and 2 emissions. The group:

- Continued to upgrade data quantification, reporting and transparency;
- Continued to improve knowledge on emissions abatement curves available for the industry;
- Identified potential pathways to significantly reduce emissions in the refining sector by using low-carbon electricity instead of fossil fuels to power some equipment;
- Is following up work on refinery emissions reduction pathways with a study on the economics of refinery electrification, assessing operating expenditures considerations and the influence of power, fuel and carbon pricing;
- Will study heat pump applications and evaluate a range of applications for heat pumps across upstream, midstream and downstream;
- Shared best practices developed individually and collectively by OGCI and its members to accelerate progress across the industry;
- Intensified engagement with signatories to the Oil & Gas Decarbonization Charter (OGDC) which shares the same net zero ambitions as OGCI (see Chapter 2).

CHAPTER 2

Leading the industry

Occidental CEO Vicki Hollub speaking at a panel at COP28.

OCGI's second core strategic ambition is to work proactively with and encourage the entire oil and gas industry, including national oil and gas companies, to strive for net zero operations in the Paris Agreement timeframe and aim for near zero methane emissions by 2030.

In its 2023 World Energy Outlook, the IEA estimated that the entire oil and gas industry's Scope 1 and 2 emissions amounted to 5.1 Gt CO_2 in 2022.[1] This is equivalent to around twice Russia's annual emissions,[2] so reducing these will make an important contribution to decarbonization.

OGCI members represent, in aggregate, approximately 26% of the world's total oil and gas production[3] and 13% of total Scope 1 and 2 oil and natural gas-related emissions on an operated basis.[4]

To help expand the reach of emissions reductions across the oil and gas industry, OGCI collaborates with industry participants to help foster innovation and promote technology scaling.

In 2023, OGCI focused its efforts on two main tracks:

- Encouraging more oil and gas producers, in particular national oil companies, to aim for net zero operations by 2050 through supporting the creation and launch of the Oil & Gas Decarbonization Charter (OGDC).
- Stepping up its work to encourage and enable more industry participants to reduce their methane emissions to near zero by 2030.

Building a coalition through OGDC

In 2023, the COP28 team requested that OGCI help shape an initiative whereby companies could share their experience and collaborate to accelerate their emissions reductions from oil and gas operations.

This aligns with OGCI's strategic ambition to intensify efforts to enable more industry participants to work toward reducing emissions from their oil and gas operations to achieve net zero operations in the timeframe of the Paris Agreement.

OGDC
THE OIL & GAS DECARBONIZATION CHARTER

"We firmly believe that in order to achieve realistic results, we must have a collaborative approach to energy transition across the industry. Partnerships are essential to create and enable solutions at scale in transforming the global energy system. As one of the first term champions of the OGDC, we are proud to leverage our expertise and share best practices to support the industry's progress towards a lower emissions future."

Amin Nasser, CEO Aramco

1 IEA, World Energy Outlook 2023, Emissions from Oil and Gas Operations in Net Zero Transitions
2 European Commission: Emissions Database for Global Atmospheric Research
3 Provisional estimate of global oil and gas production of approximately 165 Mboe/day in 2023, based on IEA indicators for oil production of 97.8 Mboe/day and global natural gas production of 67.3 Mboe/day, IEA Oil Market Report (January 2024), IEA Gas Market Report Q1 2024. OGCI member companies' 2023 total oil and gas production was 43.3 Mboe/day, OGCI Performance Data.
4 IEA Emissions from Oil and Gas Operations in Net Zero Transitions, OGCI Performance Data, Chapter 4.

During 2023, OGCI and other organizations, including the World Bank, Climate Action Taskforce, the UN's Environment Programme (UNEP), Environmental Defense Fund (EDF) and the International Energy Agency, met regularly to lay the foundation for the initiative, build out the strategic ambitions and recruit the first group of signatories ahead of the OGDC's successful launch in December 2023 during COP28 in Dubai.

To date, more than 50 oil and gas companies, including 11 of OGCI's member companies, have signed up to OGDC's core ambition to reach net zero emissions from operated assets by 2050. This includes an aim to reduce upstream methane emissions to near zero and eliminate routine flaring by 2030.[5]

OGDC includes a diverse range of companies from around the world, including international oil companies and national oil companies (NOCs).

Importantly, around two-thirds of the signatories are NOCs, some of which are among the largest companies in their countries and have significant regional influence.

In 2024, PetroChina, Oil India and Norway's Vår Energi also joined the OGDC, taking the amount of global oil production covered by the group to 43% from over 6,000 assets across more than 100 countries.

OGCI becomes OGDC Secretariat

At the request of COP28 President Dr Sultan al Jaber, OGCI became OGDC's Secretariat in 2024. OGCI will act as Secretariat through March 2027.

Signatories to the Charter aim to reach net zero carbon dioxide equivalent emissions (Scope 1 and 2) from their oil and gas operations by 2050, among other objectives. The largest single contribution would come from reducing methane emissions to near zero and eliminating routine flaring from operations under the signatories' control by 2030.

Other measures to accelerate emissions reductions would include increasing alignment with industry best practices. This could mean, for example, additional reductions from electrification of upstream operations, deployment of CCUS technologies, and use of low-carbon hydrogen.

In 2024, OGCI as Secretariat set up the governance framework for the OGDC and launched a process to collect data to establish a baseline for the Charter's annual progress tracker.

"OGCI is honoured to be OGDC's Secretariat for the next three years. OGDC is an important initiative that enables more of the oil and gas industry to work together, and with other stakeholders, to support the aims of the Paris Agreement. We are already sharing the knowledge, experience and best practice we have gained in a decade of work to reduce emissions at oil and gas operations."

Bjørn Otto Sverdrup, OGCI Executive Committee Chairman and Head of OGDC Secretariat

OGCI Executive Committee Chairman Bjørn Otto Sverdrup at COP28 in Dubai in December 2023.

5 See OGDC Charter

OGDC governance

- OGDC is governed by three CEO Champions, two of which are founding members of OGCI, and the Signatories Committee. The CEO Champions are Dr Sultan al-Jaber, COP28 President and head of the UAE's Abu Dhabi National Oil Company (ADNOC); Amin Nasser, President and CEO of Aramco; and Patrick Pouyanné, Chairman and CEO of TotalEnergies.
- The Champions' role is to actively lead and pursue the aims of the Charter, fostering a spirit of collaboration to pursue the Charter's principles and maintain momentum.
- The Signatories Committee, which is drawn from international oil companies and national oil companies, supports the champions and actively progresses the goals of the charter.
- Six OGCI member companies – Aramco, bp, ExxonMobil, Occidental, Petrobras and TotalEnergies – sit on the Signatories Committee, which also includes ADNOC, Nigerian National Petroleum Corp., India's Oil & Natural Gas Corp. Ltd, PetroChina, Malaysia's Petronas and Azerbaijan's Socar.

OGDC Baseline Report

- First report maps out signatories' emissions reduction ambitions to help prioritize and track future progress.
- Includes results of a survey to determine signatories' emissions reduction goals, implementation plans, and investment in low-carbon technologies and solutions.
- Published at COP29 in November 2024. See OGDC's website to learn more.

Sharing knowledge

OGCI, as Secretariat of OGDC, and OGCI's member companies, are already actively engaged in sharing essential knowledge and best practices with OGDC signatories. This is focused on strengthening capabilities specifically on methane emissions detection, measurement and abatement strategies as well as supporting efforts to establish a robust reporting framework.

The program, which is already operational, includes webinars, regional workshops, 1 to 1 training and sharing of tools and best practice.

OGCI-led sessions for OGDC

- **Occidental**: Methane Emissions Management System (July)
- **ExxonMobil:** Utilizing the marginal abatement cost curve to support GHG reductions (August)
- **Ipieca & Shell:** GHG emissions reporting and baselining (August)
- **Shell:** Scope 1 & 2 emissions decarbonization: Challenges and opportunities (September)
- **TotalEnergies:** Methane emissions detection, quantification, and mitigation (September)
- **Aramco:** Emissions reduction for Asia Pacific region (October)

OGCI helps industry reduce methane emissions

According to the IEA's Global Methane Tracker, methane emissions originating from venting, fugitives and flaring across the global oil and gas industry are estimated to amount to over 2.3 Gt CO_2e in 2023.[6]

Methane is a potent greenhouse gas. However, it remains in the atmosphere for less time than other GHGs. So reducing methane emissions from oil and gas operations to near zero could help deliver a significant near-term reduction in the pace of global warming and be one of the quickest ways[7] to accelerate progress toward the Paris Agreement climate goals.

OGCI member companies are aiming to achieve near-zero methane emissions at their upstream operations by 2030. Progress made by OGCI member companies and others have demonstrated that meaningful and cost-effective opportunities exist to drive rapid reductions in methane emissions in the oil and gas industry.

Near-term measures include investing in technologies and proven solutions to minimize venting, fugitive methane emissions, and flaring. Longer-term measures would also require a build-out of gas handling infrastructure to process the additional methane that would otherwise have been released to the atmosphere.

OGCI is working through a number of initiatives and directly through its OGCI's flagship Satellite Monitoring Campaign, which is now in its third phase.

Making the invisible visible

Detection and measurement of methane emissions is a critically important first step to reducing methane emissions.

Technologies such as drones, satellites, sensors and use of artificial intelligence to process data have scaled up in the past decade, helping industry participants to detect, monitor and improve quantification of methane emissions.

Satellite monitoring helps to detect leaks to aid reduction of fugitive emissions and product losses. Technologies such as drones fitted with sensors and thermal gas imaging can be used to measure and quantify emissions.

In 2021, OGCI launched the Satellite Monitoring Campaign (SMC) with GHGSat, providing satellite monitoring of methane, and Carbon Limits providing in-depth knowledge of methane emissions in developing countries.

The SMC aimed to explore the potential of using satellite monitoring to identify and provide information to help local operators mitigate significant methane emissions.

Pilot

The SMC pilot campaign in Iraq in late 2021, successfully demonstrated the use of satellite monitoring as part of a program to help reduce methane emissions. In the pilot program, GHGSat collected high-resolution satellite data on methane plumes over Iraq.

OGCI then worked with Carbon Limits to engage confidentially with local operators on a peer-to-peer level. The campaign used the data to help identify emissions sources, and shared knowledge, expertise and information on potential solutions to support the operators' work to abate the methane emissions that were detected.

The pilot was able to help local operators quickly address methane plumes of an estimated 1 Mt of CO_2e over the course of one year.

Since the first pilot, OGCI has significantly scaled up the campaign to include more countries and assets, and has had further quick wins enabling local operators to reduce methane emissions.

GHGSat methane-detecting satellites in orbit. Credit GHGSat.

6 The IPCC has noted that a high degree of uncertainty remains regarding methane emissions estimates from oil and gas operations.
7 IEA Global Methane Tracker, 2023

Results from Iraq pilot

GHGSat conducted over **175** high-resolution satellite observations over six large oilfields in Iraq.

The most common methane sources observed were gas flaring, direct venting and maintenance events.

Over 80% of satellite observations were able to identify and quantify emission rates.

The average methane emission rate is **1.5 tonnes per hour**

This is equivalent to the hourly energy use of **43,000 US homes**[10]

Phase 2

The 2022-2023 campaign over Kazakhstan, Algeria and Egypt helped operators to eliminate methane plumes with a combined average rate of 3,200 kilograms an hour.

If these plumes were from continuously emitting sources and were not abated, they could amount to an estimated equivalent of around 1 Mt CO_2e over the course of one year.[9]

OGCI is continuing to engage through the campaign with the local operators in these countries to help identify solutions to mitigate the remaining persistent emissions sources.

Incomplete combustion from burning pits, gathering pipeline emissions, equipment and storage tank venting comprised the top four sources of methane emissions identified in the campaign.

In this second phase of the campaign, GHGSat performed over 530 high-resolution observations during one year over a total of 18 pre-selected sites, using its own satellites and public satellite data.

The areas surveyed included oil and gas producing assets operated by OGCI members and non-members.[10]

Results from phase 2

Four biggest sources of methane emissions

- incomplete combustion from burning pits
- gathering pipeline emissions
- equipment venting
- storage tank venting

3 methane plumes already mitigated in Algeria and Kazakhstan

→ Combined average emissions rate of **3,200 kg/hour**

→ Estimated equivalent of **1Mt CO_2e** during one year*

* If these plumes were from continuously emitting sources and were not abated, they could amount to an estimated 1Mt of CO_2e over the course of one year. (Using IPCC AR 6 GWP for methane.)

<$2 / tonne of CO_2e

Estimated cost of detecting the methane emissions already eliminated in Algeria and Kazakhstan*

*Results of OGCI Satellite Monitoring Campaign 2022-2023 over Kazakhstan, Algeria and Egypt, March 2024, p.14.

8 Calculated using the US EPA GHG equivalencies calculator
9 If these plumes were from continuously emitting sources and were not abated, they could amount to an estimated equivalent of around 1 Mt of CO_2e over the course of one year. Using IPCC AR6 global warming potential for methane
10 OGCI Satellite Monitoring Campaign 2022-2023, p. 9

Phase 3

Based on the results of Phase 2 and feedback from participants, OGCI has extended the campaign to more countries and operators. Work now under way with GHGSat more than doubles the number of assets and countries involved, including countries in Central Asia, North Africa, South America.

Based on initial estimates, this third phase has the potential to help operators eliminate millions of tonnes of CO_2e a year.[11] Results from Phase 3 are expected in 2025.

"OGCI's SMC is a model that works to help accelerate action on methane emissions. In Kazakhstan we've seen that the campaign has facilitated best practice sharing and increased engagement with local operators – building capabilities and sharing expertise and solutions more broadly throughout the industry to enable reductions of methane emissions."

Blair Blackwell
Lower Carbon Advisor, Chevron

Aiming for Zero Methane Emissions

In March 2022, OGCI launched the Aiming for Zero Methane Emissions Initiative. It was founded on the principle that companies should treat their methane emissions as seriously as they do safety incidents and strive to reach near zero methane emissions from operated oil and gas assets by 2030.

Participation in the initiative, which is open to the entire industry, now numbers over 100 companies. It includes private and state-run energy companies, service firms, technology providers, non-governmental organizations, and consultancies.

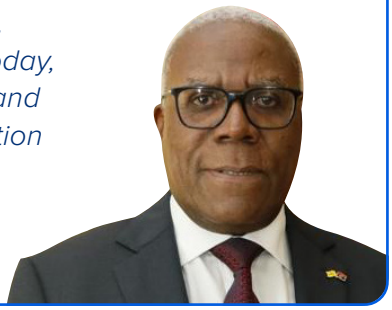
Signatories and supporters of Aiming for Zero believe that virtually all upstream methane emissions from the industry can and should be avoided.

Signatories aim to reach near zero methane emissions from their operations by 2030, use all reasonable means to avoid methane emissions, report transparently, adopt better monitoring and measurement technologies and support the implementation of sound regulations.

Supporters, including service companies, technology/ technical suppliers, oil and gas commodity traders, consultancies, investment groups and financial institutions strive to have a positive influence on reducing methane emissions from the oil and gas industry.

"As the first African national oil and gas company to join this initiative, Sonangol demonstrates its commitment to the future of the planet. Today, more than ever, we reaffirm our ambition to ensure decarbonization and the reduction of emissions from our operations, ensuring a just transition that maintains the socioeconomic development of society."

Sebastião Gaspar Martins
CEO, Sonangol



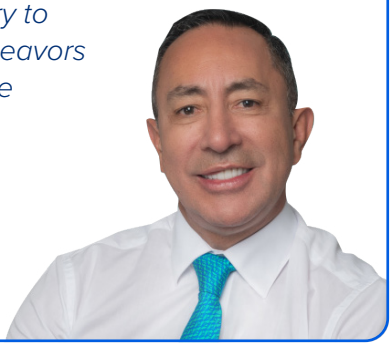
11 Based on preliminary GHGSat data using emission rates of the top 50 persistently emitting assets based on historical GHGSat data.

The initiative's clear and straightforward ambition aims to help companies take action within their organizations, fast-track the deployment, maintenance and upgrading of physical assets, and invest in new technologies and training to help reduce virtually all methane emissions.

Aiming for Zero Methane Emissions from operated oil and gas assets by 2030 is already becoming a standard reference point, as OGCI's upstream methane intensity target did before it.

"By joining this initiative, Ecopetrol will gain additional focus to elevate our methane reduction ambitions and advance fast through our commitment with a fair and equitable energy transition. Moreover, it serves as an opportunity to encourage fellow companies in the oil and gas industry to expedite their endeavors in curbing methane emissions."

Ricardo Roa Barragan
CEO, Ecopetrol



Aiming for Zero workshop

In March 2024, OGCI led a workshop for signatories and supporters to discuss collaboration around standards, measurement and mitigation of methane emissions.

Around 35 participants joined the session, which was moderated by the Climate Intelligence Program at Rocky Mountain Institute – a Colorado-based clean energy think tank.

Issues discussed included:

- The importance of satellite monitoring in methane emissions mitigation;
- How to raise awareness of the opportunities and challenges of methane abatement;
- The need to clarify and align on the definition of near zero;
- The influence the initiative has already had in shifting the mindset on methane – in particular its adoption in the text of the Oil & Gas Decarbonization Charter, which was launched at COP28.

AIMING FOR ZERO
Methane Emissions Initiative

Pipeline network

Other OGCI initiatives to reduce methane emissions

OGCI works with international institutions, think tanks and organizations to develop programs and tools to monitor and measure methane emissions, identify abatement opportunities and share best practices. These include:

Flaring data platform

- OGCI is working with the World Bank's Global Flaring and Methane Reduction Partnership (GFMR) and US-based Payne Institute for Public Policy to launch a more accessible platform on global gas flaring data.
- The platform aims to further improve the transparency and accessibility of data on flaring with a new consolidated platform designed to help oil and gas companies more easily locate and reduce emissions from flared natural gas at their operations.
- The World Bank's Global Gas Flaring Tracker Report estimated that in 2023 gas global gas flaring at upstream oil and gas facilities released 381 Mt of CO_2e. This includes 45 Mt CO_2e in the form of unburned methane.[12]
- Flaring volumes are one of the largest sources of methane emissions. Reducing these volumes could play an important role in slowing global warming and meeting climate goals.

Guidance and best practice to support operators

In 2023, OGCI published guidance on how to achieve near zero methane emissions.

- The guidance sets out a four-step pathway and provides examples of targets, standards and protocols for methane emissions to aid companies.
- This includes relevant information from OGCI, UNEP's reporting and mitigation program the Oil & Gas Methane Partnership 2.0, the Natural Gas Sustainability Initiative, gas certification non-profit MiQ and the World Bank.

Detection and quantification technologies

- In 2023, OGCI released a recommended practices guide with Ipieca and the International Association of Oil & Gas Producers (IOGP) to help operators select and deploy methane detection and quantification technologies.
- The guide includes a simple online tool to aid technology selection

12 World Bank Global Gas Flaring Tracker Report, p. 13.

CHAPTER 3

Acting to help decarbonize society

Occidental's subsidiary 1PointFive is constructing STRATOS, the world's largest Direct Air Capture facility, in Texas. STRATOS is expected to be commercially operational in mid-2025.

The third pillar of OGCI's strategy focuses on acting to help society to decarbonize.

OGCI's members have a key role in working with their customers, partners, other industries and policymakers to reduce greenhouse gas emissions and help accelerate the transition to a net zero society.

To help drive a broad transformation of the global energy system, OGCI member companies are investing billions of dollars in a wide range of low-carbon technologies and solutions.

These include energy efficiency and digitalization, renewable energy, storage, bioenergy and biofuels, sustainable aviation fuels, sustainable mobility, CCUS, and direct air capture and storage (DACS).

In 2023, OGCI member companies collectively invested $29.7 billion in the technologies noted above, including acquisitions and R&D, a 15% increase compared with 2022.

This brings the total member companies have invested in these technologies since 2017, including acquisitions and R&D, to $95.8 billion.[1]

In addition to record levels of investment in these technologies and solutions, OGCI focused its work in 2023 and 2024 on three main tracks:

- Investigating new opportunities to drive a broader uptake of CCUS;
- Enabling the development of alternative fuels and other solutions to reduce greenhouse gas emissions associated with transport;
- Advancing plans to develop a project in Brazil that would support credits from natural climate solutions.

CCUS

The UN's Intergovernmental Panel on Climate Change (IPCC) recognizes the role of CCUS technologies in reducing and removing carbon dioxide emissions and achieving net-zero greenhouse gas emissions cost effectively.

Governments, policy makers and key industrial players view CCUS as an essential technology that could help reduce greenhouse gas emissions associated with hard-to-abate industries such as steel, chemicals and cement.

It can also facilitate the production of fuels and products such as hydrogen, and help reduce greenhouse gas emissions associated with some power generation.

The build-out of CCUS infrastructure can also support the deployment of some key carbon dioxide removal technologies, such as direct air capture with storage (DACS) and bioenergy with carbon capture and storage (BECCS), that can address residual greenhouse gas emissions to help achieve net zero.

OGCI member companies, with their expertise in carbon capture, CO_2 injection and engineering and large project execution capabilities, are uniquely positioned to support the development and implementation of CCUS at scale.

In recent years, many oil and gas companies, including OGCI member companies Aramco, bp, Chevron, CNPC, Eni, Equinor, ExxonMobil, Occidental, Petrobras, Repsol, Shell, TotalEnergies have worked on different elements of carbon capture and storage technologies. These include retrofitting capture units to carbon dioxide streams in industrial and chemical processes to injecting carbon dioxide into depleted reservoirs and saline aquifers.

Since the 2019 launch of OGCI's CCUS Kickstarter Initiative to unlock large-scale investment in CCUS,

1 OGCI Performance Data

OGCI member companies are now actively involved in developing more than 40 large-scale CCUS hubs around the world.

These efforts represent almost half the CCUS hubs the IEA says are proposed or in development around the world.[2]

The CCUS hubs and direct air capture projects OGCI members are involved in have the potential to reduce and/or remove as much as 400 Mt of CO_2 a year by 2030,[3] equivalent to removing the UK's emissions in 2023.[4]

Of these, Ravenna CCS in Italy (Eni) and Northern Lights in Norway (Equinor, Shell and TotalEnergies) started up in September. More projects are set to come online next year, including the commercial scale STRATOS direct air capture project in Texas (Occidental).

CCUS and DACS hubs with OGCI member company participation

Australia
Gorgon (operational)
Gippsland Basin

Belgium
Antwerp@C

Brazil
Rio de Janeiro

Canada
Atlas Hub (FID*)
Quest (operational)

China
Junggar Basin
Changqing
Daqing
Jiangsu
Hainan
Daya Bay

Denmark
Bifrost

France
PYCASSO
ECO2 Normandy
Dunkirk

Germany
H2morrow

Indonesia
Java

Italy
Ravenna (operational)

Japan
Osaka
Nagoya Hub

Netherlands
Aramis
H-Vision
Magnum
Porthos (FID*)

Norway
Northern Lights/Longship (operational)
Luna

Saudi Arabia
Jubail

Singapore
Jurong Island

UK
Acorn
East Coast Cluster
HyNet Northwest
Bacton Thames Net Zero
South Wales Industrial Cluster
Solent Cluster

USA
South Texas DAC Hub
Houston CCS Hub
Bluebonnet Hub
Bayou Bend
Beaumont/Port Arthur
Liberty Louisana
Baton Rouge
Ohio River Valley
Magnolia Hub
STRATOS (under construction)

*FID – final investment decision taken

2 OGCI CCUS Hub, IEA CCUS Projects Explorer.
3 Based on reported CCUS projects which average 7.5-10 Mt each. See CCUS Hub.
4 The UK's annual emissions were 379 Mt in 2023, according to The European Commission's Emissions Database for Atmospheric Research (EDGAR).

Progress in 2023–2024

In 2023 and 2024, OGCI's CCUS work has expanded understanding of other potential global CCUS opportunities, further updated carbon dioxide storage potential and set out pathways to use captured CO_2.

Global opportunities

Since 2020, OGCI has published a number of studies detailing the potential for CCUS hubs in Saudi Arabia, China, Texas, California and for the Gulf Cooperation Council.

The studies have evaluated industrial locations for potential hubs, the CO_2 storage potential, economic value to the country and identified and recommended policies that could stimulate development.

This year, reports looked at the potential in Brazil and Egypt. Forthcoming reports will focus on the Asia-Pacific region and India.

Brazil

A joint report with S&P Global found that CCUS hubs in Brazil could help:

- Capture up to 88 Mt of CO_2 per year
- Contribute up to $3.2 billion to Brazil's GDP
- Create 210,000 new jobs
- Help decarbonize Brazil's iron, steel and ethanol industries

"This report shows there's significant potential to develop CCUS hubs in Brazil. The opportunity extends beyond reducing emissions to include the creation of economic value and jobs, while also helping to grow carbon markets as we transition to a net-zero emissions future,"

Ana Paula Santana Musse
OGCI CCUS Workstream Petrobras representative

Utilizing CO_2

In 2024, OGCI published a study on the potential for utilizing captured carbon dioxide in the construction industry as a way to cure cement and as a feedstock to produce some e-fuels.[5]

The joint study with Boston Consulting Group identified key utilization pathways that could help play a role in broader efforts to reduce greenhouse gas emissions.

The report highlighted important technical and infrastructure challenges and said that current regulation, which mostly focuses on supporting capture and/or storage, will need to be expanded to help scale up additional technologies to use the captured CO_2.

5 Carbon capture and utilization as a decarbonization lever, May 2024.

CO_2 storage resource catalogue

The 2024 catalogue update from OGCI, the Global CCS Institute, the International Association of Oil & Gas Producers and Halliburton brings the total number of carbon dioxide storage sites evaluated to 1,272 sites across 54 countries and takes the total aggregated carbon dioxide storage resource to more than 14 Gt.

The analysis indicated substantial storage potential that could facilitate significant progress in CCUS initiatives. However, the commercial readiness of global storage resources is still progressing through technical and commercial reviews and there is a lack of CCUS-specific regulations and policy support in many countries.

Of the global total resource identified, 626.5 Gt is classified as discovered and 3.1 Gt as commercial. Of the 54 countries assessed, only Australia, Canada, Norway, and the US include commercial resource.

The catalogue is an independent worldwide evaluation of geologic CO_2 storage resources. It aims to build a global view of the commercial readiness of CO_2 storage resources in key markets.

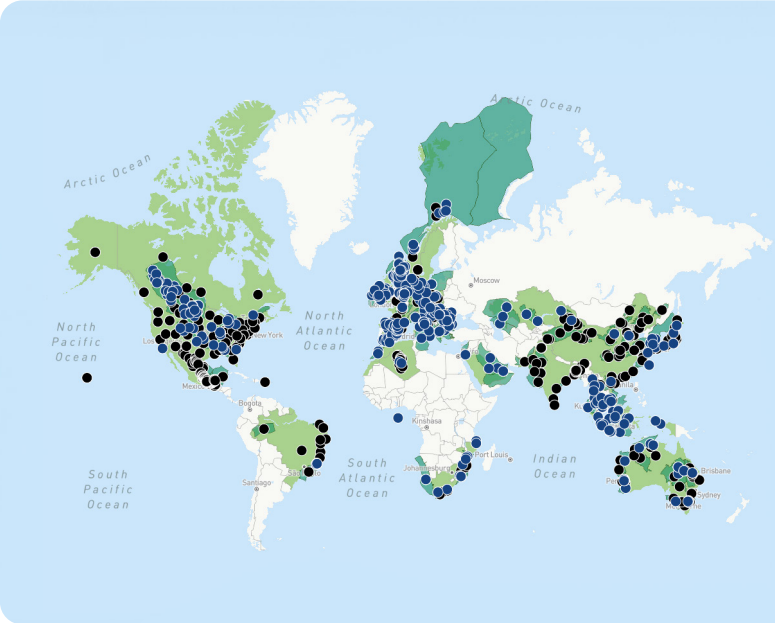
The CO_2 storage resource catalogue is an on-going project that will include six update cycles with evaluations from a different group of countries or regions each year.

The long-term aim is for the catalogue to include all regions and to be self-sustaining, meaning that project developers and researchers can input their own storage resource assessments.

CCUS Hub Playbook update

In 2023, OGCI updated the CCUS Hub Playbook, a step-by-step best practice guide for regulators, emitters and CO_2 transport and storage operators seeking to capture and use carbon dioxide in industry at scale.

The update adds sections on policy incentives by country, an overview of how different hard-to-abate sectors are using CCUS and latest CCUS hub trends in the US, Europe and Asia-Pacific.



CO_2 storage catalogue evaluates global potential storage

Country Basin Formation specified Sites

Technical lessons

OGCI launched a new section on the CCUS Hub platform in 2023, focused on helping technical experts access and make use of detailed documentation from early movers to help accelerate the pace of CCUS deployment.

The section sets out lessons learned from leading hubs and projects and shares vital information on assessing and mitigating potential mechanical and process risks that could slow the development of a CCUS project.

The first piece covers the East Coast Cluster – a project to develop a CCUS hub located in a major industrial area in the UK – and focuses on storage issues and the technology development required for scale up.

See CCUS hub to learn more.

Reducing emissions from transport

Decarbonizing transport is critical to achieve net zero. The transport sector emits almost a quarter of total energy-related CO_2 emissions.[6]

To help reduce emissions in transport, OGCI aims to add value by using member companies' extensive expertise producing and supplying reliable transport fuels, including liquid and gaseous fuels for transport, that result in fewer emissions when combusted than traditional fossil fuels.

This expertise can be leveraged to support the development of alternatives such as biofuels, and synthetic fuels, ammonia and methanol for shipping, recognizing that no single solution will work across the different transport sectors – rather a range of solutions is required.

To build a foundation, OGCI has worked on a ground-up examination of the opportunities and challenges of using alternative liquid fuels in existing engines, focusing on biofuels, methanol and ammonia, and synthetic fuels, either on their own or blended.

OGCI has also explored innovative technologies like carbon capture and storage for shipping and studied the use of hydrogen for transport.

These studies have provided an understanding of the fuels, potential demand, sustainability, safety measures and infrastructure that would be required, focusing primarily on hard-to-abate transport sectors such as shipping, aviation and heavy-duty trucking.

The technologies and solutions in these areas are mostly proven and feasibility studies have already demonstrated that it is technically possible to use alternative fuels. The missing piece of the puzzle is deployment at scale.

OGCI is currently working to identify and remove the barriers to facilitate the deployment, scale up and successful commercialization of a range of lower emission fuels. Collaborative work across industries and value chains will be critical to achieving success in this area.

Alternative fuels

Biofuels
Can be used in most vehicles

E-fuels
Can be used in most vehicles

Hydrogen
Can be used in light- and heavy-duty vehicles and airplanes

Ammonia and methanol
Can be used in shipping

Credit Adobe Stock

6 See IEA global CO_2 emissions by sector: Global CO_2 emissions by sector, 2019-2022 – Charts – Data & Statistics - IEA; CO_2 Emissions in 2022 – Analysis - IEA

Progress in 2023-2024

Shipping

- To help advance the use of bio-blended fuels in shipping, OGCI is working with companies in the value chain, including bio-oil producers, shipping companies, engine manufacturers, and standardization organizations, that can start testing the minimum amount of upgrading appropriate for such fuels to be used.
  - This would provide a framework for the market, helping to drive growth.
  - The coalition is expected to be up and running this year.
- The first phase of an OGCI-commissioned study looking at ammonia and methanol as fuels for deep-sea shipping has indicated potential for the two fuels. The next stage of work will evaluate regulatory and operational hurdles.
- The Onboard Carbon Capture project OGCI worked on with a consortium of companies and organizations[7] found that carbon capture systems retrofitted on a recently built medium-range tanker could reduce net CO_2 emissions by as much as 20% per year. See key findings here.
- To bring down the costs and facilitate the deployment/scale up of onboard carbon capture, OGCI and the Global Centre for Maritime Decarbonisation (GCMD) are looking at ways to bolster port infrastructure to offload, distribute and use CO_2 captured on a vessel.
- As part of a two-year partnership agreement to work on a range of solutions to help reduce emissions in the shipping industry, OGCI and GCMD are also focusing on energy efficiency to reduce emissions, fuels such as ammonia, methanol and biofuel blends, and onboard carbon capture pathways.

Aviation

- OGCI is working with the Coordinating Research Council's (CRC)[8] Sustainable Mobility Committee to analyse the potential sources of captured carbon dioxide which could be used to make e-fuels.
- The study, which is expected to be published in 2025, will help identify technological gaps and suggest areas and opportunities for OGCI and the CRC to support the development of e-fuels.
- This will help enable the broader deployment of these fuels in regions such as the EU, which has mandated an increasing share of synthetic aviation fuels (requiring captured CO_2) to be put on the market.

Trucking

Hydrogen has been proposed as a replacement fuel in the heavy-duty trucking sector and can be used in both fuel cells and internal combustion engines.

- OGCI has been exploring the challenges of distribution and supply of hydrogen at scale.
- Hydrogen hubs receive regional and national support world-wide for further development.
- Although some emerging hubs will focus on local production, a number will require substantial volumes of imported hydrogen.
- OGCI has been evaluating how demand will be met for hydrogen from a range of sectors, including transportation, where it could be included as a potential pathway to lower emissions for trucking.

7 Consortium included Stena Bulk, The Netherlands Organization for Applied Scientific Research, the Global Centre for Maritime Decarbonisation, Alfa Laval, ABS, Lloyd's Register, Deltamarin Ltd and Seatrium.

8 The CRC is a scientific research group that includes automotive manufacturers, API members and other organizations who work together to address problems of mutual interest.

Natural climate solutions

Natural climate solutions (NCS) are complementary solutions in the energy sector decarbonization pathway.

They do not substitute the need to avoid, reuse, reduce and recycle greenhouse gas emissions. They can however contribute to greater ambition now and in the future as global energy systems are transformed, since not all emissions can be abated.

OGCI supports national strategies, policies, and initiatives that aim to scale up the use of high-quality NCS and focuses on initiatives that help ensure that natural climate solutions are used responsibly.[9]

Progress in 2023–2024

Supporting NCS scale up in Brazil

A core pillar of OGCI's NCS strategy aims to support capacity-building efforts in natural climate solutions to help accelerate the adoption of high-quality NCS credits.

A key enabler to scale high-integrity carbon credits is nesting, which harmonizes accounting guidelines for GHG emissions reductions from avoided deforestation.

Currently, local states in Brazil and project developers use different methods to assess avoided deforestation, which can lead to double counting and undermines the integrity of credits generated.

REDD+ refers to reducing emissions from deforestation and forest degradation, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries. Given the importance of NCS in Brazil, and the reach of OGCI member companies, OGCI has partnered with IETA, a non-profit business group focused on enabling the use of high-quality carbon credits to achieve climate goals, to harmonize private, high-integrity NCS projects and support the growth of NCS markets in the Brazilian Amazon.

In an effort to promote alignment and harmonization between private projects and jurisdictional REDD+ programs this partnership, known as ALMA Brasil, will conduct technical analysis and dialogue to support the state of Para in northern Brazil to develop an effective nesting framework that enhances the credibility and integrity of the voluntary carbon market.

A rainforest community near Belem in Brazil's Para state.

IETA
INTERNATIONAL EMISSIONS TRADING ASSOCIATION

ALMA Brasil
ACCELERATING LAND-USE MITIGATION IN THE AMAZON

9 OGCI Position Paper on Natural Climate Solutions.

CHAPTER 4

OGCI Performance Data 2023

OGCI Performance Data 2023

OGCI has been collecting third-party reviewed aggregated emissions data from our member companies and publishing the data in our annual Progress Report since 2017.

Our Performance Data includes oil and gas production, greenhouse gas emissions (operated and equity), operated upstream carbon intensity, methane emissions and intensity, flaring, and investment and R&D in low-carbon technologies. Published data and percentages are rounded. Dollars in this report are USD.

- See Reporting Framework for definitions and methodology.
- See table notes for reporting scope and boundary.
- All reported data is the aggregate for 12 companies, (unless otherwise stated in the tables), and independently verified by EY.[1]

Key takeaways

Seven years of data show that OGCI member companies are making progress reducing greenhouse emissions from oil and gas operations under their control and increasing investments in the low-carbon technologies and solutions that will be needed for a net zero emissions future.

Greenhouse gas emissions

Since 2017, OGCI's collective Scope 1 greenhouse gas emissions from operated assets have decreased 19% and upstream carbon intensity has decreased 21%.

Methane emissions

Since 2017, OGCI's upstream methane intensity and total methane emissions – upstream and across all sectors – are more than 50% lower. Over the same period GHG emissions from upstream flaring have decreased by 47%.

Production

In 2023, OGCI's members produced 26% of global oil and gas on an operated basis,[2] while the group's aggregate Scope 1 and 2 emissions represented approximately 13% of the global oil and gas industry's total.[3]

Low-carbon investment

In 2023, OGCI member companies' cumulative investment since 2017 in low-carbon technologies,[4] including acquisitions and research and development, totalled $95.8 billion.

1 One member company has been unable to submit audited performance data in time for the publication of the 2024 Progress Report and 2022 data for that company has been used in place of the 2023 data. Data for 2023 will be updated as needed in the next annual Progress Report, which is expected to be published in the fourth quarter of 2025.
2 Provisional estimate of global oil and gas production of approximately 165 Mboe/day in 2023, based on IEA indicators for oil production of 97.8 Mboe/day and global natural gas production of 67.3 Mboe/day. OGCI member companies' share of total oil and gas production is 26.2% on an operated basis. Source: IEA Oil Market Report (January 2024), IEA Gas Market Report Q1 2024.
3 Total Scope 1 and 2 oil and natural gas-related emissions on an operated basis. IEA: Emissions from Oil and Gas Operations in Net Zero Transitions, OGCI Performance Data.
4 Low-carbon energy technologies include but are not limited to wind, solar and other renewable energies, carbon-efficient energy management, CCUS, blue and green hydrogen, biofuels, synfuels, energy storage and sustainable mobility.

Production

43.3 Mboe/day
Total operated oil and gas production in 2023

26%
Of global oil and gas production in 2023

34.9%
Share of natural gas in operated portfolio in 2023

In 2023, aggregate operated oil and gas production from the 12 OGCI member companies was 1% lower year-on-year at 43.3 Mboe/day. OGCI member companies operated 26% of global oil and gas production in 2023.[5]

Factors including divestments, reclassification of an LNG asset from operated to non-operated and reduced demand and sales, offset an increase in oil and gas production across some companies.

Oil production decreased 1% compared with the previous year, while gas production was 3% lower.

Production trends across the companies was mixed. In 2023, oil production was slightly lower on the year as divestments and lower demand and sales at some companies offset an increase in production at other companies from new wells, fields and stronger demand.

Gas production was lower mostly due to planned shutdowns for maintenance, repair and upgrades, divestments and the reclassification of an asset to non-operated.

OGCI indicators	Units	2017	2018	2019	2020	2021[I]	2022[I]	2023
Total OGCI oil production (operated)	M boe / day	29.8	29.9	29.7	28.4	27.9	28.4	28.2
Total OGCI gas production (operated)	M boe / day	15.2	15.7	16.1	15.1	15.6	15.5	15.1
Total oil and gas production (operated)	M boe / day	45.0	45.6	45.8	43.5	43.5	43.9	43.3
Share of natural gas in operated portfolio	%	33.8	34.3	35.2	34.7	35.9	35.3	34.9
Total oil and gas production (equity)	M boe / day	42.5	42.4	42.9	41.6	41.1	41.7	41.0

Notes:
I. 2021 and 2022 data restated

Greenhouse gas emissions (operated)

17.9 kgCO_2e/boe
Upstream carbon intensity in 2023

-21%
Upstream carbon intensity
2023 vs 2017

575 Mt CO_2e
Total operated GHG emissions (Scope 1) in 2023

OGCI's member companies are making good progress towards the group's 2025 collective upstream carbon intensity target of 17 kg/boe.

In 2023, OGCI's collective upstream carbon intensity fell to 17.9 kg/boe, a 1% decrease compared to the previous year.

This brings the total reduction in carbon intensity since 2017 to 21%.

In 2023, OGCI members' aggregate Scope 1 greenhouse gas (GHG) emissions at operated assets from all sectors (including upstream and downstream) was 575 Mt CO_2e.

5 Provisional estimate of global oil and gas production of approximately 165 Mboe/day in 2023, based on IEA indicators for oil production of 97.8 Mboe/day and global natural gas production of 67.3 Mboe/day. OGCI member companies' share of total oil and gas production is 26.2% on an operated basis and 24.8% on an equity basis. Source: IEA Oil Market Report (January 2024), IEA Gas Market Report Q1 2024.

This is a 3% decrease compared to the previous year and a 19% decrease since 2017.

OGCI members aggregate Scope 1 operated GHG emissions of 575 Mt CO_2e represents 1% of global greenhouse gas emissions, using latest 2022 data from UNEP'S Emissions Gap Report published in 2023.[6]

Scope 1 upstream GHG emissions fell by 2% over the year (and a total of 23% since 2017), due to methane emissions reductions, energy efficiency investments, projects to reduce carbon emissions in exploration and production, and divestments.

Scope 2 upstream operated GHG emissions were up 3% over the year due to factors including the addition of a refinery to 2023 data, an increase in production and acquisitions and an increase in specific emissions factors for electricity.

Overall since 2017, Scope 2 upstream operated GHG emissions decreased 9%.

Downstream, which accounts for around half of OGCI member companies' aggregate Scope 1 greenhouse gas emissions, has shown slower progress than upstream, reflecting the complexity and longer timelines of emissions reduction efforts in refineries.

OGCI indicators	Units	2017	2018	2019	2020	2021[V]	2022[V]	2023
Upstream Carbon Intensity[I]	kg CO_2e / boe	22.7	22.1	21.3	20.4	19.2	18.1	17.9
Total operated greenhouse gas emissions - all sectors (Scope 1)[II]	$MtCO_2e$	709	687	684	633	621	590	575
of which upstream GHG emissions (Scope 1)[III]	$MtCO_2e$	362	349	343	311	298	282	277
Upstream operated greenhouse gas emissions (Scope 2)[IV]	$MtCO_2e$	41.4	43.5	43.7	39.4	38.2	36.7	37.7

Notes:
I. This is the key performance indicator for OGCI's upstream carbon intensity target. It includes upstream carbon dioxide and methane emissions, both Scope 1 and 2, on an operated basis. It excludes emissions from gas liquefaction and gas-to-liquids.
II. This figure includes direct (Scope 1) emissions of carbon dioxide, methane and nitrous oxide (for those companies that report it) from all operated activities (upstream as well as downstream, which includes refineries and petrochemicals). The methane emissions were converted to CO_2 equivalent using a 100-year time horizon global warming potential (GWP) of 25 for fossil-based methane as per IPCC AR4. Using the IPCC AR6 GWP of 29.8, the operated greenhouse gas emissions were 595 $MtCO_2e$ in 2022 and 580 $MtCO_2e$ in 2023.
III. Upstream activities comprise all operations from exploration to production and gas processing (up to the first point of sale), including LNG liquefaction plants if located before the first point of sale.
IV. Scope 2 emissions were not calculated in a homogenous way across companies, with some using a location-based and others a market-based methodology.
V. 2021 and 2022 data restated.

Greenhouse gas emissions (equity)

575 Mt CO_2e
Scope 1 equity GHG emissions in 2023

84 Mt CO_2e
Scope 2 equity GHG emissions in 2023

0.88 Mt CH_4
Total equity methane emissions in 2023

This is the second year we are publishing equity emissions, in line with OGCI's ambition of greater transparency.

Equity reporting includes emissions from assets owned, even where they are operated by partners.

In 2023, total greenhouse gas emissions on an equity basis for Scope 1 and Scope 2 were 575 Mt CO_2e and 84 Mt CO_2e respectively.

In 2023, total Scope 1 equity GHG emissions fell by 3% compared to the previous year. Scope 2 equity emissions increased by 1% due to reductions in energy attribute certificates and the rise in emissions factors for certain national electricity mixes.

Total methane emissions on an equity basis were 0.88 Mt of methane in 2023, a 6% decrease compared with the previous year.

6 Total GHG emissions excluding LULUCF was 57.4 Gt CO_2e in 2022, UNEP's latest Emissions Gap Report published in 2023, p. XVI.

OGCI indicators	Units	2021[I]	2022[I]	2023
Total equity GHG emissions Scope 1	$MtCO_2e$	562 (10)	596 (11)	575 (11)
Total equity GHG emissions Scope 2	$MtCO_2e$	69 (10)	83 (11)	84 (11)
Total equity CH_4 emissions	$MtCH_4$	1.13 (10)	0.94 (10)	0.88 (10)
Equity CH_4 emissions – Upstream	$MtCH_4$	1.09 (10)	0.90 (11)	0.83 (11)

Notes:
I. 2021 and 2022 data restated.

Methane emissions (operated)

0.14%
Upstream methane intensity in 2023

-54%
Upstream methane intensity
2023 vs 2017

-55%
Total operated upstream methane emissions
2023 vs 2017

OGCI members reported an aggregate upstream operated methane intensity of 0.14% in 2023, a 5% decrease year-on-year and 54% lower compared with 2017.

OGCI members had already achieved their collective methane intensity target of well below 0.20% in 2021 – four years early.

In 2023, total operated upstream methane emissions were 0.89 Mt CH_4. This represents a 7% decrease compared with 2022 and a 55% decrease versus 2017.

The year-on-year reduction is mainly a result of continued equipment and system upgrades, improved flaring controls, continued leak detection and repair, and improved calculation methodologies. Divestment of assets also played a role for some companies.

The upstream sector accounted for around 90% of OGCI total methane emissions in 2023. Venting and fugitive leaks accounted for over almost 70% of total upstream methane emissions.

OGCI member companies are striving to reach near zero methane emissions from their operated assets by 2030. They are sharing what they are learning about detection, measurement and abatement across the industry.

OGCI indicators	Units	2017	2018	2019	2020	2021[III]	2022[III]	2023
Upstream Methane Intensity[I]	%	0.3	0.25	0.23	0.21	0.17	0.14	0.14
Total operated methane emissions - upstream	$MtCH_4$	2.0	1.70	1.60	1.30	1.16	0.96	0.89
Total operated methane emissions - all sectors[II]	$MtCH_4$	2.1	1.90	1.70	1.40	1.25	1.02	0.97

Notes:
I. This is the key performance indicator for OGCI's 2025 upstream methane target of well below 0.20%. It includes total upstream methane emissions from all operated gas and oil assets. Emissions intensity is calculated as a share of marketed gas.
II. This figure includes relevant operated activities (upstream, refineries, petrochemicals, power generation, etc, where these are operated by the company).
III. 2021 and 2022 data restated.

Flaring (operated)

-45%
Upstream flaring intensity
2023 vs 2017

-53%
Total routine flared gas upstream
2023 vs 2018

-47%
GHG emissions from upstream flaring
2023 vs 2017

OGCI member companies continued to reduce flaring volumes and related greenhouse gas emissions from flaring in 2023, in line with their ambition to end upstream routine flaring and achieve near zero methane emissions from operated oil and gas assets by 2030.

In 2023, upstream flaring intensity increased by 1% year-on-year as volumes of natural gas flared upstream were little changed on the previous year partly due to non-routine flaring events for safety reasons. Overall, upstream flaring intensity in 2023 is 45% lower than the 2017 baseline.

In 2023, GHG emissions from upstream flaring were 4% lower than in 2022 as non-routine flaring events for safety reasons partially offset flaring reduction projects, a divestment and the start up of an LNG plant in 2022.

In 2023, total routine gas flared volumes in upstream fell 10% compared with the previous year due to flaring reduction projects.

Total routine gas flared volumes upstream were 53% lower in 2023 than in 2018 – the first year of published data for this metric.

Some of the reduction since 2018 was attributed to improved production practices, such as flaring reductions for targeted assets, flare gas recovery systems, gas compression and capture projects.

Since 2017, greenhouse gas emissions from upstream flaring have decreased by 47%.

OGCI indicators	Units	2017	2018	2019	2020	2021[II]	2022[II]	2023
Upstream Flaring Intensity[I]	Mm^3 / Mtoe	10.8	9.5	9.2	7.6	7.4	5.8	5.9
Total natural gas flared - Upstream	Mm^3	24,221	21,465	20,998	16,490	15,998	12,775	12,705
Total routine gas flared – Upstream	Mm^3	/	5,636 (10)	4,871 (10)	4,250 (11)	4,165	2,926 (11)	2,627 (11)
Flaring greenhouse gas emissions - Upstream	$MtCO_2e$	62	57	55	44	42	34	33

Notes:
I. Upstream flaring intensity is calculated on the basis of the volume of gas flared per millions tonnes of oil equivalent produced on an operated basis.
II. 2021 and 2022 data restated.

Investment and R&D in low-carbon technologies

$95.8 billion
Total low-carbon investment
since 2017

$29.7 billion
Low-carbon investment at a record in 2023

+15%
Low-carbon investment
2023 vs 2022

+17%
R&D spend
2023 vs 2022

In 2023, aggregate low-carbon investment, including acquisitions and R&D totalled a record $29.7 billion. This represents a 15% increase compared with the previous year.

Renewable energy accounted for more than half the investment. Meanwhile, companies reported more organic investment in these types of projects compared to the previous year, which was characterized by large acquisitions.

Investment in CCUS continued to grow with some companies concentrating on the technology as part of their strategies to reduce emissions.

R&D spending on low-carbon technologies increased 17% in 2023 versus the previous year to $2 billion and comprised over a third (35.4%) of total R&D spend.

Since 2017, OGCI member companies' cumulative investment on low-carbon technologies and projects, including investment, R&D and acquisitions, amounted to $95.8 billion.

OGCI indicators	Units	2017	2018	2019	2020	2021[I]	2022[I]	2023
Total spent in low carbon projects (sum of total spent in low carbon projects and acquisitions of low carbon activities)[II]	$ billion	4.7 (10)	5.5 (10)	5.6 (10)	6.8 (11)	13.3 (10)	24.2 (11)	27.7 (11)
of which acquisitions	$ billion	0.3 (5)	1.0 (5)	1.1 (9)	1.6 (9)	7.7 (9)	13.2 (10)	7.1 (9)
R&D expenditures on low carbon technologies[II]	$ billion	0.7 (9)	1.0 (9)	1.0 (9)	0.8 (11)	1.3 (11)	1.7 (11)	2.0 (11)
Low-carbon R&D as a share of total R&D spend	%	19.0 (9)	15.0 (9)	15.0 (9)	11.7 (10)	17.3 (11)	30.2 (11)	35.4 (11)

Notes:
I. 2021 and 2022 data restated
II. Low-carbon energy technologies include but are not limited to wind, solar and other renewable energies, carbon-efficient energy management, CCUS, blue and green hydrogen, biofuels, synfuels, energy storage and sustainable mobility.
III. R&D spending is additional to investment.

Abbreviations

Mboe/day Million barrels of oil equivalent per day

$kgCO_2e/boe$ Kilograms of carbon dioxide equivalent per barrel of oil equivalent

$MtCO_2e$ Million tonnes of carbon dioxide equivalent

$MtCH_4$ Million tonnes of methane

Mm^3 Million cubic metres

OGCI and EY data consolidation and review process

Since 2016, OGCI has been working with EY & Associés (EY), as an independent third party, to collect and check data consistency, and guarantee the confidentiality of member companies' data.

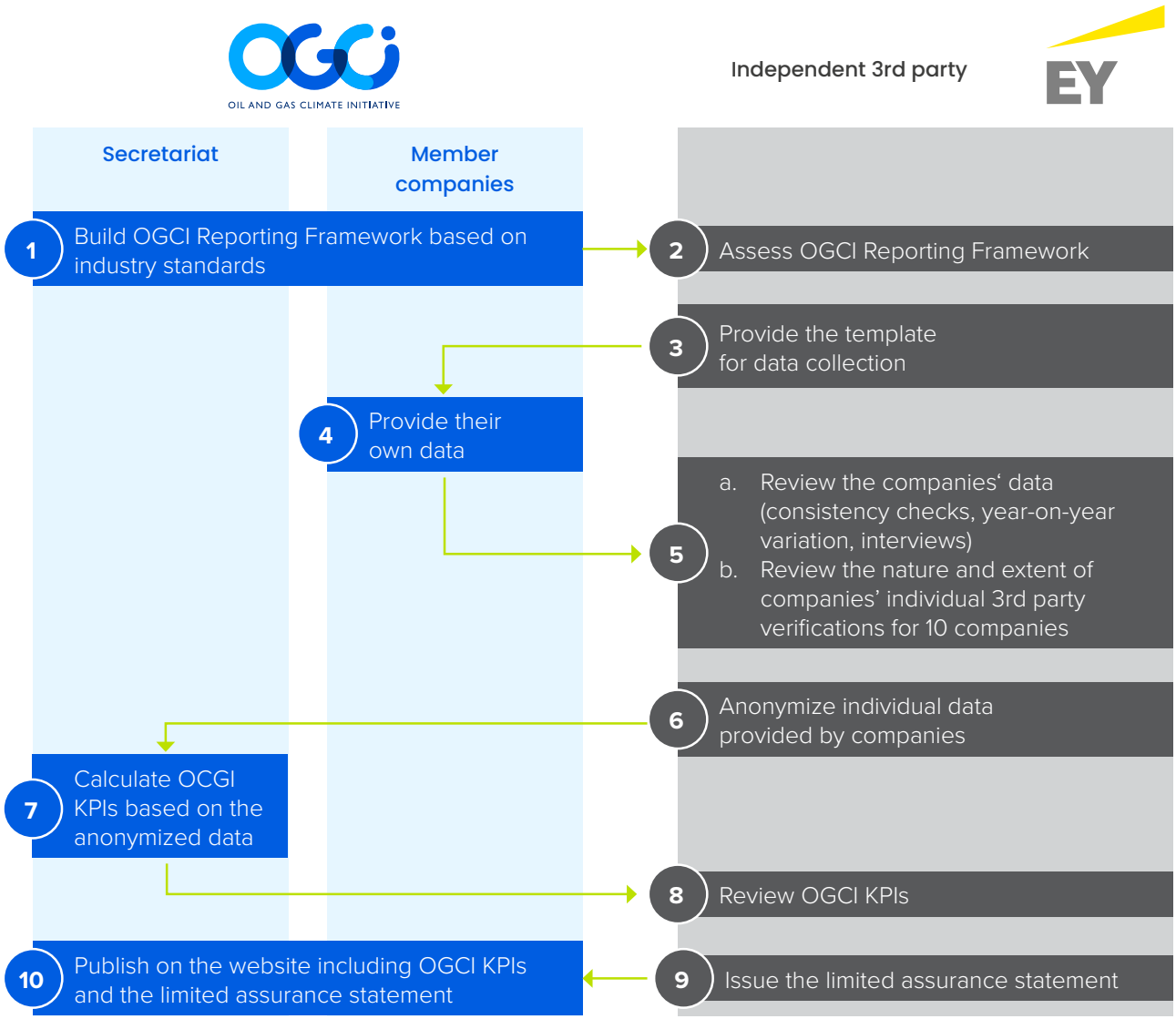
We developed together with EY an innovative process, applicable to both listed and state-owned national oil companies, to aggregate information about the level of third-party assurance that member companies apply individually into OGCI data reporting.

Most OGCI member companies already ensure that data reported to OGCI are independently verified. This additional step confirms that OGCI data, as well as information about third-party data assurance, are consolidated, reviewed and challenged in order to increase the reliability of the aggregate data we publish.

Since 2020, we have worked with EY to develop and implement a verification process for a selection of our aggregate data.

EY's statement this year covers nine of OGCI's 12 members.

Our process for data consolidation and review



Independent verifier's report on a selection of indicators for calendar year ended December 31, 2023

We have been engaged by OGCI Climate Investment LLP's, on behalf of OGCI, to perform a 'limited assurance engagement,' as defined by International Standards on Assurance Engagements, here after referred to as the engagement, to report on a selection of OGCI indicators (the "OGCI indicators") detailed in Appendix 1 contained in OGCI performance data for the year ended December 31, 2023.

Basis for Qualified Conclusion

We had access to the nature and extent of third-party verifications conducted at company level on member-company data for only 10 companies out of the 12 OGCI member companies (representing 59% of the "Operated greenhouse gas emissions – all sectors (Scope 1)" and see Appendix 1 for other OGCI Indicators). For the 2 other companies (representing 41% of the "Operated greenhouse gas emissions – all sectors (Scope 1)" and see Appendix 1 for other OGCI Indicators): either the company independent third party declined/was unable to provide the sufficient level of information on time, or the regulatory timing was not matching OGCI timing to enable the production of the relevant documentation on time.

Qualified Conclusion

Based on our work, described in the "Nature and scope of work" section of this report, except for the possible effects of the matters described in the Basis for Qualified Conclusion paragraph, nothing has come to our attention that causes us to believe that the OGCI Indicators are not presented, in all material respects, in accordance with version 3.7 of the OGCI Reporting Framework dated March 2024.

Emphasis of matter

We draw attention to Notes 7.2, 7.3 and Appendix C of the OGCI Reporting Framework and to the OGCI Progress report which describe that:

- Companies can use, for the reporting of GHG emissions, the same methodology approach used for their public reporting of GHG emissions in other relevant documentation (e.g. Annual Report, Sustainability Report, etc.)
- For methane indicators, several methods of quantification are possible.
- Upstream Scope 2 emissions were not calculated in a uniform way across companies, with some using a location-based and others a market-based methodology.
- One member company has been unable to submit audited performance data in time for the publication of the 2024 Progress report and 2022 data has been used in the place of 2023 data.

Our conclusion is not qualified in respect of this matter.

Understanding how OGCI has prepared the OGCI Indicators

The absence of a commonly-used-generally-accepted reporting framework or a significant body of established practice on which to draw, evaluate and measure sustainability information allows for different, but acceptable, measurement techniques that can affect comparability between entities and over time. Consequently, the OGCI Indicators needs to be read and understood together with the OGCI Reporting Framework version 3.7 dated March 2024, which OGCI has used to prepare the OGCI Indicators.

Responsibility of OGCI

As part of this voluntary approach, it is the responsibility of OGCI to:

- disclose the OGCI Reporting Framework version 3. 7 dated March 2024, available on OGCI's website;
- consolidate the anonymized member companies' data and ensure their consistency;
- publish the consolidated OGCI Indicators on OGCI's website.

Responsibility of OGCI's member companies

As part of this voluntary approach, it is the responsibility of OGCI's member companies to report to OGCI their data according to the OGCI Reporting Framework version 3.7 dated March 2024, to arrange external verification in accordance with OGCI and EY criteria and to provide EY with a summary of the nature and details of the verification performed on their data at member-company level, together with associated findings.

Independence and quality management

We have maintained our independence and confirm that we have met the requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, and have the required competencies and experience to conduct this assurance engagement.

EY also applies International Standard on Quality Management 1, *Quality Management for Firms that Perform Audits or Reviews of Financial Statements, or Other Assurance or Related Services engagements,* which requires that we design, implement and operate a system of quality management including policies or procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Responsibility of the independent verifier

Our responsibility is to express a conclusion on the presentation of the OGCI indicators based on the evidence we have obtained.

We conducted our engagement in accordance with the *International Standard for Assurance Engagements Other Than Audits or Reviews of Historical Financial Information* ('ISAE 3000 (Revised)') and with professional standards applicable in France. Those standards require that we plan and perform our engagement to express a conclusion on whether we are aware of any material modifications that need to be made to the OGCI indicators in order for it to be in accordance with the OGCI Reporting Framework version 3.7 dated March 2024, and to issue a report. The nature, timing, and extent of the procedures selected depend on our judgment, including an assessment of the risk of material misstatement, whether due to fraud or error.

We believe that the evidence obtained is sufficient and appropriate to provide a basis for our limited assurance conclusions.

It is not our responsibility to give an opinion on the entire annual report or on the compliance of the OGCI Indicators with applicable legal provisions.

Nature and scope of the work

Procedures performed in a limited assurance engagement vary in nature and timing and are less in extent than for a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed. Our procedures were designed to obtain a limited level of assurance on which to base our conclusion and do not provide all the evidence that would be required to provide a reasonable level of assurance.

We conducted the work described below:

- We assessed the suitability of the OGCI Reporting Framework version 3.7 dated March 2024 in terms of its relevance, comprehensiveness, reliability, neutrality and understandability by taking into consideration the best practices of the oil and gas industry.

- We conducted the following work related to consistency and arithmetical accuracy of member companies' data reported by 12 OGCI member companies with the OGCI Reporting Framework dated March 2024:

  - assessment of the appropriate application of the OGCI Reporting Framework version 3.7 dated March 2024 to the member-company data;
  - analysis and investigation of member-company data value change in 2023 compared to 2022 (except for one company);
  - calculation of consistency ratios and investigation to identify potential outliers among member-company data.

- We conducted a reconciliation between member-company data and publicly-available information.

- We assessed the nature and extent of third-party verification conducted at company level on member-company data against the following topics (hereafter the "Criteria") through the collection of supporting evidence and interviews with the external third parties of member companies, based on the following:

- level of assurance,
- work program,
- assurance standard,
- audit findings,
- Scope 1 operated emissions coverage reached with site level verifications,
- physical site visits,
- remote site visits,
- total man days allocated to the verification,
- third party team members' competencies.

- We conducted interviews with 12 OGCI member companies.

- We reviewed the consolidation performed by OGCI on the anonymized member-company data.

We consider that the work we have performed by exercising our professional judgment allows us to express a limited assurance conclusion; an assurance of a higher level would have required more extensive verification work.

Paris-La Défense, November 13, 2024

EY & Associés
Partner, Sustainable Development
Christophe Schmeitzky

Percentage of OGCI Indicators considered as reviewed by an external third party and for which the third-party verification work has been shared with EY

OGCI indicators	OGCI Indicators value in the 2023 annual report	Percentage of 2023 OGCI Indicators considered reviewed[I] by an external third-party	Percentage of 2023 OGCI indicators for which the third-party verification work has been shared with EY
Operated greenhouse gas emissions – all sectors (Scope 1)	575 $MtCO_2e$	84%	59%
Operated greenhouse gas emissions – upstream (Scope 1)[I]	277 $MtCO_2e$	87%	68%
Operated greenhouse gas emissions – upstream (Scope 2)[II]	38 $MtCO_2e$	95%	46%
Operated methane emissions - all sectors	1.0 $MtCO_2e$		
- verified as part of operated greenhouse gas emissions – Scope 1		89%	44%
- verified as a standalone indicator		26%	26%
Operated methane emissions – upstream[III]	0.9 $MtCO_2e$		
- verified as part of total operated GHG emissions – Scope 1		89%	42%
- verified as a standalone indicator		24%	24%
Natural gas flared – upstream[IV]	12,705 MMSm3	86%	80%
Flaring greenhouse gas emissions – upstream[IV]	33 $MtCO_2e$	84%	79%

Notes:

I. An indicator is considered as "reviewed" if it was published in a publicly available document and if it was covered by an opinion or conclusion statement provided by an external third party or was reported to a governmental authority and available to the public. None of the opinion/conclusion statements consulted contained any qualification. Only limited and reasonable assurance levels of opinion have been considered.

II. The sum of "Operated greenhouse gas emissions – upstream (Scope 1)" and "Operated greenhouse gas emissions – upstream (Scope 2)" indicators correspond to the numerator of the carbon intensity indicator.

III. Operated methane emissions" indicator is considered reviewed if "Operated methane emissions – upstream" are reviewed, as methane emissions mainly occur in upstream activities. "Operated methane emissions" and "Operated methane emissions – upstream" are not automatically considered as reviewed if only the "Greenhouse gas emissions - all sectors" are reviewed (as methane emissions generally represent a minor fraction of total greenhouse gas emissions).

IV. All indicators are operated. "Operated greenhouse gas emissions – upstream (Scope 1)", "Operated greenhouse gas emissions – upstream (Scope 2)", "Natural gas flared – upstream" and "Flaring greenhouse gas emissions – upstream" indicators are considered reviewed if the "Greenhouse gas emissions - all sectors" are reviewed, as they are part of the overall greenhouse gas emissions review.

CHAPTER 5

Climate Investment

Founded by OGCI

Climate Investment – a unique investor focused on oil & gas and energy-intensive industries

Climate Investment (CI) is an independently managed, specialist decarbonization investor founded by members of the OGCI.

At CI, we are striving to deliver more than 100 Mt CO_2e of greenhouse gas impact per year by 2030 through our portfolio of investments and market adoption of their innovations across our network of investors and global partners.

We invest in companies directly addressing the decarbonization challenges faced by energy-intensive industries, providing operators around the world with targeted, cost-efficient solutions for their businesses. We work with our portfolio companies to find routes to market and to date, CI has facilitated over 185 market deployments – 42 of which were completed last year.

Industrial companies and institutions also invest directly or as co-investors with CI to share more widely in the impact and commercial success of our portfolio technologies. Both OGCI members and non-OGCI companies invest with CI and our model of exchanging insights with our investors enables us to learn from one another's experiences, as well as identify the technologies that we believe can deliver material carbon emissions impact.

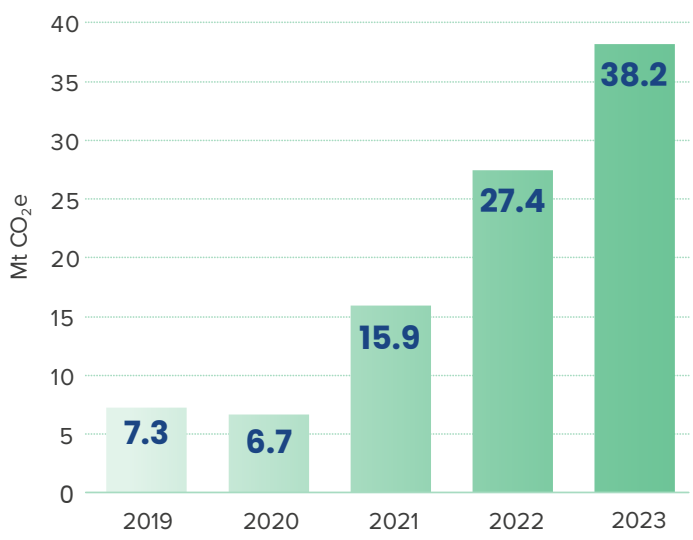
We focus on allocating capital to where the emissions are most acute; closing the gap between innovators and adopters to support the deployment of new technology; and annually quantifying impact to track progress against our targets.

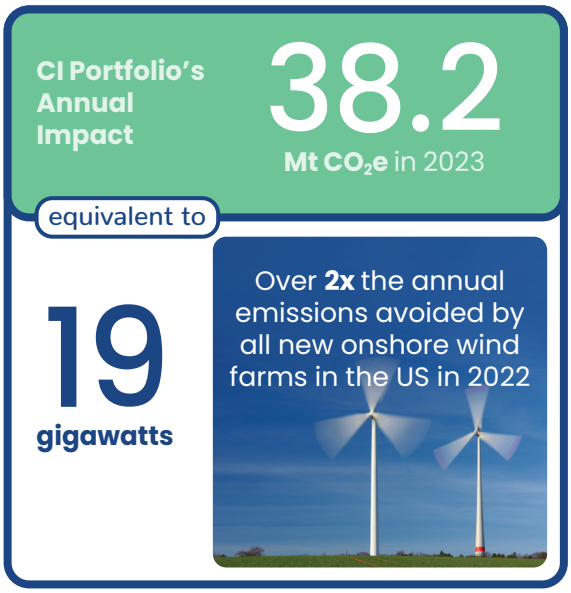
Since our formation eight years ago, we have built a portfolio of 40 companies with innovative products and services, operating in the energy systems, transport, buildings and industry sectors. Over half of the portfolio is invested in technologies that are directly relevant to oil & gas operators.

In 2023 CI's Catalyst Fund 1 (CF1) portfolio delivered 38.2 Mt CO_2e of impact, our strongest year yet. For perspective, this impact is the equivalent to over twice the annual emissions avoided by all new onshore wind farms in the US in 2022. Since 2019, our portfolio has delivered over 95 million tonnes of CO_2e of GHG impact, more than the annual emissions of New Zealand.

CI's portfolio exposure to technologies addressing emissions from energy systems, as well as its 2023 impact delivery are market leading, both in absolute terms, but especially when considering impact per dollar of assets under management.

Annual Portfolio Impact (2019–2023)





New investments

In 2023, we made seven new investments in CF1 and supported our existing portfolio through eleven follow-on investments. New investments made during 2023, together with those made since the year-end are summarized below.

CF1 is now approaching the completion of its investment period, and has initiated its first portfolio exits, with two now complete - Elk Hills Carbon LLC and NextDecade.

Please see our Impact Report 2023 and visit our website for details.

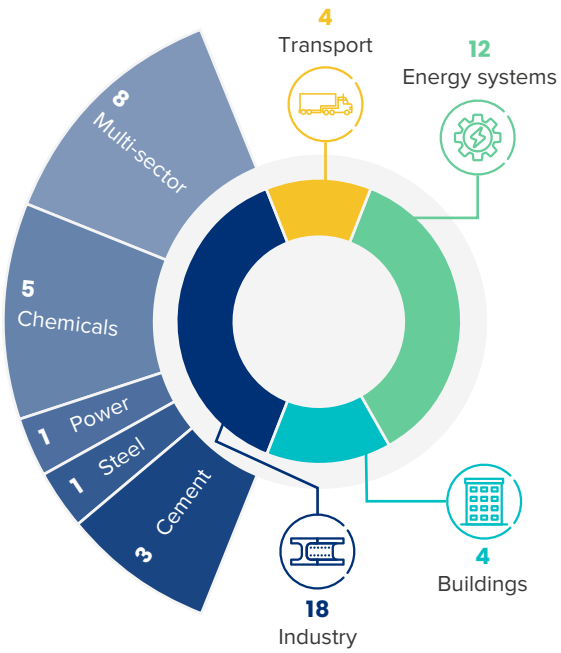
2023

7 new investments

11 follow-on investments

$1.3 billion Assets Under Management

Catalyst portfolio by sector 2023



Energy Systems

ICA-Finance develops projects that reduce methane and flare emissions from oil and gas infrastructure.

SensorUp offers a comprehensive methane management platform for oil and gas operators.

Trace develops, builds, and manages carbon capture, transportation, sequestration facilities.

Transport

Zum provides fully electrified, carbon neutral transportation equipped with vehicle-to-grid technology.

Industry

44.01 removes CO_2 from the atmosphere and uses a carbon mineralization process to turn it into rock.

Carbon Upcycling Technologies (CUT) captures and utilizes CO_2 emissions to transform low-value industrial waste materials into high-performance building products.

Cyclic Materials is creating a circular supply chain for rare earth elements (REEs) and other critical materials.

Fero Labs' industrial AI enables producers of steel, cement, and chemicals to make more efficient production decisions.

Buildings

Aeroseal's air-sealing technologies for HVAC duct work and building envelopes increase commercial and residential energy efficiency, and can be adapted for adjacent applications such as gas pipes.

Gradient Comfort develops advanced, streamlined air-source heat pumps for window installation in urban apartments.

LuxWall makes glass-based transparent thermal insulation solutions to reduce energy consumption and carbon emissions from buildings.

Providing solutions for systems-level industrial decarbonization

CI takes a systemic approach to search for impact, looking across full value chains. This is because the levers for maximum impact may lie in unexpected places, for example, in the design of the product or its means of transportation to market. This requires knowledge and time, and it is why CI stands out as a truly differentiated investor. Our team has over 500 years of aggregate investing, technology development and market deployment experience across the different sectors we invest in.

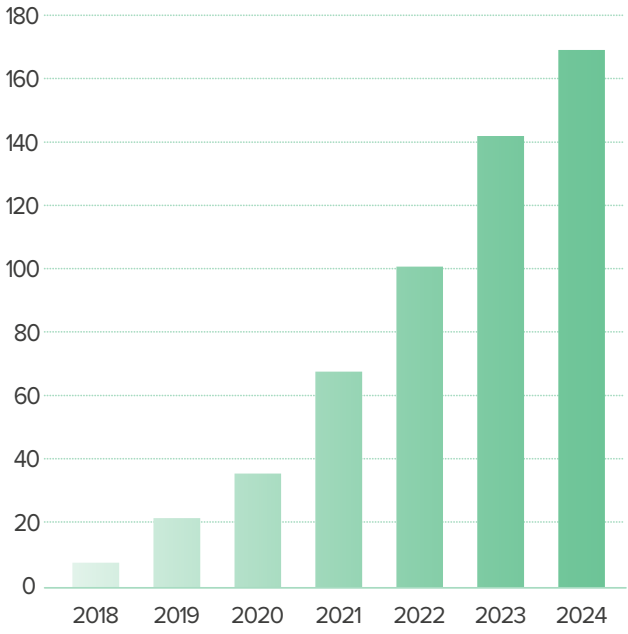
We believe that what we offer continues to be hard to replicate, making CI an attractive co-investor partner for other climate-focused funds as well as new investees.

As our portfolio companies mature, their need for new forms of capital is increasing. In response, Climate Investment established a growth equity strategy during 2023, which focuses on more established, growth-stage opportunities and which complements our venture capital strategy. We perceive attractive investment, impact and deployment opportunities for global operators and industrial corporations from both strategies.

Partnerships with OGCI member companies

Identifying market gaps and collaborating to address them underpin our unique model, and we have been pleased to see collaboration and investment across sectors. Supplementary to their investment in CI funds, OGCI members have co-created or have co-invested in almost one-third of our CF1 portfolio companies.

Cumulative Deployments with OGCI Member Companies



*Data as at October 2024.

The connection between CI and OGCI continues to drive exciting results for our portfolio companies and OGCI members. As climate impact successes emerge, the investment and deployment pipeline of opportunities expands with more mature companies seeking out partners to invest in and deploy their technologies. We look forward to showcasing such opportunities to a broader group of industrial companies. We have shared some examples of deployments between CI portfolio companies and OGCI members.

GHGSAT

A prominent example of partnership with OGCI member companies is the OGCI Satellite Monitoring Campaign. Earlier in 2024, OGCI published the latest results of this campaign with CI methane portfolio company, GHGSat. The campaign conducted more than 530 high-resolution observations, targeting oil and gas sites in Algeria, Kazakhstan, and Egypt and resulted in the successful mitigation of three persistent methane emissions sources, which with an average rate of 3,200 kg of CH_4/hr, could have amounted to approximately 1 Mt CO_2e annually if left unabated. The cost of detecting these emissions was found to be below $2 per tonne of CO_2e.

Some deployment case studies

In addition to securing several strategic acquisitions designed to further advance market adoption in the U.S., Aeroseal announced a Memorandum of Understanding (MoU) with **Aramco**. The MoU with Aramco, which is a co-investor in **Aeroseal** alongside its CF1 investment, is part of an initiative with American companies to achieve net zero greenhouse gas (GHG) emissions by 2060. The MoU was signed in the presence of Minister of Energy for the Kingdom of Saudi Arabia, HRH Prince Abdulaziz bin Salman al Saud, and US Secretary of Energy, Jennifer Granholm.

Following a successful trial of Aeroseal's duct and air sealing technologies, Aramco and Aeroseal agreed to explore opportunities to accelerate the deployment of Aeroseal's technology. As part of this program, they will also explore commercializing the technology in new applications, such as gas pipelines.

Specializing in advanced methane detection, localization and quantification, using a direct open cavity measurement through a global network of drone service providers, **SeekOps'** partnership with **bp** began in 2018 to manage fugitive emissions in the U.S.

Recognizing SeekOps' consistent, accurate measurements, bp expanded the partnership globally. SeekOps now provides actionable, year-round data across bp's onshore and offshore facilities, aiding OGMP 2.0 compliance and emissions reduction.

After five years of successful audits, bp broadened the collaboration to include regular, multi-site emissions surveys across its global upstream assets, reflecting bp's confidence in SeekOps' technology for transparent OGMP 2.0 reporting and rapid emissions abatement.

The **SensorUp** investment originated from a strategic collaboration between CI, BCG and **Occidental.** Occidental was an early adopter of several methane detection technologies but identified significant value in managing all methane data together in a single application. Occidental, an early adopter of methane detection technologies, saw the value in managing methane data in one application and became a design partner. SensorUp's platform helps operators like Occidental understand their methane emissions landscape, centralizing data for regulatory compliance and insights into the root causes of emissions. Occidental has deployed SensorUp across 5,500 sites, 21,000 wells, and 22,000 miles of pipeline and is expanding use across its enterprise. SensorUp recently launched "Powered by SensorUp" and is working with Open Geospatial Consortium on the EmissionML standard, further promoting inter-operability and adoption between industry-wide partners, such as CI portfolio company Insight M.

Read about our portfolio of new and existing investments and their impact progress in CI's Impact Report 2023 and on the CI website.

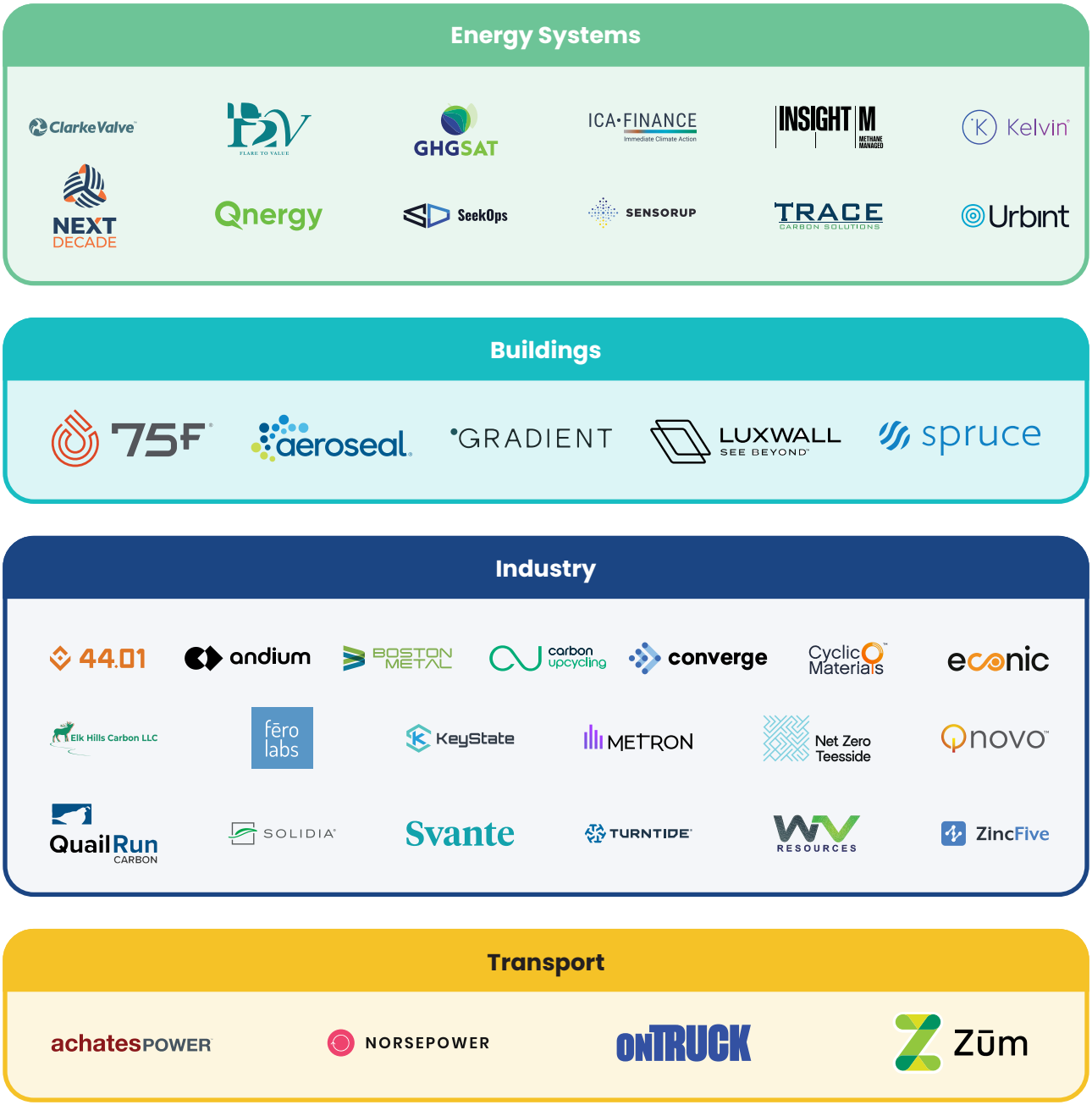
Looking forward

Across the CI portfolio we are focused on one overriding concern: is there a way for us to scale faster?

With their technology proven in home markets, CI portfolio companies are forging partnerships in new markets with both OGCI and non-OGCI companies that can help them propel their growth. These companies are demonstrating that CO_2 emissions can be addressed quickly through innovation across sectors and geographic markets.

There are many cost-effective GHG abatement solutions which we can scale today and CI's focus in 2024 is to build on the momentum that has gathered pace since COP28. We are proactively engaging with our global partners to bring the capital and commercial opportunities to enable those solutions to reach further and faster.

Join us in our mission.



OIL AND GAS CLIMATE INITIATIVE

About OGCI

The Oil and Gas Climate Initiative is a CEO-led organization bringing together 12 of the world's largest oil and gas companies to lead the industry's response to climate change.

It aims to accelerate action towards a net zero emissions future consistent with the Paris Agreement.

OGCI members are Aramco, bp, Chevron, CNPC, Eni, Equinor, ExxonMobil, Occidental, Petrobras, Repsol, Shell and TotalEnergies.

Together, OGCI member companies represent almost a third of global oil and gas production.

OGCI members set up Climate Investment a $1 billion-plus fund that invests in companies, technologies and projects that accelerate decarbonization in energy, industry, built environments and transportation.